L'insertion des jeunes dans les agricultures familiales enjeux, impacts et prospective. Le cas du Cambodge

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INTEGRATION OF YOUTH INTO SMALLHOLDING AGRICULTURE: CHALLENGES, IMPACTS AND PROSPECTS: PERSPECTIVES FROM CAMBODIA.

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INTEGRATION OF YOUTH INTO SMALLHOLDING AGRICULTURE: CHALLENGES, IMPACTS AND PROSPECTS: PERSPECTIVES FROM CAMBODIA.

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ABSTRACT

The objective of this doctoral dissertation is to look at the factors that determine the decisions of youth and their parents regarding youth occupation and thereby to understand the conditions for integrating youth into family farming.

In the context of developing countries, there are increasing concerns that the younger generations may lose interest in farming, since this is likely to threaten global food security in the long-term. The increasing importance of migration and non-farm activities to rural livelihoods in developing countries has raised a scholarly debate about whether smallholder farming holds a potential for the youth in the future at all. However, especially in a Southeast Asian context, there are only very few available studies concerned with understanding the options for and the decisions of youth and their parents regarding youth occupation and farm integration.

The present dissertation addresses this research gap by drawing on primary data from a fieldwork in Cambodia. Cambodia is home of smallholder rice-based farming, and the country experiences rapid population growth. There is therefore a huge need to ensure young peoples' livelihoods and incomes either through their integration in the labour market, or in smallholder farming.

The fieldwork took place in Cambodia's Otdar Meanchey low-density area and Takeo high-density area in 2012 and 2013. Within these two provinces, the fieldwork covered five districts (18 villages). The main purpose of the fieldwork was to understand the current and potential future role of family farming in accommodating young people. The data collection methods included questionnaire surveys, semi-structured and focus group interviews, participant observation, and a case study of an NGO (CEDAC) driven youth-integration-in-farming program. A typology of farming systems and strategies was developed for the survey and discussion.

The dissertation shows that due to low levels of education, the rural youth in Cambodia has few alternatives other than to rely on smallholder rice farming or migrate. Though acknowledging that farming is hard work, rural youth and households do not disregard farm work, and they actually do consider family farming as one of their main options. However, when having engaged in farming even with support from CEDAC, many of the young people experience that farming cannot sustain them and their families. It is therefore common that they re-consider whether they should stay in and/or leave farming, or diversify by seasonal migration.

Further, the results indicate that integrating youth into farming is purely a family decision. Settling in new pioneer areas is one of the household strategies to get access to new land and thereby secure the children's future. Only in situations where plots of land are too small to get sub-divided, households tend to invest in children's higher education. Given that non-farm activities cannot accommodate the growing number of active workers and that land, due to population increase, will have to be sub-divided for families even below the minimum threshold of sustainable living, the study concludes that the future livelihood of children must be secured under the motto of *"sharing the survival*" or "*Chék Khear Ros"* i.e., by combining both farming and non-farming activities.

The growth of the population in the rural areas of Cambodia, together with the slower pace of job development in the secondary and tertiary sectors, suggest that in the future, more land for cultivation will be needed most likely at the expense of forest and wetland. There will, therefore, be a need for redefining the land tenure systems in the country. One option could be to distribute land from cancelled economic concessions to rural families. There is also a need for further studies of integration programs in Cambodia under social land concessions, which is the existing legal framework for providing access to land for poor people to see if they are still part of the solution.

While existing studies mainly explain ways in which people been quitted farming based on push/pull factors and personal cost benefit, this study applied institutional change theory as process of problem solving to explain this question: problems that Cambodian smallholder agriculture face in their farming system become "a shared mental model "or "a shared rule" among family member and its social group that motivate them to act spontaneously or deliberately such as whether they should stay in and/or leave farming, or diversify by seasonal migration. This study is the first exploration the question of youth and family farming in Cambodia which could be interest for others country having similar context.

Key words: Rural youth, rural livelihood, small holding farming, family farming, integration in farming, Cambodia.

RÉSUMÉ

L'objectif de cette thèse de doctorat est d'examiner les facteurs qui déterminent les décisions des jeunes ruraux cambodgiens et de leurs parents concernant la profession des jeunes. In fine, nous cherchons à comprendre les conditions d'intégration de la jeunesse cambodgienne dans l'agriculture familiale.

Dans les pays en développement, le désintérêt croissant des jeunes générations pour l'agriculture pose problème car cette tendance risque de menacer la sécurité alimentaire mondiale à long terme. L'importance croissante que prennent la migration hors-village et les activités non agricoles dans les stratégies de subsistance des ménages ruraux a soulevé un débat sur le rôle que pouvait jouer l'agriculture familiale dans l'avenir des jeunes ruraux. Pourtant, il existe très peu d'études traitant des décisions relatives à la profession des jeunes dans le secteur agricole.

Cette thèse de doctorat contribue à combler cette lacune à partir de données primaires issues d'un travail de terrain au Cambodge. Le secteur agricole cambodgien est composé d'exploitations familiales qui reposent sur des systèmes rizicoles et le pays connaît également une croissance démographique rapide. De ce fait, assurer les moyens de subsistance et les revenus des jeunes, par leur intégration dans le marché du travail ou dans l'agriculture paysanne, représente un enjeu essentiel pour le pays.

La collecte de donnés a eu lieu en 2012 et 2013 dans deux zones distinctes du Cambodge: la zone à faible densité de population d'Otdar Meanchey et la zone à forte densité de Takeo. Dans ces deux provinces, le travail de terrain a couvert cinq districts (18 villages). L'objectif principal du travail de terrain était de comprendre le rôle actuel et potentiel de l'agriculture familiale pour l'emploi des jeunes. Les méthodes de collecte de données comprenaient des enquêtes, des entretiens semi-directifs, l'observation de participants et une étude de cas portant sur un programme d'intégration de jeunes agriculteurs porté par une ONG (CECAC). Une typologie des systèmes et stratégies agricoles a été développée pour l'enquête et la discussion.

La thèse montre qu'en raison du faible niveau d'éducation, les jeunes ruraux au Cambodge ont peu d'alternatives à la petite riziculture ou à la migration en dehors de leur village d'origine. Tout en reconnaissant le fait que l'agriculture est un travail difficile, les jeunes ruraux et leurs ménages ne négligent pas le travail agricole et considèrent l'agriculture familiale comme l'une de leurs principales options. Cependant, lorsqu'ils se sont engagés dans l'agriculture, même avec le soutien du CECAC, de nombreux jeunes ont l'impression que

l'agriculture ne leur permet pas de subvenir à leurs besoins et à ceux de leur famille. Il est donc fréquent qu'ils se posent la question de savoir s'ils doivent poursuivre une activité agricole ou s'ils doivent diversifier leurs sources de revenu par une migration saisonnière.

De plus, les résultats indiquent que l'intégration des jeunes dans l'agriculture est une décision purement familiale. S'installer dans de nouvelles zones pionnières est l'une des stratégies des ménages pour accéder à de nouvelles terres et ainsi garantir l'avenir de leurs enfants. Ce n'est que dans des situations où les parcelles sont trop petites pour être subdivisées que les ménages ont tendance à investir dans l'éducation supérieure des enfants. Étant donné que les activités non agricoles ne pourront pas accueillir le nombre croissant de travailleurs actifs et que le foncier, en raison de l'augmentation de la population, tendra à être subdivisée en parcelles de plus en plus petites qui ne pourront garantir un revenu durable, l'étude conclut que les futurs stratégies de subsistance des ménages ruraux devront reposer sur le principe de *«partage de survie»* ou *«Chék Khear Ros»*, c'est-à-dire combiner des activités agricoles et non agricoles.

La croissance de la population rurale cambodgienne et le ralentissement de la croissance du marché du travail dans les secteurs secondaire et tertiaire, suggèrent qu'à l'avenir, plus de terres seront nécessaires pour l'agriculture et que ceci se fera au détriment des forêts et des zones humides. Il serait donc nécessaire de redéfinir les régimes fonciers du pays. Une option pourrait être de distribuer les terres des concessions économiques qui ont été récemment annulées aux familles rurales. Il est également nécessaire de poursuivre l'évaluation des programmes de redistribution de terres entrepris dans le cadre des concessions foncières sociales, politique qui constitue le cadre juridique existant pour permettre aux pauvres d'accéder à la terre.

Alors que les études existantes cherchent principalement à expliquer l'abandon d'activités agricoles à partir de facteurs push / pull et de calculs coûts/bénéfices individuels, cette étude a mobilisé la théorie du changement institutionnel et la manière dont elle conceptualise les processus de résolution de problèmes pour traiter cette question. Les problèmes rencontrés par les petits agriculteurs cambodgiens sont alors conceptualisés comme «des modèles mentaux partagés» ou «des règles partagées» entre les membres de la famille et le groupe social. Ces règles influencent leurs décisions spontanées ou délibérées comme celle de continuer ou quitter l'agriculture, ou de diversifier leurs stratégies de subsistance par une migration saisonnière. Cette étude constitue une première tentative d'analyser la question de la jeunesse et de l'agriculture familiale au Cambodge et pourrait être répliquée dans d'autres pays ayant un contexte similaire.

Mots clés : Jeunesse rurale, moyens de subsistance ruraux, petite exploitation agricole, agriculture familiale, intégration dans l'agriculture, Cambodge.

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ABBREVIATIONS

2R	2 Cycle of IR rice, IR is name of rice variety
3R	3 Cycle of IR rice
AC	Annual Crops
CEDAC	Centre d'Etude et de Développement Agricole Cambodgien
CPP	Cambodian's People Party
CR	Common Resource
CS	Cropping System
CT	Cattle
DK	Democratic Kampuchea
DR	Water receding rice or dry season rice
ER	Early season rice/short cycle rice
FT	Fruit Tree
FUNCINPEC	Front Uni National pour un Cambodge Indépendant, Neutre, Pacifique, et Coopératif in French or National United Front for an Independent, Neutral, Peaceful, and Cooperative Cambodia in English.
GLF	Group Learning Facilitator
GO	Gross output
GV	Gross Value
GVA	Gross value added
HR	Heavy Season rice or late season rice
IC	Intermediary Cost
IC	Intermediate cost
KPNLF	Khmer People's National Liberation Front
KR	Khmer Rouge
LPV	Land Potential Value
LVI	Land Value Index
MOLINAKA	Mouvement National de Libération du Kampuchea
MSI	Minimum Surface land for sustainable Integration in farming
OMC	Otdar Meanchey province
PB	Prey Kabas, the studied district of Takeo province
PG	Pig
PL	Paid Labor
PL	Paid labor cost
PRK	The People's Republic of Kampuchea
PT	Poultry
SRI	System Rice Intensification
TK	Takeo province, or Tram Kak district the study district
UNTAC	United Nations Transitional Authority in Cambodia
VA	Value Added
VG	Vegetables
VN	Viet Name/Vietnamese
YAE	Young Agricultural Entrepreneur

CHAPTER 1 IS FAMILY FARMING AN OPTION FOR FUTURE YOUTH EMPLOYMENT IN CAMBODIA?

1.1 Problem of the study

Youth unemployment and underemployment have become a major issue in most developing countries (Bennell, 2007, p. 2). Given that 55% of youths reside in rural areas globally, agricultural improvement by turning small farms into productive and profitable organizations seems at least one of the possible solutions to youth employment issues (Dixon, Gulliver, & Gibbon, 2001; The World Bank, 2007). However, smallholder farming has been neglected in many of developing countries in terms of policy intervention and support especially since the structural adjustment program (Ellis & Biggs, 2001)

The change in rural areas with respect to demography, diversity and globalization of national economy has impacts on cultural values and ideologies of household economic behavior Migration as a central part of rural livelihoods has implied that an increasing number of rural households have no commitment to farming (Ellis & Freeman, 2005; Rigg, 2006). This new tendency has opened up a debate on rural development policy, and whether it should continue to center on agricultural development. Some scholars argue that policies need to be completely rethought with a new focus on non-farm activities. (Ashley & Maxwell, 2001; Chang, 2009; Rigg, 2006). Others, however, argue that there are still only limited possibilities for supplying non-farm activities to the growing youth in the least developing countries and that it is therefore still necessary to look at small-holder farming as a potential solution when dealing with rural youth unemployment (Bennell, 2007).

Although smallholding agriculture currently is the biggest source of employment in developing countries, evidence show that youth loses interest in farming (Hall, Hirsch, & Li, 2012; White, 2011, 2012). Recent studies from African countries show that youth view agriculture as an hard, inferior, and dirty work (Bennell, 2007). The declining number of youth who are willing to take up farming signifies a generational issue which should be of global concern, since it can have grave adverse impact on regarding global food security (Proctor & Lucchesi, 2012). But, to what extent is smallholder farming actually able to accommodate young people if they want to settle in farming? What factors contribute to keep them work on farm or move away from farm? And what kind of intervention to be considered for youth integration project? This doctoral dissertation aims to explore answers to these questions in the context of Cambodia.

1.2 Farmer exclusion and job creation

The new emerging problem is not just only the structural problem within farming sectors but it is also about the farmer exclusion from job creation in farming resulted from the global market integration. The more the countries integrate into the global market, the more farmers are being distracted from the already degraded small-scale farming.

Macroeconomic development policy by the World Bank assumed full employment and put it into equations. Agricultural sector is often considered as a primary sector that can provide labor force for the development of secondary and tertiary sectors for economic development processes (d'Orfeuil, 2012). By doing so, we will get more land per people and increase productivities per unit of land in order to overcome the challenging need for food of 9 billion human beings while maintaining environmental services as well as to provide job in the field. However, such a policy seems to yield counterproductive consequences as it encourages peasant evictions and apparently ignore the fact that agriculture is still the biggest source of employment for developing countries where its industrial sectors are poorly developed. Hence, the globalization via market integration would otherwise evict peasants in the integration process and there could be about two billion peasants to be pushed out of farming (d'Orfeuil, 2012).

A relatively recent analysis by d'Orfeuil (2012) has outlined a number of factors that could contribute to maintaining 40% of global peasants in a poverty trap and exclude them from the job market. One main factor is the disequilibrium of job demand and supply. Globally, people working on agriculture accounts for about 40% of human jobs. This number is varied and largely concentrated on poor countries as 93% in Bhutan and Burkina Faso, 64% for China, 59% for Cambodia, 3% for France, and 1.7% for the United State of America. The global market integration implies urbanization and transfer of labor forces from agricultural to industrial sectors. But few poor countries have revolutionized their industrial sectors to such an extent that these sectors can absorb the growing labor forces. A second main factor is the eviction of peasants from farming due to limiting their access to resource i.e. land and market, often a result from liberalized trade, integrated agricultural markets, real estate markets, sanitary standards which create very unequal competition. Hence, the more the poor country becomes integrated in globalization, the more people will be excluded to existing poverty trap and to new exclusion from job market and eviction from the farms. This process is seriously accumulated around the city of the south countries for example between 1993–2002, the poor has been fell by 150 million in rural areas but been risen by 50 million in urban areas. Hence,

economic growth, urbanization helped reduce poverty globally (Ferreira & Ravallion, 2008; Ravallion, Chen, & Sangraula, 2007).

There is a high risk of double exclusion. The first exclusion is the unbalanced labor market and shortage of job which are the result of demographical growth. The second exclusion is job destruction process which excludes peasant from their land and job markets due to market integration and very unequal competition.

The doctoral study gives an overview on the experience from Cambodia in order to see if Cambodia would be one of cases of the global problem as an Asian country which will sooner or later be integrated into ASEAN regional economic community. The following section will discuss the structural constraint of smallholding farming.

1.3 Smallholder farming: structural constraints

A global economic crisis is likely to increase youth unemployment and job creation recovery would be a very challenging effort (ILO, 2011). That is why youth unemployment is considered as one of the world major problems since the 1960s, however, youth development remains a negligence in many developing countries (ILO, 2006).

While rural sectors of developing countries are dominated by smallholding agriculture and plays a vital role in economy, the agricultural sector faces a number of serious challenges (P. B. R. Hazell, 2005). In addition to technical constraints, such as declining productivity, and structural constraints, such as limited investment on research and dissemination, smallholding, poor institutional support and weak governance, farmers not only have to face unfavorable markets and high competition, they also have to face the complex social and economic issues arising from the growth of population to be accommodated. Although there are high levels of urban unemployment and/or under-employment, rural out-migration is still continuing because there is a greater per capita earning in urban than in rural areas. One of the reason has been explained by Goldsmith, Gunjal, and Ndarishikanye (2004) that it is because of the degrading economic conditions of the rural sector (Goldsmith et al., 2004). Recent study by d'Orfeuil (2012) has added another glue for rural out migration that it is the outcome of global labor market exclusion of peasant from farming.

Beside unemployment i.e. serious underemployment is also matter. Number of unpaid family workers continue to increase in rural area (ILO, 2011, p. 21). Policy measures which aim at targeting urban labor investments such as micro-credit measures could worsen

the situation in that it could create even greater incentives for rural out-migration and thereby increase more unemployment and underemployment in urban areas (Goldsmith et al., 2004). Dealing with unemployment alone is not enough. The unemployed youth are mainly better-educated from urban area who can engage in job search. But rural youth are under the serious underemployment in the low productivities particularly household-based activities. It is better to focus on livelihood improvement of the most disadvantaged youth rather than focus solely on unemployment (Bennell, 2007, p. 4).

Given that about half of the world's populations , whose livelihood depends on smallholder farming, are poor and living in rural area, the key to move them out of poverty must rely on the improving farming (Dixon et al., 2001). This can be done by turning small farms into productive and profitable organization (The World Bank, 2007). It might increase value added to agricultural product in the agricultural value chain and then create more on-farm, off-farm and non-farm jobs in rural communities. Then, the pressure coming from the rapid population growth could be reduced by those new job creations. This notion is known as small farming led-growth model which is considered to potential to contribute to sustain economic development and poverty reduction in developing countries.

The recent debate is centered on the rapid transformation in the rural south in terms of household economic behavior, particularly changing cultural values and ideologies that call for less emphasis on small-holding family farming but should rather focus on development of non-farm activities (Rigg, 2006). The positive manner in terms of delivering higher incomes, more resilient livelihoods and higher standards of living drive non-farm activities becoming central to rural livelihoods and drive number of rural households to no longer have commitment toward farming (Rigg, 2006). As earlier mentioned, it is found that rural youth are now increasingly disinterested in smallholder farming and view that farm activities are inferior and dirty work (Bennell, 2007, pp. 4-5). Therefore, one should not underestimate the capacity of the global labor market that provides work and remittances to sustain rural life and to cope with the crisis. With the suggestion to rethink the development approach, Rigg (2006) concludes that we can no longer assume that small farmers are better off than landless laborers, tenants are in a better position than owner-occupiers, agriculture and farming are the desired default positions of rural households, parents desire a settled and farming life for their children. And no longer should we assume that agricultural development is the best way to promote rural development, and that rural development is the best means of raising rural incomes and improving livelihoods (Rigg, 2006). This analysis show completely different perspective from what d'Orfeuil (2012) provocative call which has given me an impressive

spectrum of thinking to examine the case of Cambodia with regards to youth, employment and family faming in Cambodia.

1.4 Cambodia: demographic, employment and agrarian-nexus

In Cambodia, about 80% of the country's 14 million people resides in rural areas. Their predominant occupation is subsistence farming based on annual rice cropping plus other natural resources dependence (McKenney & Prom Tola, 2002; Bhargavi Ramamurthy, Boreak Sik, Per Ronnås, & Hach Sok, 2001a).

From the 1980s until the 2000s the population doubled at a growth rate of 2.5%. Large numbers of young people enter the labor force as a result of a baby boom in the 1980s (McKenney & Prom Tola, 2002).Existing research shows that people who are 24 years old or younger accounts for 60 % of the entire population (CDRI 2007)[4]. Each year, about 275,000 young people enter the job market (ILO, 2007). If the pattern of employment in the agricultural sector remains the same, which is approximately 59% of the total labor force (Bhargavi Ramamurthy, Boreak Sik, Per Ronnås, & Hach Sok, 2001b; Theng, 2009), the agricultural sector will have to accommodate more than 162,250 young people seeking for land in order to make farming their livelihood by every year.

During the 2000s, Cambodia enjoyed the double digit economic growth which was driven by the garment industry, construction and tourism. Agriculture accounted for a huge 59% of employment, compared with 13 % for industry and 27 % for services (Theng, 2009). In 2006, 330,000 workers were employed in the garment industry. They came from the rural areas. More than 90 % were young women. The construction sector offered about 260,000 jobs to young men, while hotels and restaurants together produced 61,000 jobs (CDRI, 2007).

Though employment data in Cambodia is poorly recorded in the country and unreliable for making a complete picture to understand the employment issue of the countries, it is obvious to observe that the current country growth rate of 7% will not be enough to create job for the young growing labor force.

Demographical analysis suggested that Cambodia will have a very long way to go through the job creation issues. Debouvry (2011) predicted that population will continue to growth until year 2020 and stabilize for several years, the population structure will then

[4] If the definition of Cambodian youth is applied, the 30 years old or below account for 65% of the entire population in which 32% were the 15-29 years old labor force. The calculation based on data from NIS (2009)

change to old age structure. According to (2011) by the year 2060, Cambodian population will reach its peak about 18.788 million before its declining in the year afterward. Base on this, we can say that Cambodia will have 8 years more to cope with the rise of population and 48 years for reaching post population transition. However, this is not a sound estimation. Based on the most recent work of Diepart (2016) suggested that the Cambodian demography is well-engage in the demographic transition process and by the year of 2030, the population of Cambodia will reach 18,390,683 people. Based this, 3 million people will be added to rural labor force by the year 2030 (Diepart, 2015a).

In Cambodia, most households are smallholders with less than 2 ha[5] (RGC, WB, & ACI, 2005b). The average marriage age is 24 years old (National Institute of Statistic, 2009). Those whose parents are farmers often receive rice land as a wedding gift to begin their livelihood. The average household size is 4.7 persons per family (NIS, 2009). This implies that less land is available per household for sub-division making the available land capital insufficient for subsistence. Consequently, an increasing number of rural Cambodians migrate to the cities. An agrarian study in Kampong Thom province indicates that the out-migration from the rural community is a result of labor surplus (2010). Those migrants are mainly young and lack employability due to low education and limited training (ILO, 2007).

Cambodian agrarian structure study finds that smallholder agricultural production systems absorb a significant amount of the rural labor force, while the large commercial plantation systems often do not (RGC et al., 2005b). But it seems that the government prioritizes in large scale plantation as evidenced in large scale of land concession (Ngo & Chan, 2010b).

However, a study indicates the pressure on agrarian system of the country which intervolves with migration and settlement in new area. The assessment on scenarios for rural sector in Cambodia shows that the main farming system i.e. terrace farming system accounts for about 70% of the total population. The system has now reached level of saturated density which is no longer possible to support and accommodate more people (Pillot, 2007; Pillot, Fusillier, Pouliquen, Morel, & Yang Saing, 2000). Pillot (2007) estimated that there will be about 1.5 to 4.8 million of people will have to move out of the farm by the year 2020. This figure is considerably high. The analysis of the 2008 population census data indicated two

5 The baseline survey in 1998 indicated that about 20-30% of total population had more land than one ha/household and occupied nearly 70% the total agricultural land, leaving about 10% for the majority who had less than 0.5ha/household (Ramamurthy et al., 2001b)

patterns of internal migration. First is migration from rural to rural area called "agricultural-driven" migration. Second is migration from rural to urban area called" job-seeking migration". This confirms the scenario suggested by Pillot (2007). In addition, the prospects of job creation in rural-non-farm industry seem to be very small though there is a sign of nascent (Acharya, Kim, Chap, & Meach, 2003b). Pillot (2007), in his analysis, suggested that given the fact that the country still enjoys high economic growth rates, agricultural policy regulating employment would yield desirable results in coping with the growth of the young labor force and with pressures on rice terrace farming systems compared to liberal policy.

In the meanwhile, there are not may studies related to rural-rural migration related to agrarian issues. Only after 2010, scholars such as Pilgrim, Ngin, and Diepart (2012), Diepart and Dupuis (2014) began to pay attention to rural-migration from agrarian perspectives. This came from an alarming finding in the 2008 population census which indicates that rural-rural migration accounts for 60 percent total migrants. Hence, this doctoral dissertation is one of the initial scholarly attempts to explore and gather knowledge concerning youth employment and small-holding farming in the country.

The issue of youth integration in Cambodian family farming is quite new to Cambodian research. There is almost no knowledge and experience documented about the county in this topic. First, question of making farming attractive is not systematically researched and documented in the country especially way that Cambodian youth and their family are motivated to do in farming and their perception toward farming apart from traditional practices in the farming activities. In addition, there is insufficient knowledge whether current small farming in Cambodia is profitable enough to bring attractiveness to youth or not. Rural-rural migration is remarkably observed to be a natural dynamic rather than a result from intervention policy. It is obvious that the movement are driven by the agricultural land seeking to settle in new area. But knowledge on role of migration in family farming is not much available. There is also no existing knowledge or study on rural youth and farming. Even (rural-urban) migration are just emergent trend on the Cambodia research arena due to rural out migration and rural in migration are remarkable as shown by National Census in 2008 but what is happening to rural farm structure especially the sustainability of farming in absorption youth is not available.

Acharya et al. (2003b) found that occupation outside of agriculture is emerging only slowly in Cambodia. This is largely due to the country's history (Acharya et al., 2003b). Pillot (2007) suggests that Cambodia should consider employment regulating agricultural policy is a

sound proposition. A study by Kydd and Dorward (2004) reveals that smallholder agricultural based countries are often challenged by weaknesses of institutional environment[6], and, thereby, face serious coordination failure[7]. Hence, the countries require a continuous effort on technical innovation. In this regards, Coordinated Market Economy (CME) approach would be more appropriate than Liberal Market Economy (LME) (Kydd & Dorward, 2004). However, it is very unlikely for Cambodia as so far, the country does not have even general youth employment policy. It will be a very long way to go for regulating employment in farming as Cambodia position itself in a free market economy. In addition, government is more favor in large scale plantation than smallholding farming. This can be seen through large scale economic land concession which is now become most controversial for political discussion and land conflict in the country. Industrial sector remains only garment work, tourism, and construction which are unlikely to create enough job for the growth of young labor force especially the leading in garment industry which faces an uncertainty due to a number of factors. This sector is largely dependent on external markets such as EU and US. If those markets face problem i.e. global financial crisis, then Cambodia will face the problem of cutting down the job in the sector too. Hence, it seems the lesson from this has taught Cambodian government to value agricultural sector. But the lacks of regulating and coordinating policy for agricultural transformation are showing the opposite attention of the government especially in related to land policy. National youth employment policy has not yet been developed but on the process of establishment of consultation and formulation. This means that agricultural employment is not yet in the policy idea. This situation is favorable for peasant exclusion when rural livelihood is not improved and the job creation has no perspective especially when Cambodia has to integrate into labor and agricultural market in ASEAN in the year 2015. Based on the factual analysis by Pillot (2007), growth of young labor force, migration and shortage of employment in the secondary and third sector and agrarian structure of the country suggest that Cambodia is one of the countries that fall into new unheard and unidentified global problem pointed out by d'Orfeuil (2012).

The issue of youth is even more complex when it was put in the regional context integration. Rapid transformation in Cambodia since it becomes a member of ASEAN in term of economic growth, infrastructure development and urbanization, integration into market

[6] The *institutional environment* is the set of fundamental political, social, and legal ground rules that establishes the basis for production, exchange, and distribution, *institutional arrangement* is an arrangement between economic units that govern the ways in which these units can cooperate and/or compete. (Davis & North, 1971)
[7] Coordination defined as effort or measures design to make players within the market system act into a common or complementary way or towards a common goal.

liberalization, institutional improvement such as land law and natural resource management regulation has contributed to the recent agrarian change in Cambodia. Many lands, about 1/5 of the country area, are devoted for economic land concession which is in favor of large scale plantation (UN, 2007). Agricultural land price is rapidly increased due to land expansion, land speculation and land scarcity. This results potential land conflict between local communities, the local elites and the concession company. The investment in farming is become more and more expensive due to high demand for more inputs both technical and managerial knowledge (Dorward, Kydd, Morrison, & Urey, 2004; Wampfler, 2014).

This doctoral dissertation aims at breaking through this complexity to understand conditions for integration Cambodian youth into smallholding-agriculture. By acknowledging that addressing the complexity need multidisciplinary, the study examines the existing theoretical framework explaining the cause of youth to move away from the farm and, thereby, position its self on the institutional economic based on the application concept of institutional change in relation to problem solving and livelihood framework to understand youth integration matter in Cambodia.

1.5 Research questions

1. What lies behind youth and family ‘s decision not to take up the farming activities?
2. To what extend can smallholding farming accommodate youth if they wanted to settle in farming?
3. What factors contribute to keep youth works on farm or move away from farm?
4. What kind of intervention to be considered for youth integration?

1.6 Youth definition applied in the study

According to national youth policy, Cambodia define “youth “as those age between 15 to 30 years old, while international youth definition defined by UNESCO define “youth as those age between 15-24 years old (UNICEF, 2009). The study applies youth definition of Cambodia. However, based on knowledge from the field survey, when taking about youth in farming, this study defines youth or youth couple as people whose ages are between 14 to 35 years old. Adult or adult couple or adult household is defined as people whose ages are above 35 years old.

1.7 Structure of dissertation

This dissertation comprises of five main chapters. Chapter 1 proposes the problem of the study, context of Cambodian and research questions. Chapter 2 consists of 3 parts. Part 1 is reviewing theoretical background concept of institutional economic and institutional change and how its relevant to this doctoral study. Part 2 is about the framework for understanding the issue of successful youth integration in farming. Part 3 is about research methodology and analytical framework.

Chapter 3: "Rural livelihood and smallholding farming: The farm and household economy in rural Cambodia" analyzed the farm production system and its profitability. It was followed by the analysis of household consumption and income sources. By doing this we were able to see that whole picture of farming capacity in generating income for sustaining youth family. The chapter addressed the following question: (1) what type of farming system available in the study area? Does farming generate attractive income? Is the total earning from farming enough to meet household need? What role of non-farm income and remittance from migration?

Chapter 4: "Youth integration in family farming in Cambodia" is to explore the extent to which different farm type and diversity of farm impact on accommodating youth in farming.

Chapter 5: "Institutional dimensions for sustainable youth integration in Cambodian family farming" is dealing with the following question: what are motivations for them to decide to settle in farming? Even with strong support from the project, why youth still quit farming after the project finish? What factors contribute to those who success and failure in business farming initiated by youth with project support? What are role of family and relevant institution facility youth access to farming. The chapter is written based on the interview with CEDAC project staff, interview with youth who succeeded settling in farming, youth who failed to settle, and their parents.

Chapter 6: "The future Prospect of youth integration in family farming in Cambodia" is the synthesis of finding and conclusion of the dissertation.

CHAPTER 2 THEORETICAL BACKGROUND, RESEARCH FRAMEWORK, AND METHODOLOGY

PART I. Theoretical background

The world has reached the conventional consensus on the idea that the economic development should not be solely based on market regulation. Invisible hand of market alone is not enough but it should be an institution that helps regulating and correcting the market to reach efficiency as high as possible. This is because the disappointment of the previous economic explanation i.e. neoclassical economic that is mainly based on the assumption that the economics of exchange is costless and individual can maximize their choice of benefit under the market and price regulation, then market could reach efficient level as the outcome of interaction between market and choice be made by individual. However, in the real word, how people making choice is very much depend on the information availability and their mental capacity to process the information. The limitation of capacity of processing information and the imperfect information drive individual to bear the cost associated with their choice making before to transaction such as searching, monitoring, coordinating etc. When it is costly to transact, it is, then, institution matter. Simply, institution is a human imposed rule of the game to facilitate human interaction in the market economy (North, 1990). Major portion of national economy[8] are devoted to transaction cost. Developing countries are poor as because the economics of exchange bear high transaction cost due to the absence of institution that minimize those transaction costs (North, 1990). In addition, the previous neo-classical economic approaches are frictionless, timeless and tend to be more static than dynamic in explaining the complexity of issues (North, 1990, 2003). This, on the one hand, opens up the gate for transaction cost paradigm in explaining economic development. On the other hand, it requires a body of theory that integrates the three important dimensions of politic, economic and social in explaining the economic development and, therefore, framework of institutional analysis for understanding institutional change is introduced (North, 2003). When transaction cost and roles of institution are widely recognized, it becomes more obvious that the previous economic hypothesis of neoclassical theory is far from the reality. Two mainstreams of economist try to bring economic theory to be more reality.

[8] Taking example of the calculation of transaction costs of the U.S. national economy, transaction cost account for up to more than 45 percent of the national income (Shin, 2005).

First there are the orthodox institutional economists tend to suggest that “economics embedded in the imperfect market where the information is incomplete; thereby it requires some basic necessary institutions to regulate the market”.

Second there are the heterodox institutional economists prefer to take into account the complexity in which the economy is embedded. They argue that the neoclassical economic assumption is far from the reality and, therefore, it should be completely change the economic hypothesis. The suggested hypothesis is that “economic is embedded in social institution”. Probably, it is in this economic hypothesis that North (1987, 1990) has developed a theory of institutional change explaining how the economics of exchange is taking place and functioning in the society. If the economic is place on the social institution, then, one may understand that objective of economic is no longer individual maximization and equilibrium but objective of economic embedded in social institution is to create an incentive behavior for individual for the purpose of economic growth both productive and redistributive of one society. Therefore, institutional change theory can be considered as a grand theory as it provides a whole perspective of how society is evolved and construct the economics of exchange.

2.1 Institutional Economics: Theory of Institutional Change

Addressing the complex issues of understanding reality, one cannot ignore that the issues are multidisciplinary. This study employs institutional economic approach in addressing the question of youth integration into smallholding farming, given that it permits the study to combine economical and sociological discipline. Family farming can be either considered as institution or organization. The institutional change theory is, hence, relevant family farming embedded in social institution. This section, I am going to show that given family farming can be considered as an institution and an organization, the institutional change based on *“the shared mental model”* is relevant in explaining the question of why smallholder farmer quitted their farm.

2.1.1 Concept of Institution

Self-interested behavior embedded in human mind and ignorance, which individuals face when they interact; generate the potential inter-individual conflicts and social interaction issues. Inventing social rules and following the social rules are, hence, the devise for restricting self-interest of all or some member of the society and to better mutual advantage in

exchange process (Mantzavinos, 2001). Therefore, enforcements are the characteristic of the institution.

Motivations derive from self-interest seeking (economic aspect) arise social problem and inter-individual conflict. Social rules and institutions exist as the mean of solving social problem and overcoming the social conflict (Mantzavinos, 2001).

Due to the limits of human cognitive capacity plus the complexity of the environment (social aspect), individuals mobilize their energy only when the new problems arise. They, then, classify the new problems into situation where it is similar to the old existing one that they used to solve. Then it follows the routine.

Institutions exist as rule of the game to stabilize expectation and to reduce uncertainty of agents (Mantzavinos, 2001). Institutions are, therefore, defined as social rules i.e. rules of the game that shape human interaction in the society through mechanism of social control either formal or informal (North, 1990). They are patterns of behavior serving to solve the problem of cooperation and providing the platform for conflict resolution (Mantzavinos, 2001).

Institution is generally referred to every kind of organization. It is necessary to distinguish between institution as rules of the game and organization (or institution) as corporate entity, for example, the bank (Ellis, 1988; Mantzavinos, 2001; North, 1990). Organization as corporate entity is a group of individual so-called collective units characterized by a set of procedural rules that define the coordination of individual members to achieve the common objective or to solve a common problem. When organizations deal with other organizations or with individuals, they are submitted to the general social rules which are equally constrained by general rules of the game. That social rule is called “the institutions” (Mantzavinos, 2001, pp. 83-84).

Mantzavinos (2001) distinguishes formal and informal institutions based on its enforcement agency. Formal institution is enforced by law. Informal institution can be classified into three categories: (1) conventions as self-policing institutions, (2) moral rules with individual as the first party controller and (3) social norms which are enforced by the member of the social group.

2.1.2 Institutional Change theory

Depending on the social-cultural context, individuals have different mental models and capacities to process information. They therefore act differently when making their choice in the economics of exchange (North, 1995; Williamson, 2000).

Because of the economic interest, people will try to maximize its own benefit which is not necessary to add value to the economies at all such as rent seeking, free riding. This could lead to tragedy of the common (Chang, 2010). The act in seeking such personal interest with guile is called "opportunism" (Williamson, 1985, p. 30). Normally, people intended to rationally economization orientation. But since they have limited capacity to make their choice due to the limited "cognitive competence", the situation of behavioral uncertainty arisen. Williamson (1985) calls this "bounded rationality". Based on this "behavioral uncertainty", Williamson views the emergence of institution as a contractual relation. Contractual relation is never perfectly defined; contractual gap is, hence, occurred. Parties involve the relation, devise machinery to "work thing out" that is to invest their specific assets (asset specificity) in order to specialize in the governance structure. Objective is to minimize the transaction cost[9] as well as to safeguard the behavioral uncertainty; finally, alternative mode of organization is defined. This is known as organizational theory.

Williamson's organizational theory is oriented towards industrial firms especially related to the aspect of organization management and contractual interrelation between organization that is it evolves mainly at the institutional design and formal rule (Chavance, 2009, p. 79). In this case, transaction cost framework is often applied in which production cost, governance cost and alternative mode organization are the theme of analysis (Williamson, 1985, pp. 43-63). In addition, according to the four level of institutional analysis, Williamson (2000, p. 597) distinguishes between the institutional environment and institutional arrangements which correspond to informal and formal rules. Since it takes very long time to change informal rules, it would be difficult to conduct a field study at this level. Hence, Williamson tends to analyze the institutional only formal rules. However, Slangen, Loucks, & Slangen (2008, p. 84) observe that there have been many types of cultural shifts during the last one hundred years suggesting that institutional change at this level is not that time dependent. In this regard, it is probably a limitation of Williamson organizational theory

[9] Refer to the costs for running the economic system.

if the informal rule is taken into account. Instead, I will consider North's theory of institutional change.

Due to socio-cultural factors, people are influenced by the system of belief, ideology and other aspects of behavior such as a form of altruism and self-imposed standard of conduct. This will influence their choices (North, 1990, pp. 20-25). Institutions are, hence, defined as the rule of game in a society where human impose constraint to structure/shape the human interaction that create the incentive systems[10] for human exchange in either politic, social or economics. It is about rules and norms both formal and informal with their enforcement characteristics in the society. If institution is rules of the game, organizations are, then, players in within society that can be individual or group who share common purpose to achieve objectives such as political body (political parties, senate, …), economic bodies (firms, trade unions, family farms, cooperatives), social bodies (churches, pagoda, clubs, civil society …) and educational bodies (school, university, research center …) (North, 1990, 1995, 2003).

The institutional change is determined by the interaction between institution and organization. Two main determinants shape institutional change. First is the opportunity provided by the incentive structure of the institutions. Second is the feedback process that humans perceive and react to the changes in the opportunity set. Organizations are created in line with the institutional framework and will act to get the opportunity set from the incentive structure of the institutional framework. The chance to gain the profitability depends on the mental model in which entrepreneur of organization process the information. The cognitive capacity of entrepreneur creates a kind of communication among member of the organization so that every member possesses the same understanding-a shared mental model. This is known as organization learning. Therefore, organizations will invest on seeking means that permit them to be able to capture more opportunities i.e. knowledge[11]. When the organization evolves in taking advantage of the opportunities set, they will become more and more specialized in knowledge, more efficient and more productive, more competitive and gradually change the institutional framework (North, 1990, 1995, 2003).

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10 The incentive system could yield both incentives and disincentives that behave in a certain way

11 Knowledge here refer to "all the human adaptations to environment in which the past experience has been incorporated"(Hayek, 1960, p. 26) cited in (Mantzavinos, 2001, p. 78). North (1990) classified knowledge as (1) communicable knowledge (can be transmitted through communications) and (2) tacit knowledge (can be transmitted through practice and initiation). Mantzavinos (2001) classify knowledge as (1) Theoretical knowledge or scientific knowledge-"know what" which can be transferred with aid of symbols, (2) Practical knowledge-"know how" which can be transmitted by example and imitation, (3) Atomistic knowledge-knowledge exist in individual brain experience reality: can be transmitted within small groups such as family firms. It is everyday phenomena.

North ‘s theory of institutional change gives broader perspective to understand the complexity of the society ranging from individual motivation to informal and formal institutions. In addition, based on individual behavior, North employed the concept of shared mental model which is result from process of learning. He emphasizes that the way in which knowledge is developed could shape the individuals perceptions of the world around them and those perceptions, in turn, shape the search for knowledge (North, 1990, p. 76). The incentives that are built in the institutional framework play roles in shaping skill and knowledge. Viewing the society is complex so-called “decipher environment”, North believes it is individual that is the principle agent stimulating institutional change. The extent to which agents willing to change the institution depend on their motivation where they perceive and learn from the decipher environment. However, acknowledging that our understanding of individual motivation is incomplete, it is, therefore, existence of existing institutions that provide means for choice making and motivation of actors (self-interested seeking, altruism and other no wealth-maximizing values) that helps shaping institutions (North, 1990, p. 25). North ‘s theoretical framework of institutional change could be a basic theory for understanding the perception and motivation of young people regarding agricultural work. In this sense, we can simply say that the study of institutional economic is about the study of formal and informal rules and its interaction with individual or group of individual members of the society that could affect their economic behavior. The change will be either an incentive or disincentive for economic activities.

2.2 Institutional change as process of problem solving

In line with North‘s ideas concerning individual perception, motivation, knowledge and learning process, Mantzavinos (2001) elaborates the theory of shared mental model as a simple communication model and, thereby, explains institutional change as a process of collective problem solving which individuals face. The main argument for this theory is that institutional change is the outcome of changing agents’ perceptions if their interests are better served under the new institutional arrangements. The change will go through the evolutionary process of learning (growth and transmit knowledge) i.e. trial and error by either collective or individual. Once, everyone possesses the same cognitive structure (shared mental model), they, then, initiate the change deliberately through collective action or spontaneously through invisible hand.

When individuals meet a problem, they try to find ready-made solutions from the environment they are living in. If new problems occur, individuals communicate. The effect

of communication (called insertion rule) permits introducing solutions to the problem into the cognitive system of individual from the cognitive system of other individuals. Finally, both sender and receiver possess the same cognitive rule(s) and finally arise the share rule(s) between individuals called a "shared mental model"(Denzau & North, 1994; Mantzavinos, 2001, pp. 68-69).

Base on this problem-solving model, the institutions are, then, either changed deliberately or spontaneously. Deliberate change happens when collectives encounter the same problem and make a conscious choice to solve it. Spontaneous change happens when individuals try out an innovative[12] solution. If a given new solution solves the problem, other individuals tend to react, to imitate and to adopt the new solution. The process, with aid of invisible hand, constitutes the accumulative process through which new behavior or pattern of action becomes more wildly adopted by those who expect to have better condition.

In this study I apply the problem-solving model (motivation and knowledge as learning process) deriving from the theory of institutional change to understand conditions for integration young into smallholding agriculture. Based on this model, individual and family make choices based on the problems they face in their livelihood, knowledge of solutions they have learnt from member of their social group, and what they perceive to be the best solution conditioned by their resource constraints.

2.3 Family farm: as institution or organization

It is important to highlight meaning of family farm[13] or farm household. The term 'family' implies a range of sociological factors, such as interpersonal relationships, whereas 'household' implies notions of functional economic activity (Tipper, 2010).

Families are households and include kin, which refers to a blood-relationship between individuals. Once notions of kinship are attached to family, it implies collective responsibility, collective action rules, norms and decision making within family members (Tipper, 2010). In this sense family may be considered as an 'institution or informal institution'(Chia, Dugué, & Sakho-Jimbira, 2006; Mantzavinos, 2001)."Family" can be considered as 'organization' in the sense that it comprises governance structures for coordination of economic activities to achieve common objectives, i.e. sustaining livelihood

[12] The case of an individual perceiving something as new problem and trying out a solution that is new to him but not to the others member of the social group does not constitute an innovation(Mantzavinos, 2001, p. 94).
[13] There are many study define meaning of family farming or peasant farming such as (Ellis, 1988).

(Requier-Desjardins, 1994). It is a unit of production involving both production and consumption. One of its important roles is as provider of insurance against economic adverse events (Pollak, 1985). In this case family may incline to the notion of household suggested by Tipper (2010) and organizational theory suggested by Williamson (Williamson, 1985).

PART II. Theoretical framework

2.4 Existing theories explaining the change of family farming

Lewis as early as in 1954 stated that all countries at some stage have to experience the movement of a labor force from the agricultural sector to non-agricultural sectors especially in societies with a fairly low level of economic development and rapid population growth. This is because agricultural activities are subject to diminishing returns. When there is surplus labor adding to the same plot of land, then labor productivity will decline up to the point where it is equal to or below the subsistence level. Commercial farmers must reduce the number of workers or reduce the wage rate. Family farm households must share the earning from agriculture to more member of household working on the farm and the dependent. When this share is below the household subsistent, farm household‘s member will seek alternatives which could result in higher earning such as out-migration. More often, this migration has implied geographical movement of workers from rural to urban areas. The growth of urban unemployment would drive this labor working in petty services which has usually low productivity (Thirlwall, 2006).

In line with Lewis regarding to population growth, Dynson, (2010) argues that population growth is the main factor for societal change. Considering mortality and fertility as natural phenomena, demographical transition theory explains the path of transition as the change of society from the high birth and death rate to lower birth and death rate and, thereby, resulting population growth, people movement from rural to urban (urbanization) and change from “young age structure” to “old age structure” society (Dyson, 2010). Theory stated that traditional society will begin with declining in mortality which leads to rapid population growth: urbanization, migration, gender differentiation i.e. changes in women’s roles, child bearing, family structure; these pose the stresses and strains on the society. As a consequence, people reduce number of children implying the decline of fertility. The society will gradually move to the structure of population aging[14] (Dyson, 2010, pp. 216-225). However, even though each country has to go through the process of transition, it does not mean that each

14 For detail framework please see Dyson (2010, p. 9)

country would achieve the same outcome of the transition. The concept of demographical transition shares similar perspective with institutional economics. On the pathway of institutional change, the outcome would vary even though the same policy and standard institution was adopted. To understand the current challenge of the world, North (2003) suggests taking into account-population growth and institutional structure. Hence, land and labor of family are important aspects for addressing youth issue in family farming

General social and economic theories of migration are always popular when issues involve people's decisions to migrate out of the farm. The theories emphasize numerous factors influent decision of agent of the family farm. General social theory of migration suggested that those factors are (1) original factors (push and pull forces), (2) destination factors, (3) intervening obstacles (physical and sociocultural distance) and (4) personal factors (perception in which individual learn from their environment) (Rhoda, 1983). The economic migration theory focus on (5) the expected "profitability of the employment" at the destination; that is, a personal cost-benefit analysis taking place in the prospective migrant's mind and extended to income and intersectional linkage model (Rhoda, 1983; Todaro, 1969).

Sustainable livelihood theory suggests that migration has now become a central feature of the livelihood of the majority of households in low income countries (Ellis & Freeman, 2005). Illustration 1 shows the linkage between migration and the livelihood framework[15] as a way of moving out of poverty. The immediate connection migration to the human and financial capital in livelihood framework could help family farming to accumulate their wealth. Migration involves mobility of labor together with a person's experience, skills, educational level and health status. This human capital will play multiple roles in both reducing vulnerability and enabling asset accumulation of the household. Earnings obtained from migrating and the remittances sent back by migrants to their resident families are to maintain or raise the level of other assets such as saving, land, equipment, livestock, education of children and so on. This could contribute to the increase of household asset and reduction of the rural poverty (Ellis & Freeman, 2005).

[15] For livelihood framework: see Sustainable Rural Livelihoods: A Framework for Analysis by Scoones (1998)

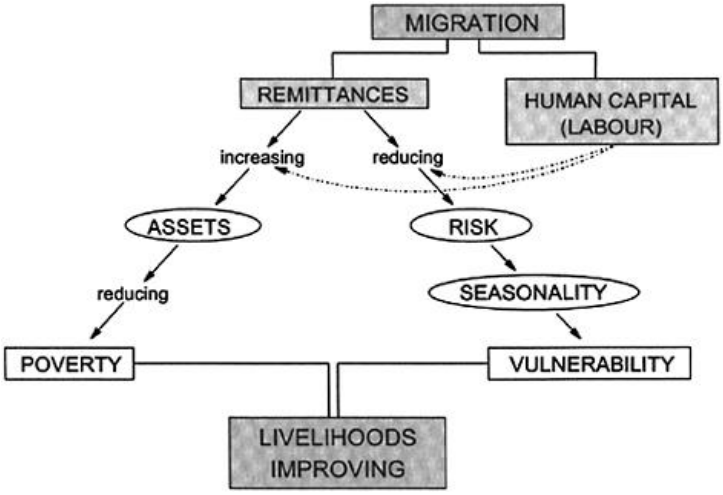

Illustration 1 Basic livelihood and migration framework (Ellis & Freeman, 2005)

Nevertheless, many study results on impact of migration are empirically conflicting. For example Rigg (2006) and Ellis & Freeman (2005) emphasized the role of remittance from non-farm activities, Obi (2011) contends that impact of non-farm activities are varied and depend on the specific context for example, increasing household assets by poor household often achieved only tiny increments because their inability to borrow or to generate cash (Ellis & Freeman, 2005).

While many scholars assert that development smallholding farming is key for poverty reduction and growth, others contend that some rural development intervention which is originally intended to reduce rural-urban migration provides even better condition for rural-out migration (Rhoda, 1983). Therefore, it is not possible to provide a clear-cut answer on what type of rural development interventions impacted on reduction rural-urban migration. So, it requires an understanding of particular contexts, empirical indications, and possible policy implications as extensively discussed in Rhoda's work (Rhoda, 1983, pp. 55-59).

The processes of economic development, younger generation are facing with decline of social cohesion, the rising of individualization and social exclusion. A major discontinuity in relationships with the rest of society is defined as social exclusion (Macpherson, 1997). This is due to the lack of personal resources, insufficient or unsatisfactory community facilities, such as access to schools, remoteness, poor public transport networks, poverty, lack of resources at an individual or a household level, inadequate social participation, lack of social integration and lack of power (Millar, 2003). However, Jentsch and Shucksmith (2003) cited in Shucksmith (2004) found that young people face uncertainties in their pathway of individualization. Social networks, civil society, the state and market are means where young people rely on for managing and coping with these uncertainties. Therefore, traditional social

commitment and assurance persists in many societies and varies according to their location, class, race, religion gender, education and occupation to support rural young people. For example families still provide young people important support such as financial, emotional and other resources (Shucksmith, 2004). In this regard, family farming plays crucial role assisting youth.

2.5 Framework for successful and sustainable youth integration in farming

Wampfler (2014), in her recent works on youth integration in farming particularly in African countries suggests a framework for successful youth integration. The framework stipulates that successful and sustainable youth integration is intertwined with individual youths, families, and society. It starts with individual youths' and their families' motivation to improve livelihoods and farming. It also requires supportive agricultural policies creating better conditions for farming, and that the society values agriculture. Good performance of the agricultural sector depends on the state where peasants can produce and sell agricultural products with a profitable price such as good competition in local and international market with sufficient rural infrastructure. This will be a pre-condition for improved rural livelihood. The status of the farmer is the societal recognition that farmers are legal entity who has independent in their living and income generation and, thereby, have equal social responsibility like many other classes in the society, for example, farmer is able to sign contract for loan. Beside this, if farming is viewed as goods, then it might be a motivation for youth to settle in farming as well their parents' desire for making a decision on their childrens' future work on farm.

However, from individual youth and family perspective, the way in which farming is valued is derived from the capacity of farming that is the production system that can overcome the technical constraint to farming and be able to produce more than family sufficiency. Hence, youth will need training, advice and access to information such as extension so that youth are able to innovate their farm production systems. These skills will facilitate them to have access to land, finance and equipment that are very important when deciding settlement in farming.

In addition, youth who often lack life skills will strongly need profession, social and market integration so that they will be successfully integrated in farming. Figure below illustrates the framework for sustainable youth integration in family farming.

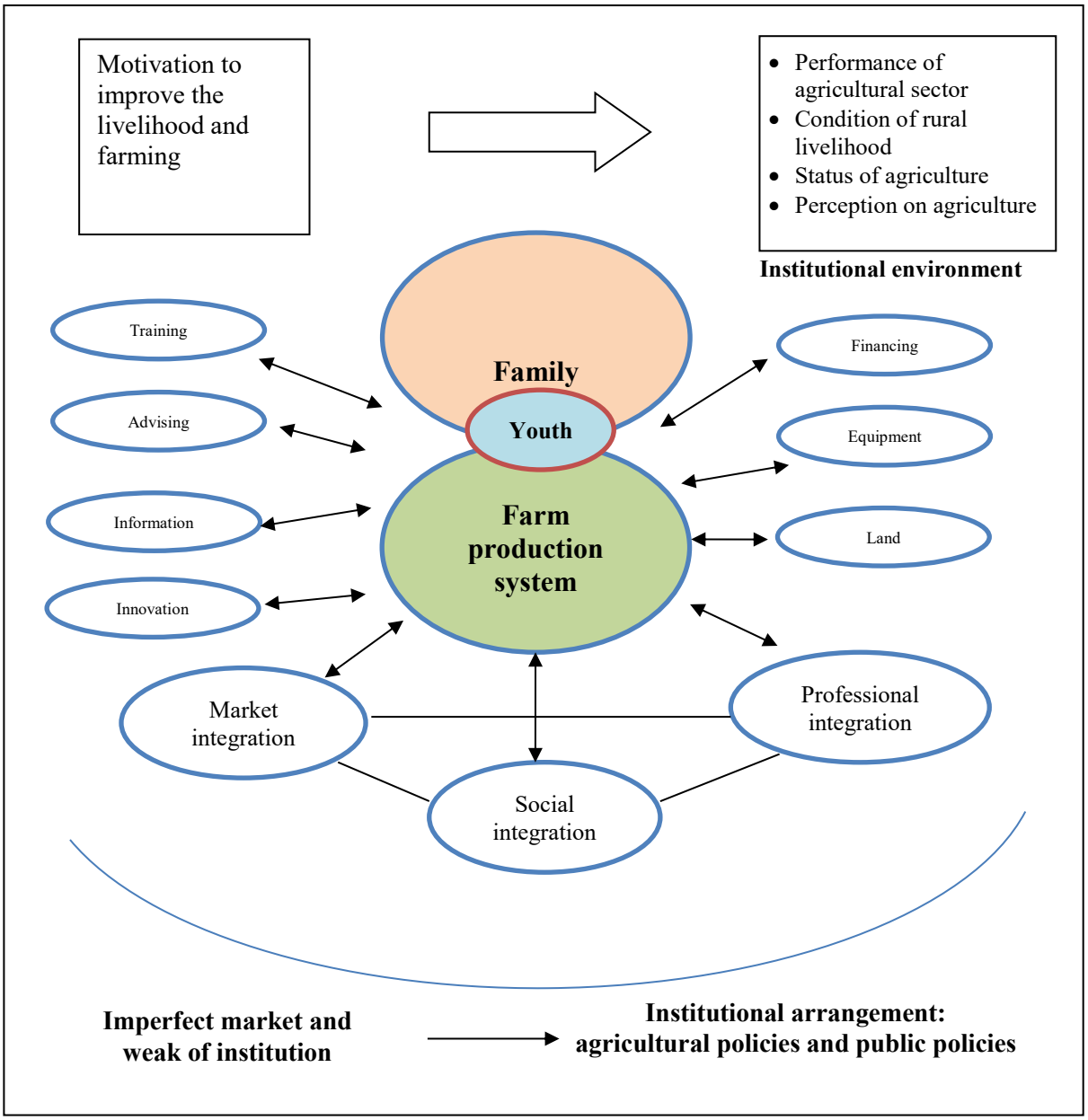

Illustration 2 Framework for sustainable youth integration in Farming

Source: (Wampfler, 2014)

2.6 Framework for understanding the issue of integration youth in smallholding farming in this PhD study

At the policy level, institutional change theory draws the development thinkers' attention on different paths and stages of development which requires careful adoption of economic policy for example the influence of demographical transition and institutional structure. The case of smallholder agricultural based countries, analysis suggested that due to weaknesses of

institutional environment[16], the countries would face serious coordination failure[17]and, hence, requires a continuous technical innovation. In this regards, Coordinated Market Economy (CME) approach would be more appropriate than Liberal Market Economy (LME) (Kydd & Dorward, 2004).

The issue of youth integration in family farming can be explained from different theoretical points of view and share some interrelated points. Institutional economic theory suggests to take into account the institutional environment and arrangements which condition farm household behavior, individual choice, household decision making, information flow and governance structure of the household but the theory seem less emphasis on rural livelihood aspects such as migration and social structure when it comes to apply at the farm level. While livelihood framework less taken into account market and different level of institutional environments (individual, family, community and state), both social and economic migration theory stress on individual personal economic cost benefit as incentive for migration. These theories emphasize less incentives such as role of belief, ideology, tradition, altruism, social norms, and cultural values which lead to bounded rationality (in intuitional economic theory). However, when questions of youth integration are primarily related to land, those theories do not take into account the social structures which would result from the effort of rural development (Berger, 1992). While land access may generate different agrarian class, failing to take into account social structure may contribute to failure in development effort. Social capital theory is, hence; somehow contribute to understanding this from the sociological point of view. When family farm is considered as an organization, family farm may have to invest in specific assets (asset specificity) such as knowledge, skill, and experience and network which are necessary to ensure the durability and sustainability of the farm household in the market lock-in. In this sense asset specificity may incline to notion of social capital, the aggregation of the actual or potential resources which are linked to possession of a durable network of more or less institutionalized, socially instituted and guaranteed under the common name of family (organization).

To understand the condition for integration young people in family farming the study should understand young people's decisions to move away from the farm and migrate. There are both push and pull factors, and personal cost benefit analyses drive households to

[16] The *institutional environment* is the set of fundamental political, social, and legal ground rules that establishes the basis for production, exchange, and distribution, *institutional arrangement* is an arrangement between economic units that govern the ways in which these units can cooperate and/or compete (Davis & North, 1971).
[17] Coordination defined as effort or measures design to make players within the market system act into a common or complementary way or towards a common goal.

decide to migrate (Rhoda, 1983). Land and labor i.e. growth of family members whom family farming has to accommodate are the problems that family farm face. Age, gender, marital status and level of education influence the way the individual and family value the future and choice of livelihood strategies (Obi, 2011).

This review suggests us to understand that youth integration can be operationalized through, (1) understanding the socio-economic situation of family farms as this will condition their motivation/commitment and livelihood strategy to farm work. (2) Both young peoples' and their families perception of work in agriculture should be examined as economic rational aspects may not be enough to explain choice of farm work. This could be, for example, their aspiration to enjoy city life. (3) Different levels of institutional environments and arrangement ranching from family roles over community based organizations to state policy. (4) Access to land and different type of farming systems will determine the different level of investment and need for integration especially the capacity of farming in income generation to sustaining the farm family, (5) Social systems such as community based organizations, and other institutional support contributing to attract young people to agricultural work.

The present dissertation suggests that livelihood and migration share some points with institutional economic theory and, thereby, an integrated theoretical framework can be developed. This could reconcile between the orthodox and heterodox economic mainstreams as well as harmonization between homo economicus and homo sociologicus. The study proposes that conditions for youth integration into smallholding agriculture are perception/motivation/desire of family farm/farm household to decide to utilize their assets to make livelihood activities to sustain livelihood and to cope with livelihood constraints (shock, trend, seasonality) based on economic rationales embedded in social institutions (formal, informal, institutional environment/arrangement).

Literature review from different theories indicates that issue of youth integration in family farming can be explained from different angles of theory such as institutional change theory, organizational theory, migration theory, livelihood theory, and social capital theory. Both past and recent empirical studies indicate the growing change of youth and family farm commitment toward farming activities which contribute to the concern of global thread on future food security (Proctor & Lucchesi, 2012). The question of making agriculture attractive is still very challenging and whether it should be made attractive not easy to give answer (Brüntrup, 2010). In such decipher environment of family farming, to understand the issue of

youth integration into small holder farming requires an integrated framework which lie between institutional economic, livelihood, migration and social capital theory.

Many studies attempt to explain the reason why youth move out of the farm. Recent research related to youth and family farming mainly focuses on the youths' own aspiration and technical constraints toward farming but tends to neglect structural constraints. In addition, roles of smallholder family farming in accommodating the growth of family members and the extent to which agriculture generates income for sustaining livelihoods have not been at attention of any recent research related to the issue of youth and family farming. Hence, more empirical study needs to be carried out with an integrated framework.

PART III. Methodology

2.7 Research Design

My study combined household socio-economic survey, in-depth key informant interviews, and focus group discussions with youth. Given that youth and households are inter-dependent, to capture youth issues on farming, youth was selected from the household. Hence, the unit analysis of this study are individuals (youth) and households.

The survey was designed to understand from the general sense on the situation of farm family in Cambodia in order to see the economic activities generated from farming and non-farming, social status, and family demography (age, gender, education, migration), access to common resources, household daily consumption/expense and thereby triangulated this data to see if farming could meet the household need.

The case study on youth integration project in Cambodia is to reinforce the knowledge from the survey. It was intended to understand what would be reasons that influence youth and family's decision to quit or to stay in farming. With general and specific knowledge, the study would be able to discuss the real motivation of youth regarding farm work and to discuss with appropriate consideration for future youth integration in Cambodian farming.

Given that rural-rural migration is remarkable in Cambodia, the study is designed to investigate in two areas-low and high-density areas to see inter-linkage of the areas especially related to the issue of land availability. This study area is designed for the first socio-economic survey. The second field work is dedicated to the case study of one youth integration project of CEDAC project. Youth who were taking part in the project were identified and selected from four provinces of Cambodia.

2.7.1 The study area for the first survey

After exploration, the study decided to choose (1) Otdar Meanchey representing low density area and (2) Takeo province representing the high-density area. Otdar Meanchey is new created province where large part forestlands were converted to agricultural land as a result of population movement for new settlements. A common type of farming system is rain fed rice farming with annual crop on the upland land. Some people migrate to Thailand as it is close to the border. Takeo province is an old and stable area. People own small plots of agricultural land and try to diversify agricultural activities through growing earlier rainy season rice and

vegetable. In some areas like in Prey Kabas commune, people intensify rice farming with water supply from irrigation. The proximity to the capital Phnom Penh and the present of garment factories makes it attractive for youth and adult to migrate to the city for educational and non-farm occupational purpose.

Three districts (out of five) were selected from Otdar Meanchey province to see historical linkages regarding to political integration, settlements, land acquisition, and migration related to farming. Two districts (out of ten) were selected from Takeo province based on agro-ecological zones of the province, poverty map, and migration. Tram Kak district represents high migration district and agricultural diversification districts, whereas Prey Kabas represents low migration and rice intensification district. One commune was selected from Tram Kak district. Two villages represent agricultural diversification based on limited source of storage water and other two villages represent agricultural diversification with no access to water source.

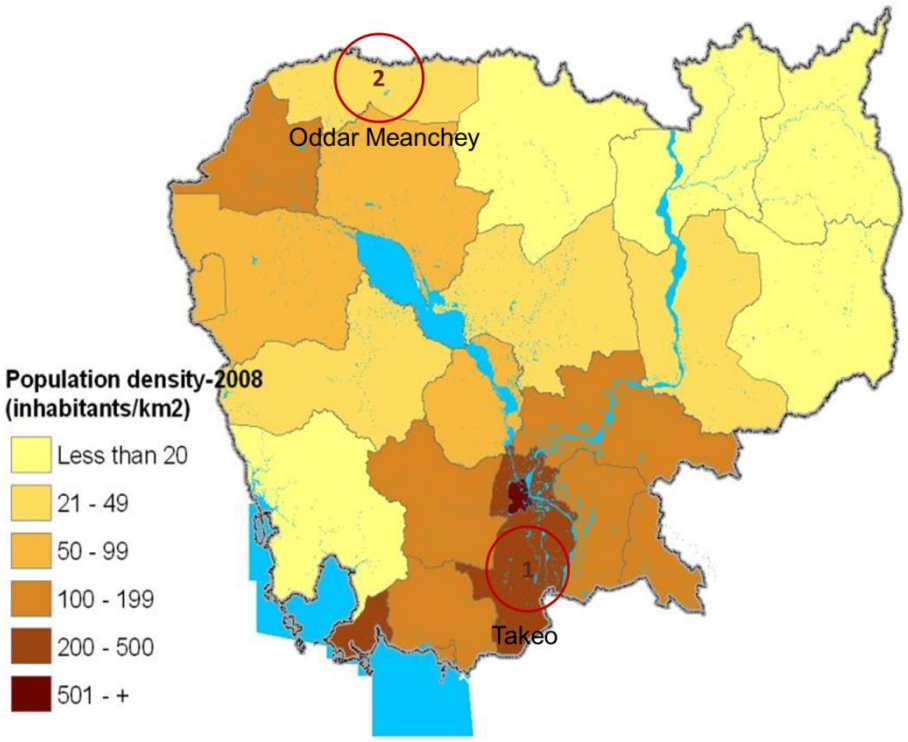

Figure 1 Study Area

Source: General Population Census of Cambodia 2008 (National Institute of Statistic, 2009)

The study randomly selected respondents of 382 households from the two study areas. The survey covered 25% of youth age between 15 and 30[18] years old. The contents of the questionnaire are mainly about household composition (age, sex, education, and marital status), migration and occupation, agricultural and non-agricultural activities (land, labor input, income, and expenditure), household consumption, and general views related to agricultural occupation. One group discussion was conducted with youth who were currently studying at secondary and high school to get their view regarding to occupation on farming. Twenty key informants were interviewed including key farmers, village chief, chief of community forestry NGOs staff and independent analysts to get knowledge on locality, constraints regarding to youth occupation in farming and prospects. Qualitative interview was also done with some selected youth who were engaged in farming and their parents to see challenge in starting up farm work and extent of which family could support youth farmer.

2.10.1.1 Site selection in Otdar Meanchey

As I did not have background knowledge about the situation of Otdar Meanchey in advance, and with the caution to political sensitiveness, I decided to identify the study area through the development NGOs that was working in Otdar Meanchey and had good relationship with local authorities. I contacted "NGOs forum" based in Phnom Penh whose work is to coordinate the NGOs and INGOs in Cambodia. I finally got the name of two NGO-Buddhists for Development (BfD) and Children Development Association (CDA). BfD provided me with good general information regarding to legal document related to the provinces, such as on the establishment of the province, and gave me suggestions regarding how? to target the village. However, BfD's works were mainly related to education, decentralization and de-concentration and they therefore, did not have good access to the village. CDA was working closely with villager through development project such as livelihood improvement, community forestry, and land issues. CDA had very good access to the field and was willing to assist and guide me to the field. Moreover, all identified villages from BfD were in the target area of CDA. I, therefore, decided to work with CDA for accessing the field.

Samples were randomly selected in Otdar Meanchey. Initially I planned to choose 20 respondents per village from 10 identified villages representing 3 regions of the province.

[18] According to national youth policy, Cambodia define "youth "as those age between 15 to 30 years old, while international youth definition defined by UNESCO define "youth as those age between 15-24 years old. The study applies youth definition of Cambodia.

Each region had a different history which was connected from one to another. I shall elaborate this later in the context of the study area. However, due to scattered and geographical distribution plus sensitiveness of the hot land issues, the interviews could not be conducted as planned to cover 200 respondents especially in the last two villages where they were the former Khmer rouge villages[19] with high sensitivities to outsider. When the study took place in the villages, villagers had been seriously involved in land conflicts with a private company who owned economic land concession from the government. They showed anger to outsiders and refused to participate in the survey. It was important to note that for access to the Khmer Rouge villages, it was necessary for me to go through networks they trusted either government or NGO networks. Otherwise, the data collection would be difficult. In my case, I used Children Development Association (CDA) network, the only organization working on forest and land issues in Otdar Meanchey and actively engaged in REDD project in Cambodia.

> "What is the network where are you coming from? Ah, you come from CDA. No problem because CDA working very well with our community forestry. If you work only within your topic, I can answer some. If you working on something else (I presume that he means something related to politics, KR history), then I cannot answer" (Source: one village head chief, in former Khmer Rouge village, and former KR commander of one brigade)

The quotation above made me realize that the advices which were given to me to be cautious on data collection in former Khmer Region are serious.

2.10.1.2 Why three districts?

The agro-ecological system of the Otdar Meanchey province is mainly similar. Major farming systems are rice based. The rice lands are from forest clearance. People cultivate rainfed rice once a year. All people practice sowed-rice but not transplanted rice. But some people whose land is higher elevated, tend to grow annual crops, particularly cassava. However, people learnt how to grow cassava only in the last one or two years. On the new occupied forest land where it is not yet cleared, people have to speed up the process of

[19] Village that has been settle by former Khmer Rouge force fighting against the government between 1991 and 1998 and its final surrender was in 1998 and submitted to live under the administration of the government 1998 in Along Veng district of Otdar Meanchey province.

clearing land and therefore growing cassava is a mean to justify the right of land utilization. This is necessary for claiming land title since the time the study take place, there is a campaign initiated by the government granted land title to rural household on zone pioneer. Thanks to this., I assumed that farming system in Otdar Meanchey was similar due to the fact that majority of the farming system was predominated by rainfed rice farming system. Labor exchange in rice farming was so common in the province particular during harvest season (harvest, thresh and transport yield to home).

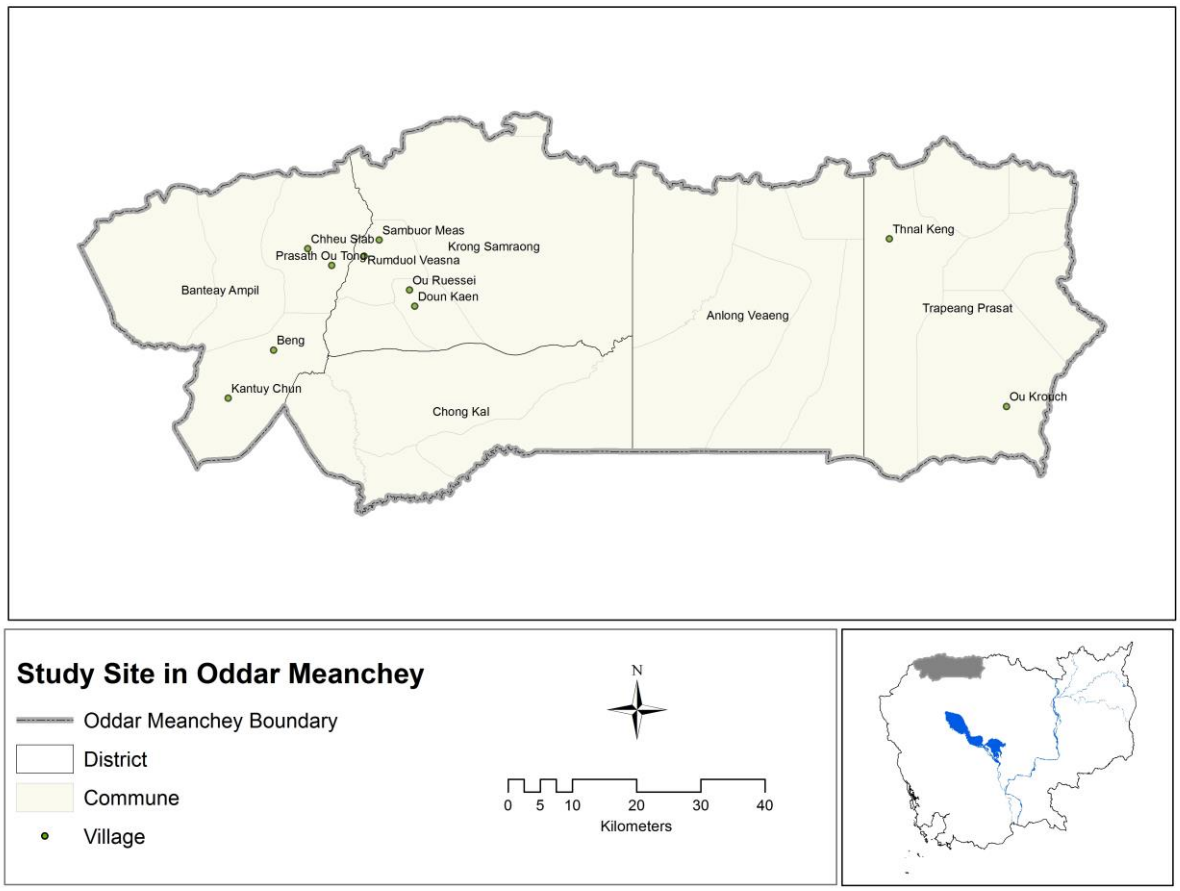

Figure 2 Map of the study area in Otdar Meanchey

What makes the 3 districts remarkably different is the movement of integration and settlement in the village which is a result of national and local historical and political events. The point of selecting these three particular districts was to capture the local history of land access, migration and settle in the area and geographical distribution of the study area. Banteay Ampil District represents a former territory of anti-Vietnamese forces. Samrong District represents a territory of pro-Vietnamese forces, and Trapaing Prasat represents a former Khmer Rouge last base in Cambodia. In agreement with CDA, I decided to choose 2

communes from each district, and two villages from each commune. In Trapaing Prasat districtd only one village was selected from each commune. As mentioned earlier, my data collection in Trapaing Prasat was not as smooth as in the other districts due to the sensitive and "hot" land conflicts especially in Ou Kroch village. However, in terms of rice based farming system, there was no difference between the three districts.

2.10.1.3 Site selection in Takeo province: why two districts?

Before deciding for the exact field sites, I talked to four institutions working in Takeo-Agronomes et *Vétérinaires Sans Frontières* (AVSF), Provincial Department of Agriculture of Takeo province (PDOA), district office of agriculture and CEDAC to discuss agro-ecological system of the province. These talks pointed me to the district of Bati, Tram Kak and Traing as having high migration, while Angkor Borey, Borey Cholasa, Koh Andet, Prey Kabas, Don Keo, Kirivong are comparatively low in migration. After that I applied land use and natural resource mapping taking into account poverty distribution and farming, I decided to choose two districts Tram Kak and Prey Kabas district. Tram Kak district represents a high migration zone, while Prey Kabas represents a low migration zone. I also talked to the district offices of agriculture in both districts to get an impression of the different agro-ecological systems and thereby to identify the communes. I learnt that Tram Kak district was more oriented to agricultural diversification, which means that people used dug ponds to grow early rainy season rice in certain areas, together with vegetable growing and poultry production. In Prey Kabas district, people intensify rice farming up to three times a year with existing irrigation, plus water receding rice during the dry season (dry season rice) once a year.

In Tram Kak district, I selected two communes: Tram Kak and Trapaing Kranhoung. In Prey Kabas district, I selected Prey Kabas commune. I spent two days visiting each commune, and I drove through them as well as observed the landscape. I found that Tram Kak and, Trapaing Kranhoung communes have similar agro-ecological systems and a history of land acquisition linking to the Khmer Rouge era. So, I finally decided to choose only one of them, i.e. Tram Kak commune due to its accessibility.

I talked to the commune chief and commune council, who assisted me in identifying villages in the two communes and provided me with maps of the communes I also discussed my landscape observations with them based on these maps.

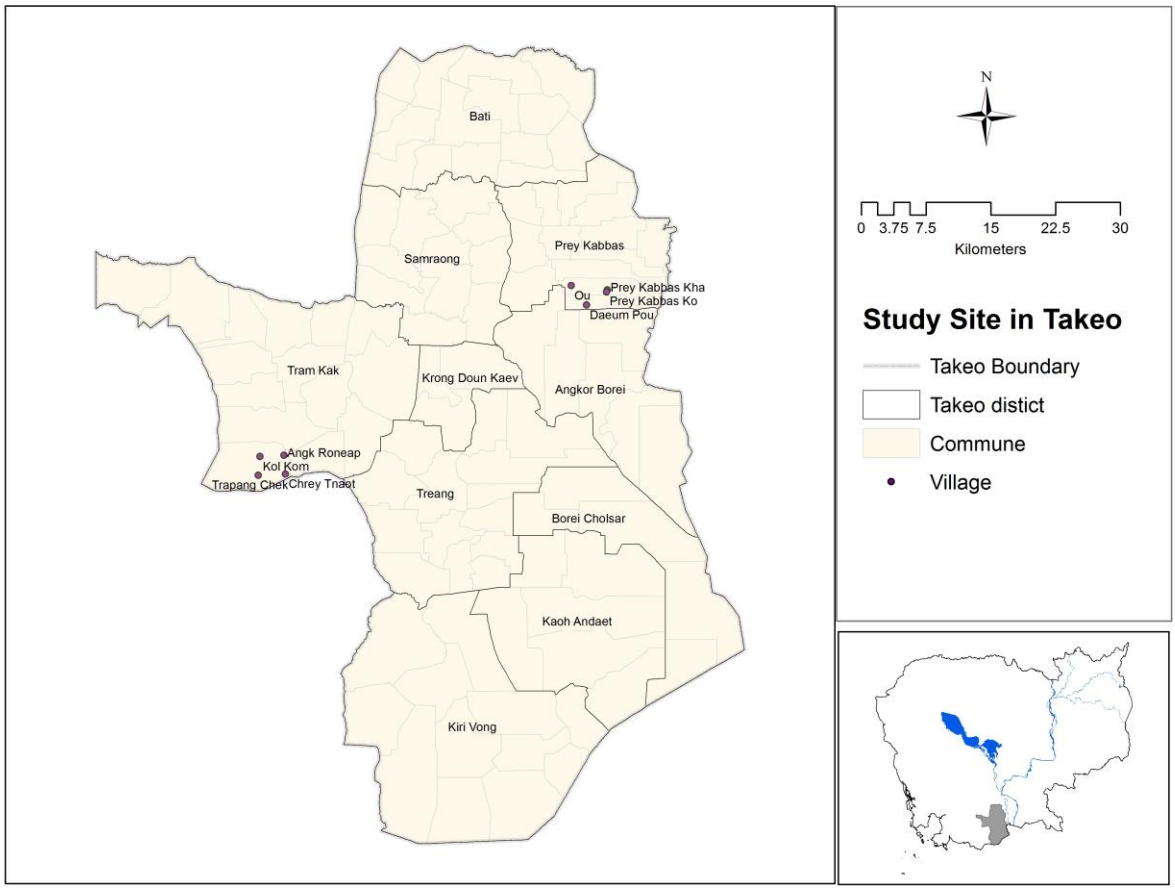

Figure 3 Map of study area in Takeo province (Tram Kak and Prey Kabas)

2.10.1.3.1 Tram Kak commune

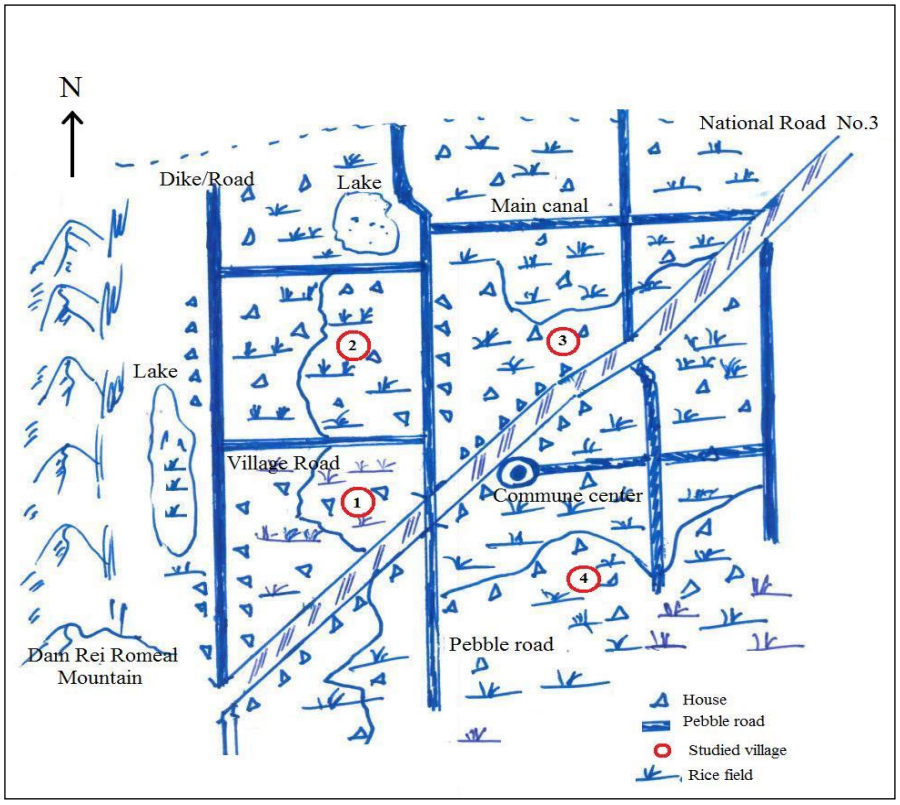

Figure 4 Sketch of Tram Kak commune

The area is characterized by the limited access to water for agricultural production and small plots of rice production. People tried to diversify agricultural production through digging ponds to store water for home consumption, for growing early rainy season rice and for growing vegetables, plus poultry production. However, such diversification could be done by only few villagers, while many villagers kept cultivating one rainy season rice plus other non-farm activities. This allowed me to select four representative villages where two villages had access to a water reservoir in the village and two other villages who did not have access to water at all.

The first of the two selected villages was Trapaing Chak. This village had access to Trapaing Chak lake with a dike constructed to capture water from the Dam Rei Romeal mountain. The dike also functioned as a pebble road leading to another village. With this source of water, some families living around the lake could cultivate early rainy season rice and grow vegetable. Other families, who did not have access to the water, used a dug pond to irrigate their rice. The farmers only allocated some of their plots to cultivate early rain season rice.

The second village was Kok Kom village. Kol Kom's dike was constructed to capture water in the Kol Kom reservoir. The situation was exactly the same as in Trapaing Chak village. Both reservoirs were constructed during the Pol Pot regime in 1975-1979. In 1980-81, the state of Cambodia[20] distributed rice land to families, 15a per person. In the west of the Trapaing Chak dike, there was available forest land along the foot of Dam Rie Romeal Mountain but this land was not distributed to the villagers. There were Khmer Rouge forces residing in the mountain often came down and used guns against people in the commune. Not so many people dared to encroach land over there. However, villagers, who dared came to occupy the land to cultivate annual crops. These land holdings were not legalized as they had not been officially distributed. At the time when the study took place, youth volunteers of the prime minister surveyed these lands for granting land titles to the occupants. The upper foots of the mountain were put under the control of community forestry.

The other two villages, Ang Roneab and Chrey Thnaot, which were located East of Trapaing Chak and Kok Kom, did not have access to water source. There was a pond but it

[20] From1979 to 1989 Cambodia was named: People's Republic of Kampuchea (PRK) and between 1989 to 1993 Cambodia was named: State of Cambodia (SOC), from 1993-present Cambodia is named the Kingdom of Cambodia, and Royal Government of Cambodia.

was just for home consumption, and the rest of the water could be used to irrigate the early rainy season rice, but only on a tiny plot of available land. During the interviews, I noticed that many young people in these villages migrated to the city to work in the garment industry, especially in the last two villages.

2.10.1.3.2 Prey Kabas commune

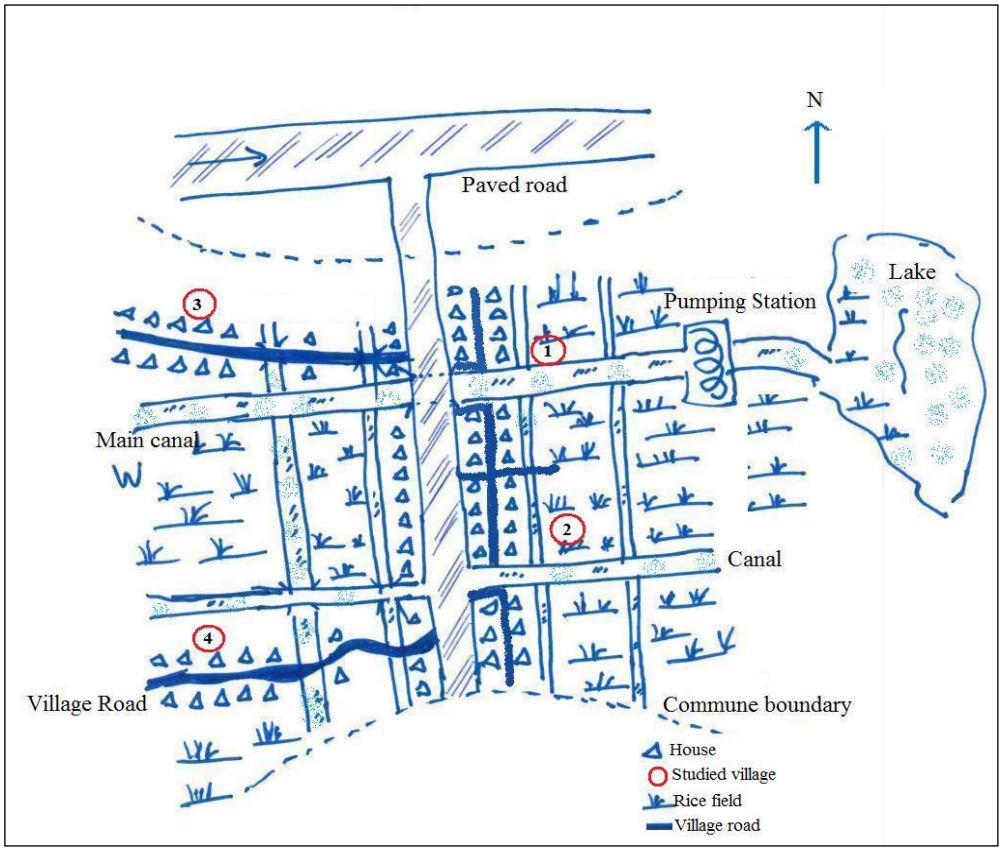

Figure 5 Sketch of Prey Kabas commune

Prey Kabas commune was the area with the highest potential for rice intensification due to the existing irrigation system that remained from the Pol Pot regime and recently was restored by a working group of a political party[21]. The villages were mainly situated along the main commune road. Rice is field situated around the village. Rice field situated on the west of the pumping station call upper land rice field "Sré Leur" where people could at least grow rice twice or maximum three times a year. Rice field situated east of the pumping station call lower land rice" Sré Krom" or" Sré Beurng" (simply mean rice field situated at end of or in a lake) where people cultivated water receding rice

[21] It is Cambodian's People Party (CPP), a current ruling party.

During 1980-81, both upper rice land and lower rice land were distributed to the villagers with 18a of each land type per person.

Rice intensification requires heavy fertilizer and pesticide inputs. Therefore, the rice is mainly for selling purpose. Some people grow organic rice for domestic consumption. Hence people raise cows, besides selling purpose, to get manure fertilizing their organic rice field. Many villagers complain that high utilization of agro-chemical inputs make their farm profits shrink to a minimum. People in the village are busy all along the year with the cultivation. Some villagers do not have time to raise poultry or other animals, others raise pigs and cows.

In 1995, people still grew rice through transplanting the seedling. The mechanization by two-wheel tractors and other farm machinery like harvesting and threshing machines began in 2000 when farming techniques completely transformed from transplanting seedlings to sowing rice seed. It was at that time labor exchange in the village began to disappear.

People informed us that they rarely buy fertilizer in cash but in credit, and that the price therefore often is higher than cash price. They also claimed that they prefer credits, which they can repay at the end of the harvest season. My general observations indicated that the socio-economic status of these villagers was relatively high. They had rather big houses. Most of the houses had pumping wells and hygiene toilets, and many rice cultivators owned two-wheel tractors and pumping machines. In the village, there were harvest machines operated by wealthier families. Many households informed that they send their children to study at universities in Phnom Penh.

The commune has a very strong connection with high ranking officers in Phnom Penh as it is their home origin.

2.10.1.4 Social economic survey sample

The Table 1 below illustrates number of respondents selected for interview in Otdar Meanchey and Takeo province.

Table 1 Sample selection in the study area

Province	District	Commune	Village	Total house hold	Despondent		Total
					Male	Female	
Otdar Meanchey	Samrong	Bansay Reak	Sambour Meas*	150	8	15	23
			Romdoul Veasna*	94	4	10	14
		Samrong	Ou Ruessei	58	2	11	13
			Doun Kaen	460	11	22	33
	Banteay Ampil	Kouk Khpos	Ou Toung*	105	1	16	17
			Chheur Slab	175	3	21	24
		Beng	Beng	130	10	11	21
			Kantuy Choun*[22]	101	5	12	17
	Trapaing Prasat	Trapaing Prasat	Ou Kroch**[23]	180	0	5	5
		Ph'av	Thnal Keng 105**	180	5	11	16
	Total						**183**
Takeo	Tram Kak	Tram Kak	Trapaing Chak	169	5	21	26
			Kol Kom	200	8	15	23
			Ang Roneab	285	11	13	24
			Chrey Thnaot	289	9	15	24
	Prey Kabas	Prey Kabas	Prey Kabas Kha	187	20	6	26
			Prey Kabas Ko	155	15	13	28
			Ou	175	12	13	25
			Daeum Pou	119	17	6	23
			Total				**199**
	Grand total						**382**

2.10.1.5 Focus group discussion with youth

After having carried out the questionnaire survey, I carried out focus group discussions with young people in Takeo province on the general question “what do you think about agricultural work?” After the discussion, they were asked to respond to a short questionnaire survey regarding their opinion about agricultural work (see questionnaire in the appendix). The challenge was that youth who were available to participate the discussion were those who were studying and staying in the village. Only one of the participants was a drop out youth and worked in a farm. This suggested for better design for group discussions in the further

[22] New village created in 1997-98
[23] New village created in 1991 Former Khmer Rouge village

study one characteristic should be considered that is drop out youth and youth who still studying in the village. We could not include drop out youth who migrated away from village and youth who migrated for studying purpose as they were not there for the study. This was also a challenge for this kind of youth study in relation to farming, migration and settlement.

2.7.2 The case study on Young Agricultural Entrepreneur Project (YAE)

The purpose of this second field work was to strengthen the knowledge from the first field work on the factors affecting the integration or disintegration of youth from farm work in Cambodia by looking at the case of Young Agricultural Entrepreneur (YAE) project of Centre d'Etude et de Développement Agricole Cambodgien / Cambodian Center for Study and Development in Agriculture (CEDAC) which was initiated since 2008 to help youth between 16-30 years old who dropped out at grade 9 to 12 to successfully run a profitable farming. From 2008 to 2013, there were 267 youth taking part in the project in six provinces of Cambodia. My interview with CEDAC 's YAE program director during the first field work in 2012 indicated that among 20 youth taking part in the 2 year support, there were only 2 who had successfully run farm work. With such a big support, I wondered why only few youths successfully ran farm business.

The objective of this field study was to strengthen the knowledge from the first fieldwork in order to match knowledge from first field study with degree of reality of intervention of NGO to integrate youth in farming.

I went to NGO forum database to check list of NGOs who had projects related to agriculture and then checked their webpage to see if their program activities were related to youth integration in farming. I found that many of them were just general rural development projects that aimed at raising productivity, livelihood improvement such as distribution of seed, training on agricultural techniques, etc. CEDAC informed me that they had substantial scale of work in integrating youth in farming. Therefore, I decided to focus only on CEDAC.

My identification of key informant was based on snowball sampling. I asked local project staff who knew the addresses of the participants in YAE. After that I asked the interviewees if they knew other trainees. It was difficult to find YAE for an interview as many of them had quitted farm work and migrated out of the villages. In the end I managed to interview 29 youth of YAE project in four provinces-Preys Veng, Svay Rieng, Takeo and Kampong Chhnag. Table 2 below illustrates number of person interviewed and their status.

Table 2 YAE Key informant interview

Status	N	Male	Female	Year
In the project	6	3	3	2012-2013
Successfully run farm	11	8	3	2008-2010, 2009-2011
Quit farm	12	8	4	2008-2010, 2009-2011
Total	29	19	10	

The interview was done at their house. After finishing the interview, I visited their farm and had a look at their business plan. The main content of the interviews was to understand their family background, life story on how he/she ended up with YAE project with CEDAC, household resources, household composition, their impressions about the program, their challenges, and their future aspirations. The idea was to see the difference between those who succeeded in business farming and those who did not, and what factors contributed to the success, or why they decided to quit farming.

2.8 Economic calculation and data analysis

In order to understand the economic sustainability of farming, I measured the economic value of each cropping system within the farming system including the farming inputs, expenditures, labor inputs, amount of sale, amount keeping for home consumption and value added derive from each system. After that, the profitability of farming was calculated (Barral, Touzard, Ferraton, Rasse-Mercat, & Pillot, 2012).

Gross Output (GO) = (Seasonal quantity produce x unit price) $Product_1$+ Seasonal quantity produce x unit price) $Product_2$+… (Seasonal quantity produce x unit price) $Product_p$, Or

Gross Output (GO) = Σ(Seasonal quantity produced of each product x unit price of each product)

Intermediate Cost or input (IC) = Σ(Quantity each input used x unit price of each) + Σ(Each service input used x price of each service)

Paid Labor Cost (PL) = Σ(Quantity each paid labor input used x unit price of each)

Gross Value Added (VA)= GO- IC

Income or net income = GVA-PL

Income Rate= Income/(IC+PL)

Value added per land unit "Land productivity":

GVA per ha = Total VA by Cropping System (CS)/ surface under this Cropping System (CS)

$$Land\ Productivity = \frac{\sum Value\ Added\ in\ cropping\ system\ X}{Area\ of\ X}$$

Value Added per unit of labor "Labor productivity":

GVA per working day = seasonal VA by CS on a given area/ number of working days require per season for this CS on the given area.

$$Labor\ Productivity = \frac{Value\ Added\ in\ cropping\ system\ X}{Total\ Labor\ contributed\ to\ Cropping\ system\ X}$$

While labor productivity was used to see the level of intensification of each crop, land productivity would be used to calculate Land Value Index, Land Potential Value and the MIS.

Economic sustainability of household

After understanding the economics of each cropping activity, the economic sustainability of farming system of the family was calculated to see if the earning generated from agricultural activities and non-agricultural activities was enough to cover what was actually need by the current family farming as illustrated in table below.

Household Sustainability	Total household income	-	Total household expenditures
Negative (-) Or Positive (+)	-Rice (2R, 3R, HR, DR) -Vegetables -Annual crops -Fruit trees -Animal (Cattle, chicken, poultry, aquatic culture such as fish, frock culture) -Common resource + Non-farm and off-farm activities (earning and remittance from migration)		Buy more rice (kg) Daily food (food ingredients) Clothes Medical Electricity Water Cooking fuel (fuel wood, Charcoal, gas...) Land tax, Other tax Wedding party Social contribution Children schooling Telephone Transportation Entertainment (traveling …) Other (community member fee…etc.)

2.9 Some Ethical Considerations

The exploration of youth integration in family farming is quite new to Cambodia. It seems no one has ever thought about this question. Therefore, having heard that I was doing this research, everyone whom I met in Cambodia were surprised to hear that I had raised this question.

2.9.1 Youth perception on farming

Designing a study to understand the question of youth integration in farming faced a number of challenges. In many families the youth did not know much about resource management of farming as this information was centrally managed by the household head. Drop-out youth had often migrated and non-drop out youth was often students. To better capture the different views, the interview had to be done with both household heads and youth. However, when the interview took place, the youth was often not present. If youth was available, they did not know much about farming work, which required me to go back to the household head.

2.9.2 Economics data from YAE case study

The case study was not favorable for getting economic data for comparing with survey data given that youth shared work with parents and the environment for interview was not good to discuss in-depth on farm operational activities given that many of them were household head, having children on hand, and some of them were just beginning of farm work and therefore there was no good record keeping on farm work. Their works were ongoing trial learning with the training. Therefore, the case study was mainly discussing life history, reason to settle in farming, family support, future aspiration, factor of success and failure in settlement in farming and their perception on farming.

2.9.3 Year of getting marriage

In the survey I did not expect to include the variable age of marriage but I had to as I wanted to know if at the marriage they got land share from parents of both sides or not. But by not include this variable; I mix the picture of land share of both old and new couple. If the variable was included, it would give better picture. However, in the analysis we could still distinguish both old and young couple by their age. And this distinguished land they got at their marriage. I raised this question for a lesson learned for future study related to the question of youth integration in farming.

2.9.4 Typology of farm hosueholds

Given this study employed socio-ecnomic survey, the farm typology based on statistical approach using principle component analysis and cluster analysis require field revisit for validation the farm types found in this study in order to verify if they are reflecting the real situation. This study could not complete this process due to limitation of research budget and time constraint. However, based on the field observation and qualitative information obtained, the result of farm type is reflecting the situation. I acknowledge that due to the methodological application, the representation of farm types mainly reflects structural farm typology. While functional farm typology requires a closer look using agrarian diagnostic approach. Initially, this study does not attempt and does not design to employ this agrarian diagnostic approach given that youth situation in smallholding farming in Cambodia absent. That is the reason why this study employed socio-economic survey as an exploratory stage of getting general understanding youth situation in farming in Cambodia. Even the study employed the socio-economic survey, the questionair is designed to capture all agricultural activities raised in the agragrain diagnostic approach including, cropping systems, farming systems and livelihood activities undertaken by household to respond to the agrarian questions. The data was organized according to the cropping systems for making economic calucation such as land and labor productivity. The good point of doing farmy typology based on this socio-economic survey is that when the land is small, the agrarian diagnostic approach may not find the significant of land holding between the farm types which the statatical approach does.

2.10 Analytical Framework

The question of rural youth in relation to agriculture and rural-rural migration are not at the attention of any study in Cambodia. In 2010, there was only one study on rural migration and settlement done by IDRC, which indicates different waves of migration and settlement in rural Cambodia (Pilgrim et al., 2012).

Illustration 3 below illustrates the coherence of analysis of this doctoral study.

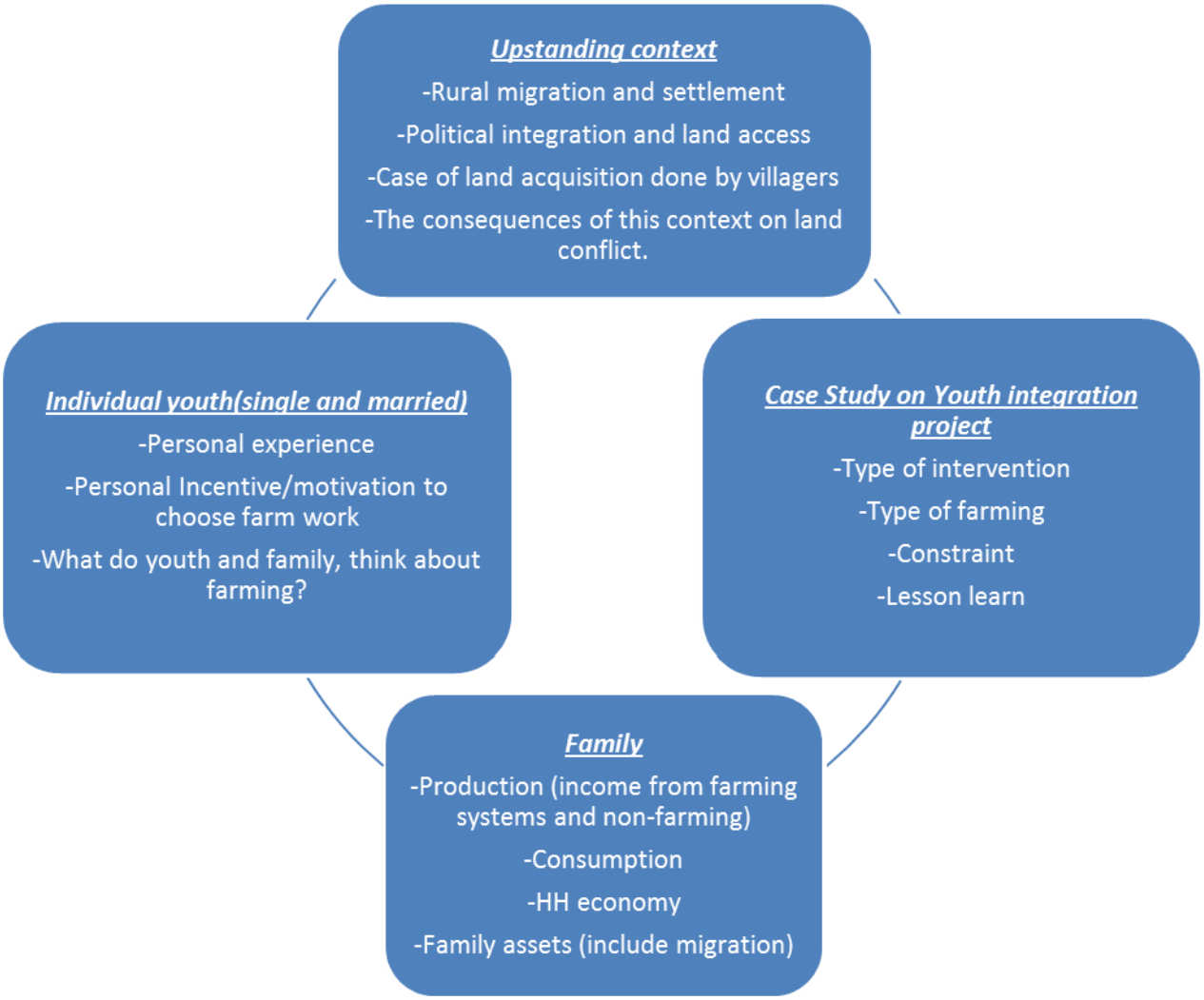

Illustration 3 Analytical framework of the PhD study

What would be policy perspective for future consideration on question of youth and employment in agriculture? Analysing Institutional environment/rural environment/decipher environment to draw policy perspective for future youth integration in farming

My study will begin by examining the contextual factors (rural settlement, migration, history of agricultural land seeking, and motivation for rural migration) that can explain different waves of rural migration and settlements.

After that, I will develop a typology of different farming systems and strategies, and examine the economic profitability of the different types, and whether they can generate enough income to meet farming families' livelihood needs. My study includes other income sources such as off-farm and non-farm availability, natural resource exploitation in all seasons. All these income sources will be used to compare with the daily consumption need stated by each family to see the economic sustainability of farm family (chapter 3).

Next, based on the farm typology and drawing on youth and adult household interviews, I will first examine the economic capacity of family farming and their youth integration capacity. Then, I will explore the rural youth's rationale for choosing occupation, the socio-economic background of the families, and their general perception of occupation in agriculture (chapter 4).

In chapter 5, I will look at general perception of single youth, youth couple and adult household to see the view on farming. After that, the case of CEDAC's Youth Agricultural Entrepreneurs program (YAE) has been explored. YAE has supported youth settling in farming for two years. My purpose is to see, under conditions of improved farming systems, technical advice, and training, what factors cause youths to stay or move away from farms? For this purpose, I have explored youth life histories to see how they decided to take part in the project, and examine the existing environment that contribute to the success and the constraint of youth integration efforts done by this NGO. By doing this, I will see the degree of effectiveness of the intervention, and consider some future pathways for the youth integration program (chapter 5).

Finally, I will draw on the combined knowledge from chapters 3-5 to analyses the prospects for youth integration in farming. In particular, I will focus on the importance of the institutional environment and national policies in the context of land scarcity. More specifically, I will use the survey results on land, settlement, demographics, and migration, for a discussion of the process of land occupation in the low and high density area-Takeo and Otdar Meanchey and relate to the survey results on the general economics of farming, and triangulate with the study on YAE. Lesson learn from this will be used a reflection on the degree of reality of recent land distribution policy if it met the objective of sustainability of

farming and the future consideration for any youth integration project that might talk place in the future for the solution of demographic growth and employment creation in within farming sector (chapter conclusion).

CHAPTER 3 UNDERSTANDING RURAL LIVELIHOOD AND SMALLHOLDING FARMING IN CAMBODIA

In Cambodia, rural youths find themselves seriously challenged when looking for non-farm activities due to their low level of education and limited opportunities. Many non-farm income jobs require a high-level of education and are very competitive. Young people also need a strong social network. Hence, migrating is a strategy for the rural youth to accumulate the financial capital to invest in their farm, such as enlarging the farm's size or buying a two-wheel tractor, fertilizer, and other farm inputs to make their livelihood more secure. Therefore, agriculture is viewed as more than just employment for rural youths: it is a source of livelihood that plays a vital role in accommodating youth in terms of income generation, food security, safety-net for a household and its migrant members, and source of basic education. However, smallholding farming in Cambodia faces a number of challenges in sustaining rural livelihood, especially when the profitability from farming is small due to small land size, high production cost and low yield and prices.

The knowledge from the field survey data collection suggests there are three local contextual factors which affect the options for youth integration in the three studied areas in different ways. They are the historical setting, the different socio-economic status of the areas, and the alternative employment options available. In the following, I will compare the three study areas with regard to these factors.

3.1 Historical setting of Otdar Meanchey and Takeo province

Looking first at the historical setting of Otdar Meanchey, it can be noted that it is a newly created province that was established in 1998. It was previously one of the districts of Siem Reap province. It is also the last base of Khmer Rouge and FUNCINPEC.[24] It is the last province that was integrated into the government administration in 1998.

This province suffered badly during the civil war. The western part of the province, which includes the district of Banteay Ampil and some parts of the Samrong district, was formerly controlled by Para forces (a local given name to the movements that aimed to free Cambodia from the Vietnam forces who occupied Cambodia between 1979 and 1989). The

[24]FUNCINPEC stands for Front Uni National pour un Cambodge Indépendant, Neutre, Pacifique, et Coopératif in French and National United Front for an Independent, Neutral, Peaceful, and Cooperative Cambodia in English.

centre part of the province, the Samrong and Chong Kal district, was controlled by the People's Republic of Kampuchea (PRK) who were backed up by the Vietnamese military. The eastern part of the province, the Anlong Veng region, was controlled by Khmer Rouge up to its final surrender in 1998, and was its last base.

After the liberation of Phnom Penh and central Cambodia by Vietnamese forces (VN) in early January 1979, the Cambodian people were in extreme poverty, not even food. This period was described as year zero. A serious drought during the following rainy season made things worse, since the conditions for rice cultivation were not favourable. The newly created government backed by the Vietnamese troops was under international embargo. Therefore, thousands of Cambodians fled to the Cambodian–Thailand border to seek for food from the United Nations (UN), who established refugee camps and distributed food to people along the border. At that time, resistance groups formed to fight against the invasion by Vietnamese troops.

During the time of resistance 1979-1990, these groups were based in the provinces along the Cambodian–Thailand border so that they could stay connected to the refugee camps situated in Thailand. In Otdar Meanchey, the Para force was stationed in the Kouk Khpos commune in Prey Tran (Tran Forest), which is just about 500 meters from one of my study villages, Chheur Slab[25]. In Kouk Khpos, there is a centre point called Tonlé Sar. This was the boundary/front line between Para forces and Vietnamese forces. From Kokpos to the West, the land was controlled by Para-forces and eastwards it was controlled by the VN and the PRK.

Some of the VN troops were stationed at the centre of the Samrong district, where the Doun Kaen village is situated. They held back people who wanted to escape to the refugee camps. The refugees then decided to settle in Ou Ruessei village because there were sources of water nearby, and then became the permanent residents of Ou Ruessei village. Soon after, the VN troops taught the new villagers how to grow vegetable from the VN troops, who then bought the vegetables from the villagers to supply their troops. This is how people in Ou Ruessei village began to grow vegetables.

It is important to explain briefly the history of the Para-forces in Cambodia, as this is part of the explanation for land acquisition in the study area. The first force, called FUNCINPEC, was led by King Norodom Sihanuk. The second force, called Khmer People's

[25] Said interviewee in Chheur Slab village.

National Liberation Front (KPNLF), was led by Mr Son Sann, who was prime minister of Cambodia during the 1960s. The third force, called MOLINAKA,[26] was formed from five resistance groups. Under the UN Paris Peace Accord, signed on 23 October 1991, these forces were integrated into the government through the first national elections, managed by UNTAC.[27] Khmer Rouge forces declined to join the elections claiming that the Paris Peace Agreements were not properly implemented. In particular, they accused the UN monitoring system examining the withdrawal of Vietnamese troop of being weak.

At the end of 1991, the refugees in several camps along the border were repatriated all over Cambodia. 138 households were repatriated to the Kam Norb village, located in Samrong district, which would later become the city centre of the Otdar Meanchey province. These households obtained residential land but not agricultural land. Together with other landless citizens, they cleared forest and grew rice in the Bansay Reak commune under shifting cultivation. Due to lack of dragged power and means of production, they could only do rice cultivation on very small plots of land of between two and four acres. At that time, the country's political situation was in chaos due to the presence of Khmer Rouge troops. The interviewees in the studied villages said that at that time, land acquisition occurred just for the purpose of survival. There were no clear land property rights. The original residents of Don Ken had only small land properties inherited from their parents, and these properties were scattered around the village. When the situation became more stable between 1996 and 1998, people started to occupy more land and clear the nearby forests to cultivate rice due to the increasing population in the area. There were also initiatives by the local authorities to establish a new village and distribute land to landless people supported by local military leaders. The overlap between these and the villagers' own initiatives resulted in chronic conflicts for example in the Kantuy Choun village. These conflicts remained unsolved until the complete shift of political power in 2003. Now, the resolution seems effective only in villages who supported the ruling party.

In Anlong Veng, the Khmer Rouge government allowed its people to come down from the mountains to settle in the area and seek agricultural land. People explained to me that

[26] MOLINAKA stands for Mouvement National de Libération du Kampuchea.
[27] UNTAC stand for United Nations Transitional Authority in Cambodia (February 1992 - September 1993).

they came to settle in the area (Tabun[28] village), as early as in 1991, where in most other places integration did not happen until 1997-98.

After the Paris peace agreements, these groups (FUNCINPEC, KPNLF, MOLINAKA) transformed themselves into political parties to compete in the upcoming elections. FUNCINPEC became the FUNCINPEC party; KPNLF become the Buddhist Liberal Democratic Party (BLDP) and MOLINAKA become MOLINAKA Party. PRK was then transformed to the State of Cambodia (SOC),[29] which was represented by the Cambodian's People Party (CPP). All parties participated in national elections on 23–28 May 1993 which were run by UNTAC.[30] The election results show that FUNCINPEC won 58 seats, CPP won 51 seats, BLDP won 10 seats, and MOLINAKA won 1 seat. However, CPP claimed irregularity, demanded re-elections in several provinces and threatened to create an autonomous area. King Norodom Sihanuk proposed a resolution of creating a coalition government with two co-prime ministers, where power was shared between the two parties (FUNCINPEC and CPP), which solved the immediate problem. However, the struggle among the two parties led to the collapse of coalition through a coup d'état run by CPP in July 1997. This resulted in 1996 being known as the year of Khmer Rouge integration. Two factions of Khmer Rouge forces in Samlot and Pailin (in the Battambang province) laid down arms and submitted themselves to the government under the win-win policy[31] initiated by the co-prime minister Hun Sen. Impunity was given by the King to the leaders of these two groups. Due to the coup d'état in 1997, FUNCINPEC forces fled to Otdar Meanchey, its former resistance base, and started the resistance again. At that time, the former Khmer Rouge in Samlot, who had been disappointed with their leader due to the unfair benefit sharing of the incentives given by the government right after the integration, decided to join FUNCINPEC and the Khmer Rouge forces in Anlong Veng. People were gathered by force again to live in refugee camps along the Cambodia–Thailand border in the Banteay Ampil and Anlong Veng districts, which my respondents in the Kouk Khpos and Ph'av communes witnessed.

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[28] Tabun is the name of one of the leaders of KR force from Mondulkiri, he is Phnong ethnic minority in Mondulkiri, later on the village was call Thnal Keng 105 meaning the corner road in T-shape, in which 105 is number of brigade 105 of KR force from Mondolkiri province.

[29] This name was given to the state during the transitional times from the withdrawal of Vietnamese troops from Cambodia in 1989 until the restoration of the monarchy in 1993.

30 UNTAC: United Nations Transitional Authority in Cambodia.

[31] This policy as three main strategies: guaranteed personal and family safety; assured career safety; and secured safety of properties. The field knowledge allows me to interpret the last two to mean that that the former Khmer Rouge have the right to control the area and manage their resources including land and forest under the government administration. They can still have their leadership role over people in the area, who are governed by them.

In 1998, the national reconciliation led to the election and integration of the Anlong Veng FUNCINPEC and Khmer Rouge forces. Between 1998 and 2000, villagers rapidly occupied the land to expand rice cultivation due to an increase of family members and the improved stability of the area. The strong relocation movement was remarkable in 1998, when people came to settle in this new area. Some of these migrations were organised by local people and some under arrangements by local authorities. Later on, requests were done spontaneously by village elders or deliberately by local authorities to register the village with the Ministry of Interior.

In 2008, political chaos in Thailand resulted in the Thai government (the Yellow shirt group, a Royalist Group) to fuel a border issue (case of Preah Vihea temple) with Cambodia. The conflict escalated from small arms clash to a small war at the border of the Otdar Meanchey and Preah Vihear provinces. Due to this, the government of Cambodia issued a special policy for the north-west region of Cambodia, which was partly in response to military needs and partly aimed at the long-term development of the newly established province. Many roads were constructed, such as the Nation Road No. 6, connecting Banteay Meanchey to Siem Reap; National Road No. 100, connecting the Kralanh district of the Siem Reap province to the Otdar Meanchey province; and National Road No. 57, connecting Samrong city to the Banteay Ampil district of Otdar Meanchey, the Banteay Chhmar district and the city of the Banteay Meanchey province. The aims of the policy can briefly be summarised as follows: to redistribute the labour force in the area, develop strong and permanent military bases, and transform former conflict areas into agricultural development and tourism zones. Due to the policy, villages along the border were newly joined with military bases. This led to land conflicts between those who encroached land in 1998–2000, those who settled later in 2008, and private companies, who were granted economic land concessions. Before 2003, provincial and district governors were from FUNCINPEC (particularly former military leaders). After 2003, all were replaced by CPP. At this time, some of the land conflicts were resolved, but the resolution did not meet the expectations of local people.

In the above historical description, the local timeline is connected with the national political timeline. I call this the “institutional environment.” The institutional environment in the studied area contributed to different waves of settlements and land acquisitions. Those who came after 2000 did not get distributed land free of charge. They could, however, purchasing land at a cheap price.

Takeo province is a much more politically stable area with a different history compared to Otdar Meanchey. However, some parts of the area, particularly the Tram Kak commune, were historically the stronghold of Khmer Rouge during the Pol Pot regime (1975–1979), and a liberated zones were established since 1971 (Chandler, 1999). The Khmer Rouge in Takeo was considered the strongest in the country. This force used to crackdown on any rebelling forces within the KR itself. After 1979, many people from this force sought refuge in the north-west (Battambang, Pailin and Samlot), the northern parts of Cambodia (Otdar Meanchey and Preah Vihear) and the southern part of Cambodia (the Takeo and Kampot provinces). After the integration in 1996, the Khmer Rouge who had been located in the Takeo province became a network inviting their relatives in Takeo province to settle in the new areas including the Pailin and Battambang provinces, or the Malay and Banteay Meanchey districts of the Otdar Meanchey province.

As mentioned above, the history of land acquisition in Takeo, thus, also links to the process of integrating Khmer Rouge, since this created the conditions for illegal land acquisition along the Dam Rei Romeal Mountain. However, the situation is Tram Kak is not as remarkable as in the Otdar Meanchey province.

At the time of writing, the Takeo province is the stronghold of the ruling party: the Cambodian's People Party. It is the homeland of many of the high-ranking officers such as the minister of agriculture, the deputy prime mister and some military generals. They often come to visit the Takeo province and offer support to people there, such as supporting infrastructural development like the irrigation scheme in Prey Kabas.

The above historical setting gives us the picture of situation of the two study provinces impacted on access to land and how security and stability of the area impacted on youths 'access to education and thereby impacted their choice to settle in farming.

3.2 Socioeconomic diagnostics of rural households

This section, I am going to look at the general social economic of the household survey in Tram Kak, Prey Kabas and Otdar Meanchey by looking at situation of youth and household such as demography, education, migration, income sources, consumption, food security access to credit and reasons of settlement of household. This will give the general picture of the three study areas that will be the basis for further understanding the diversity of farm household in each area.

3.2.1 Demographics

Cambodia's population has a young age structure. The annual population growth rate was 1.83 per cent from 2008 to 2013. The average household size was 4.6 persons per household in 2013. The total gender ratio (the number of males per 100 females) is 94.3. The Takeo province has a high population density of 200 to 499 persons per square kilometre, with a population growth of 1.78 per cent, while the Otdar Meanchey province has a lower population density of 20 to 49 person per square kilometre with a remarkably high population growth rate of 4.49 per cent (NIS, 2013).

My survey on 383 households in both the Takeo and Otdar Meanchey provinces shows the number of family members and their age, gender, education and migration profile of 2,185 people. 40 per cent (874 persons) are youths (aged between 15 to 30 years old). The average age is 27.14 years old (26.11 in Otdar Meanchey, 28.68 in Prey Kabas, and 27.82 in Tram Kak). This implies that both provinces have a young population, which also can be seen from the population pyramids in figure 1. The gender ratio is 98.54, which indicate there is almost equal distribution between males and females among the population in the study area. The average household size is 5.02 (5.4 in Otdar Meanchey, 4.83 in Takeo, 4.78 in Tram Kak and 4.89 in Prey Kabas).

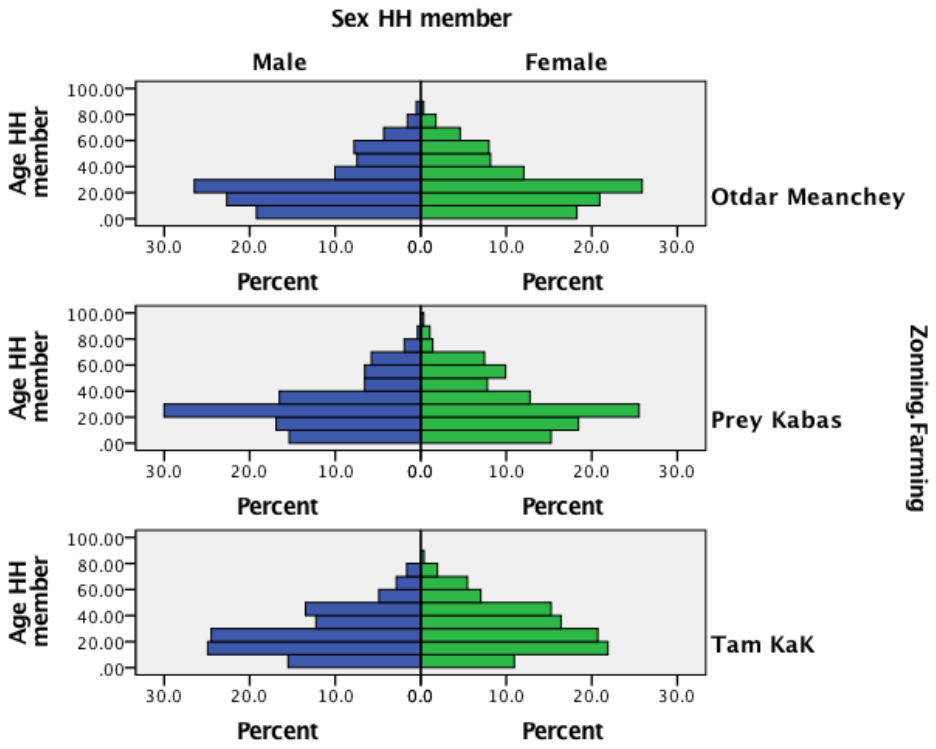


Figure 6 Population pyramid in the study areas by zone

3.2.2 Education

3.2.2.1 Youth education

Among the total youth population of 874, 670 (76.7 per cent) are no longer attending school, and 204 (23.3 per cent) are currently attending school. Table 3 illustrate the educational level attained by rural youth who stop studying.

Rural youth mainly drop out at primary and secondary school. Due to the insecurity and war experienced in the area, many people in Otdar Meanchey did not have access to education. Many of the household heads and elder people are illiterate. It was only after the region had peace and stability around 1998 and 2002 that people started forming new villages. School development and construction was initiated by the local people and formalized as state schools. However, at the first stage only primary schooling was available. So, even though young people have had access to school, at this early stage of school development, young people mainly access primary school because the secondary school is very far from home. That is why the survey shows that many young people stop schooling after primary school.

Unlike the Otdar Meanchey province, in the Takeo province where Tram Kak and Prey Kabas are situated is a stable and secure area. The youth in the area have better access to education than in Otdar Meanchey. However, in 1998, there was a change in educational policy. Both secondary and high school exams were reinforced and tightened, resulting many

youths dropping out in 1998 and 1999. This policy had an impact all over the country. In Prey Kabas people highlight that this matter had a strong impact on the decision of many youths in the area in favour of settling in farming.

The survey shows that youths aged 15 to 30 years old who are no longer studying report that they are access to mainly primary and secondary school. Tram Kak has lowest rate of youth access to primary school at 18 per cent and the high rate of youth access to secondary and high school at 47.5 per cent, while youths in Prey Kabas at the primary and secondary school level are 37.2 and 37.9 per cent respectively. Otdar Meanchey has the highest rate of youth drop out at primary school at 47.3 per cent, with 21.3 per cent dropping out at secondary school. While the percentage of illiterate youth in Tram Kak and Prey Kabas is 2.2 and 2.1 per cent respectively, Otdar Meanchey has the highest rate of illiterate youths at 19.2 per cent. Youths in Tram Kak have highest access to high school at 29.5 per cent, followed by Prey Kabas with 19.3 per cent. Otdar Meanchey has the lowest rate of youth drop out at high school with 9.4 per cent.

Very few youths finish their study at vocational training schools and university. Although the figure is low, Prey Kabas have the highest percentage of youths finishing education at university with 2.8 per cent, but the lowest rate of youths finishing vocational training with 0.7 per cent. 1.4 per cent and 1.3 per cent of youths finished university in Tram Kak and Otdar Meanchey respectively, while the percentage of youth finishing vocational training were 1.4 per cent in Tram Kak and 1.6 in Otdar Meanchey.

In general, nearly 40 per cent of rural youth dropped out at primary school, 30.30 per cent drop out at secondary school, 12 per cent are illiterate, 15.7 per cent drop out at high school and 1.3 and 1.6 per cent finish vocational training and university. If illiterate youth, primary and secondary school are count together, rural youth 81.31 per cent have access to secondary. At the primary and secondary school level in Cambodia, youth possess only basic knowledge of how to read, write, numerical calculations and basic life skills, but not professional skills oriented for job seeking. Besides factors such as war and insecurity in rural areas, particularly Otdar Meanchey, distance from secondary and high school is one of the main reasons for rural youth to drop out from school (The World Bank, 2017, p. 74).

Table 3 Educational level attained by youth (who no longer at school)

Zone	Educational level	Frequency	Per cent	Cumulative per cent
Tam Kak	Primary school	25	18.0	18.0
	Secondary school	66	47.5	65.5
	High school	41	29.5	95.0
	Vocational training	2	1.4	96.4

	Bachelor's degree	2	1.4	97.8
	Illiterate	3	2.2	100.0
	Total	139	100.0	
Prey Kabas	Primary school	54	37.2	37.2
	Secondary school	55	37.9	75.2
	High school	28	19.3	94.5
	Vocational training	1	0.7	95.2
	Bachelor's degree	4	2.8	97.9
	Illiterate	3	2.1	100.0
	Total	145	100.0	
Otdar Meanchey	Primary school	182	47.3	47.3
	Secondary school	82	21.3	68.6
	High school	36	9.4	77.9
	Vocational training	6	1.6	79.5
	Bachelor's degree	5	1.3	80.8
	Illiterate	74	19.2	100.0
	Total	385	100.0	
Total	Primary school	261	39.0	39.0
	Secondary school	203	30.3	69.4
	High school	105	15.7	85.1
	Vocational training	9	1.3	86.4
	Bachelor's degree	11	1.6	88.0
	Illiterate	80	12.0	100.0
	Total	669	100.0	

3.2.2.2 Children education (age below 14)

Although primary school is now accessible in rural areas, still 4 per cent of children (age below 14 years old) in Tram Kak, and 9 per cent in Otdar Meanchey did not attend the primary school, while in Prey Kabas, all under-youths attend primary school (Please see appendix 4 for detail dropout rate at different school age).

3.2.2.3 Household head's education

The 383 household surveys show that 24.3 per cent of household heads are illiterate or did not attend school, 47 per cent attended primary school, 25.2 per cent attended secondary school, 10.8 per cent attended high school and only 1 per cent attended upper high school. This suggests that majority of household heads did not have much access to education. The main grade that they can access to primary school is at grade 4, to secondary school is grade 8 and to high school is grad 11. While the education level of the household heads in Tran Kak and Prey Kabas household head is similar, Otdar Meanchey is remarkable because the household heads had having no access to school 39 per cent and primary school 51 per cent. This is due to the history in the area, which has due to war and political insecurity, people had no access to school. Interviews with the key informants revealed that about 50 per cent of adults in the area are illiterate. This figure is confirmed by the survey, which showed that among the adult population in Otdar Meanchey, 47.1 per cent did not attend school or were illiterate while

another 40.2 per cent only had access to primary school. The situation is much better in the other two zones.

3.2.2.4 Youths currently studying

Looking at the youth who are currently at school, the percentage of distribution of youths to the total number of youths currently attending school shows that Prey Kabas has highest percentage of youth studying upper high school. This corresponds to the field observation that households in Prey Kabas are better off and tend invest in children's higher education, even if they have to borrow the micro finance to do so.

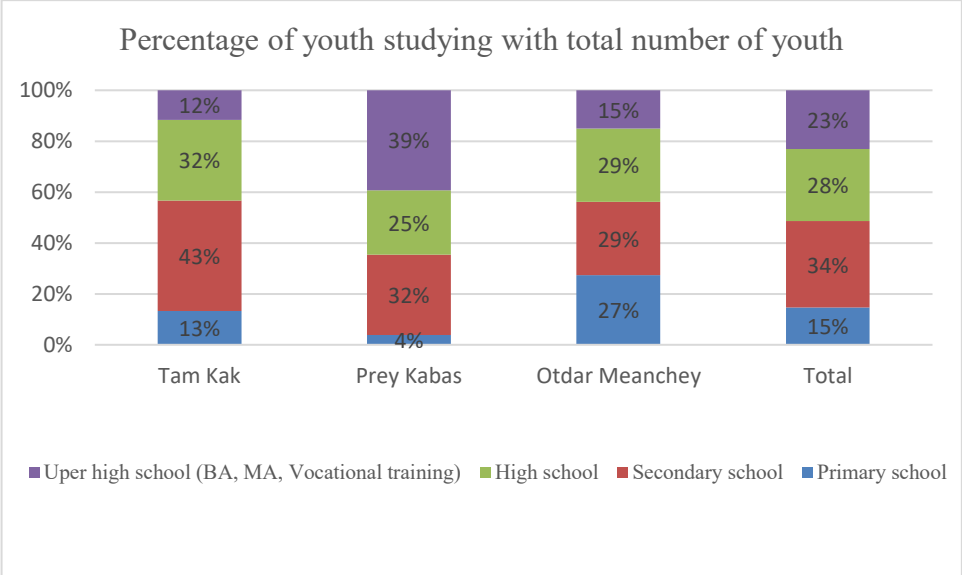


Figure 7 Percentage of youth currently studying by zone

3.2.3 Migration and youth

Among the 669 youth in the study who have dropped out or stopped studying, at the year interview, 31 per cent of them are on migration. Within this 31 per cent of, Tram Kak have highest rate of youth on migration with 49.6 per cent, Prey Kabas with 26.2 per cent and Otdar Meanchey with 26.7 per cent.

However, among the same 669 youths, 48.10 per cent of them used to migrate before the year interviewed: 57.6 per cent in Tram Kak, 42.8 per cent in Prey Kabas and 46.6 per cent in Otdar Meanchey. This implies that there are youth who just migrate in the year the survey was conducted, youth who returned from migration to their home village and youth who are still on migration.

Among the 31 per cent of youth who had migrated when the survey was conducted, 1.4 per cent in Tram Kak, 5.3 per cent in Prey Kabas and 17.5 per cent in Otdar Meanchey had never migrated before. This gives the average of 10 per cent of youth who had migrated in the three zones.

Among 69 per cent of youth who are residing in the village now, 17.1 per cent in Tram Kak, 24.3 per cent in Prey Kabas, and 33.6 per cent in Otdar Meanchey had migrated before the year interviewed. This gives the average of 28.9 per cent in all zones. These figures show there is higher percentage of youth who have return from migration and reside in their home village than youth who migrated for the first time in the year surveyed. This implies that rural family farms are currently accommodating drop out youths and return migrant youths.

Taking into account the total youth population distribution among each household including youth who currently study, youth doing non-farm work and youths doing farming work, on average across the three zones, 55 per cent of youths are engaging in farming activities, particularly rice farming, 5.7 per cent are doing non-farming activities, 15.4 per cent are migrating and 23.52 per cent are studying (Figure 8). Tram Kak has highest percentage of youth migration (25.23 per cent) and doing non-farm activities (6.42 per cent) and the lowest in doing farming (40.83 per cent). Prey Kabas has a higher percentage of youth doing farming than Tram Kak (52.76 per cent) but is lower than Tram Kak in youth migration (9.45 per cent) and youth doing non-farm activities (3.94 per cent). Otdar Meanchey has highest rate of youths doing farming, which account for 63.45 per cent of total youth in the area, whereas the percentage of youths who have migrated is lower than Tram Kak and higher than Prey Kabas. Prey Kabas has the highest percentage of youths studying, which corresponds to the field observation that the households in this area are well off and have a greater ability to invest in children's education than the other two study areas. Otdar Meanchey have lowest rate of youth studying, due to the historical reasons outlined above.

According to the key informant interviews, the high migration in Otdar Meanchey is due to drought in the interview year resulting a low rice yield. For example, in Sambou Meas, the village's normal rice yield is 2 tons per hectare but the drought impacted on yield and it dropped to 0.5 or 0.6 ton per hectare. In addition to the desire to earn additional income to support daily expenses, migration in Otdar Meanchey is also driven by land lost due to land conflict between the villagers, the military and concession companies; however, the households who had lost their land had completely migrated so were not there to answer the survey. Migration in this area is also strongly motivated by the aspiration to accumulate capital to invest in farm machinery, particularly to buy a two-wheel tractor and to buy more

land and expand the agricultural area, especially for young couple who only possess a small amount of land. In Tram Kak and Prey Kabas, the motivation for migration is to seek the complementary income to farm activities when the farms do not produce enough to meet the household's need.

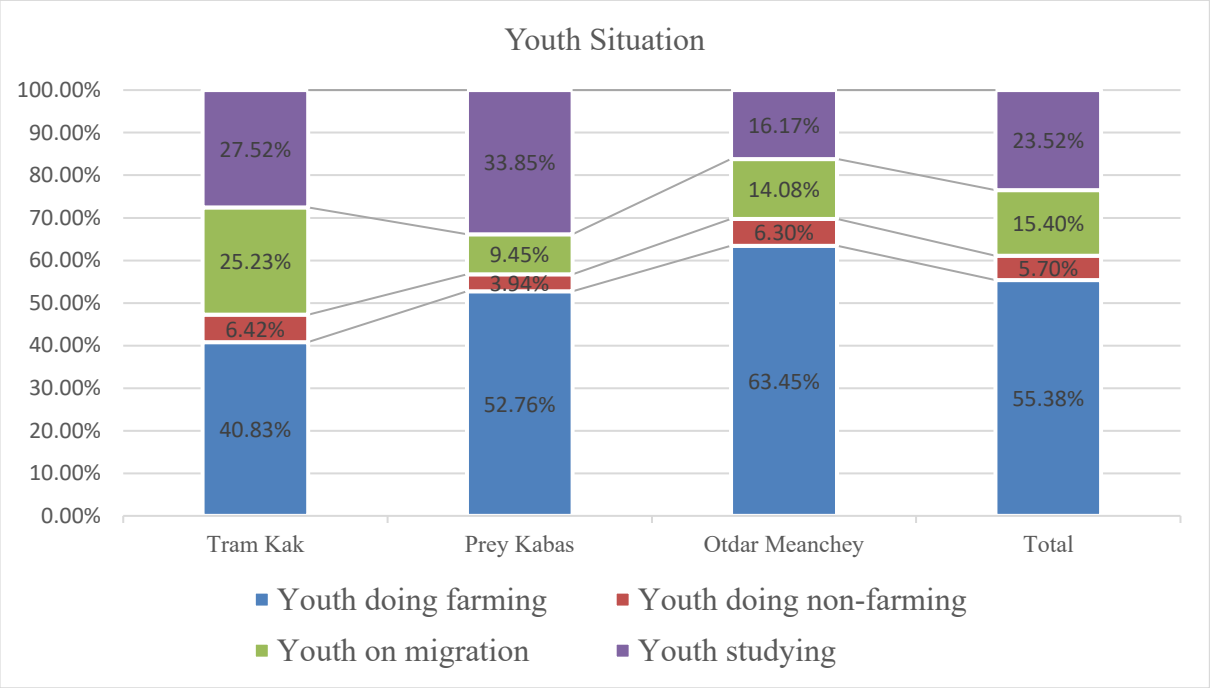


Figure 8 Youth situation in the study area

22 per cent of the household heads (83 of 382) migrated in the previous year. At the time when the interviews took place, only 12 household heads (approximately 3 per cent of the total household heads) were on migration. This is due to the interview taking place during the cultivation season when the household returns home. Migration is higher among household heads who were youths in comparison to adult household head, with 49 per cent youth and 17 per cent of adult household heads had migrated in the previous year. The destination of migration is mainly other provinces, Phnom Penh or Thailand. Otdar Meanchey has highest rate of migration to Thailand out of the three zones.

The destination of migration for youths was mainly the capital of Phnom Penh, other provinces of Cambodia and Thailand. In Tram Kak, 55 per cent of youth migrate to other provinces of Cambodia, 32 per cent to the capital and 10 per cent to Thailand; in Prey Kabas, youth migrating to other provinces accounts for 44.7 per cent, to Phnom Penh 31.6 per cent, Thailand 5.2 per cent and South Korea 2.6 per cent. In Otdar Meanchey, local migration within the province account for 10.1 per cent, migration to other provinces 23.3 per cent, to Thailand 65 per cent and to Malaysia 1 per cent (Table 4).

Table 4 Migration destination of rural youth

Youth destination of migration	Frequency	Per cent	Valid percentage	Cumulative percentage
In commune in the interview commune	6	2.86	2.86	2.86
In a district in the interview district	3	1.43	1.43	4.29
In province in the interview province	10	4.76	4.76	9.05
In other provinces	79	37.62	37.62	46.67
Phnom Penh	34	16.19	16.19	100.00
Thailand	76	36.19	36.19	82.86
Malaysia	1	0.48	0.48	83.33
Korea	1	0.48	0.48	83.81
Total	210	100.00	100.00	

3.2.4 Consumption and household expenditure

In addition to selling agricultural products for income, some of the agricultural product was kept for home consumption. Looking at the total consumption from farming in the three zones, rice consumption accounts for 75.83 per cent, poultry (chicken and duck) 15.07 per cent, common resources 8.46 per cent, while the vegetable annual crop and aquaculture contribute less than 1 per cent of the total consumption.

Tram Kak and Otdar Meanchey have similar percentages of rice consumption, with 72.3per cent and 73.41per cent respectively, while rice share highest percentage of rice consumption, 84.33 per cent, in Prey Kabas. Poultry in Tram Kak contribute 20.76 per cent, follow by Otdar Meanchey 15.36 per cent. The lowest consumption of poultry is in Prey Kabas 10.01 per cent. In Otdar Meanchey, poultry raising is not done for income-generation purpose but mainly for home consumption because chicken will be used as food to host the exchange labour during the picking season. This is not the case in Tram Kak and Prey Kabas, where poultry is used for family consumption

The proximity to community forestry provides access for the locals to common resources, particularly non-timber forest products (NTFP). This constitute the highest percentage of common resource consumption, with 10 per cent of the total agricultural consumption in the area. In Tram Kak and Prey Kabas, the common resources are mainly the collection of protein sources from the rice field (such as fish, crabs, snails and mice) which contribute about 5.15 and 5.65 per cent of total agricultural consumption respectively. However, due to the expansion of agricultural land and many people exploiting common resource, the people in Otdar Meanchey share the view that common resources have

dramatically declined. In Prey Kabas, the decline is attributed to the high chemical input used on rice cultivation (Figure 9).

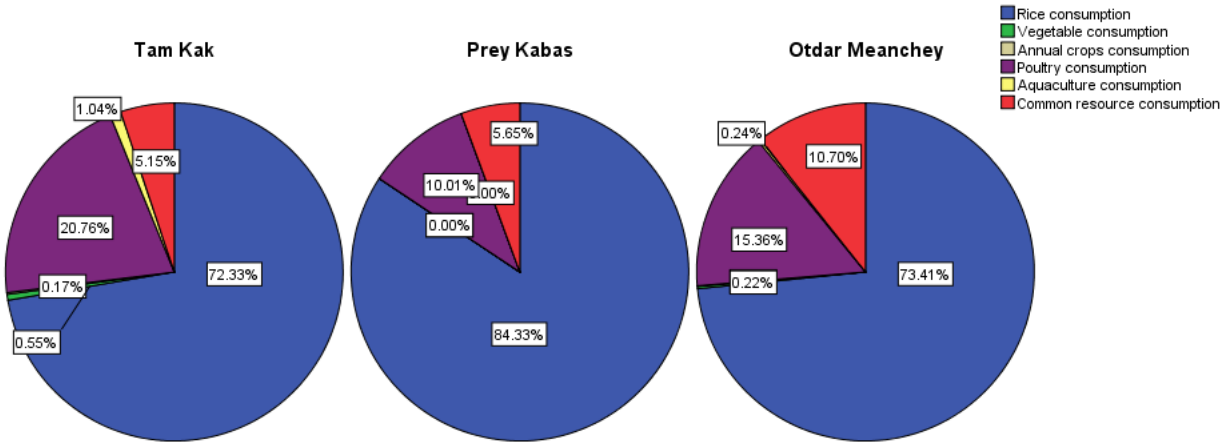


Figure 9 Percentage of agricultural consumption

In addition to the rice, vegetables, annual crops and poultry that households produce for home consumption and income generation, households' expenses for daily living including buying additional rice, daily food (such as protein and seasoning), clothes, medical treatment, electricity, cooking fuel, children's schooling and social contributions, such as wedding parties. These expenses are used the income generated both farm and non-farm income.

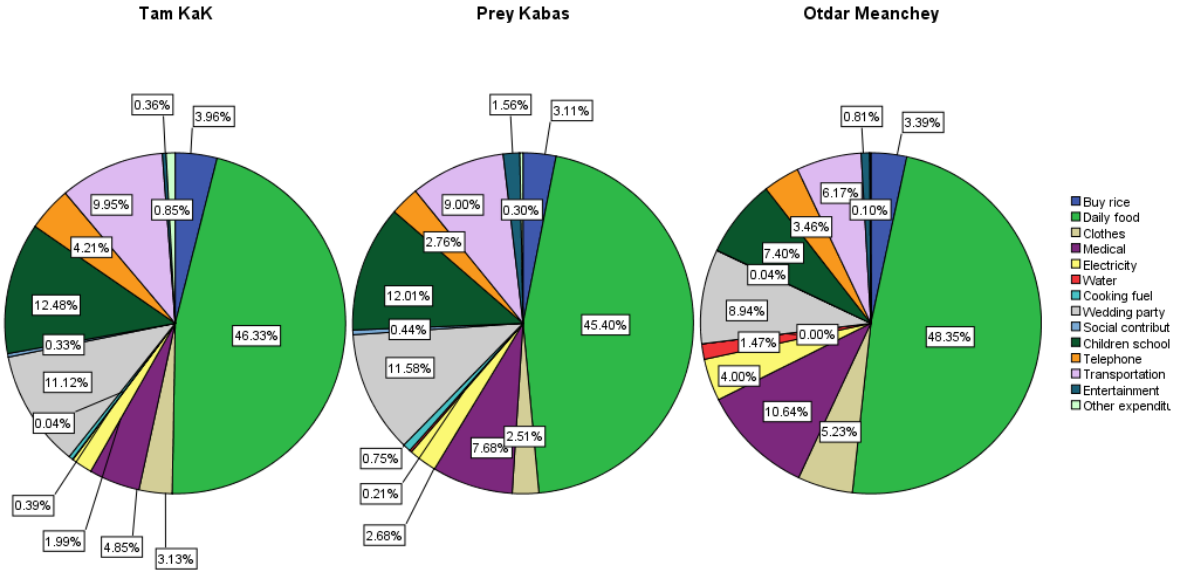


Figure 10 Percentage of household non-agricultural consumption (expense)

Figure 10 above shows that the percentage of household expenses or consumption in addition to agricultural consumption. 3 to 4 per cent was spent on buying additional rice while

45 to 48 per cent on buying daily food. This implies that in each zone spends on food nearly 50 per cent or more of the non-agricultural consumption. Beside the expenditure on food, according to field observation, expenses for contributing to wedding parties are considerable and was raised as a concern by many households. For some household, this type of expense is equal or even higher than the earnings from agriculture. Tram Kak and Prey Kabas share more than 11 per cent of total non-agricultural consumption, while Otdar Meanchey shares about 9 per cent. This share is just slightly lower than the expenditure on children's education, which is 12 per cent in Tram Kak and Prey Kabas and 7.4 per cent in Otdar Meanchey.

By grouping the consumption of food (the sum of agricultural consumption is the amount kept from the harvest and food expense is the amount that the household bought) and non-food consumption, the contribution of agriculture to total household consumption on average for the three zone is 33.29 per cent (30.56 per cent in Tram Kak, 26.83 per cent in Prey Kabas and 38.23 per cent in Otdar Meanchey). This implies that rural household spend on food an average of 65.35 per cent of total expenses, of which 33.29 per cent comes from agriculture that the household do not need to buy and another 32.05 per cent is expense is on non-food expenses, where the income from both farming and non-farm work is used to cover the expenses on food. The average percentage of spending on food in Tram Kak is 60.79 per cent, in Prey Kabas is 60.51 per cent and in Otdar Meanchey is 70.03 per cent (Figure 11).

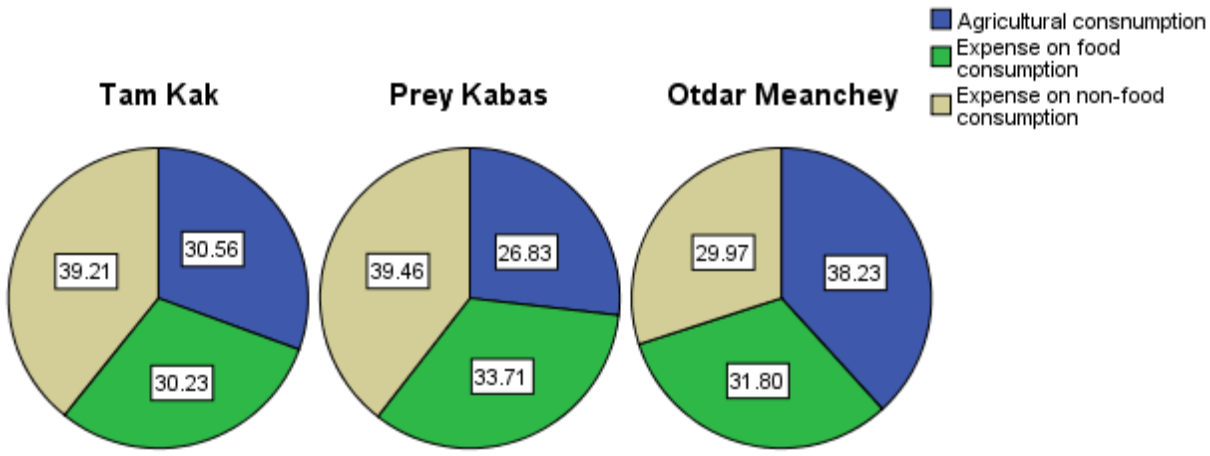


Figure 11 Expense on food and non-food of rural household in percentage

3.2.5 Income sources

Income is the net monetary value the household generates from each economic activity, both farming and non-farming, taking out intermediary cost for production and paid labor cost for when households hire external labor to execute the economic activities. The survey results show that in general, in the three studies sites agricultural income contributes approximately

69 per cent of the household's income, with 65 per cent in Tram Kak, 72 per cent in Prey Kabas and 64 per cent in Otdar Meanchey. The remaining 31 per cent is non-farm income, within which 22 per cent is non-farm activities and 9 per cent is from migration (**Figure 12**). It is interesting to see that non-farm activities developed by rural household, although contributing less than agricultural income, contribute twice as much as migration income in three zones: 21 per cent, 19 per cent, and 25 per cent in Tam Kak, Prey Kabas, and Otdar Meanchey respectively.

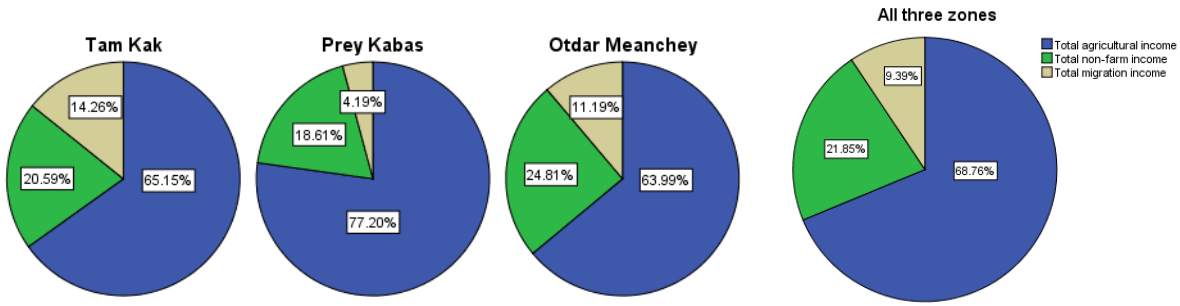


Figure 12 Income sources in Tram Kak, Prey Kabas and Otdar Meanchey

Looking at the agricultural income, rice is the predominant source of income and constitutes 38 per cent of total income. Annual crops and vegetables contribute a small amount, which is about 1.88 per cent and 2.38 per cent respectively, and income from raising animals, which includes poultry, pig, and fish, contributes 10.45 per cent. The impression from the field interviews suggests that cattle play an important role as supplementary income to rural households and this was highlighted in the survey result that cattle contribute about 12 per cent of total household income. Fruit trees, in particular coconut fruit, contribute income to a few households in Tram Kak and banana trees for a very small number of families in Otdar Meanchey. However, fruit trees are just a supplementary income and not the key livelihood activities of the people in the study area, as is the common resources (**Figure 13**). Given the access to irrigation in Prey Kabas, rice contribute 50 per cent of household income to people in Prey Kabas and cattle 15 per cent. Vegetables and annual crops is not the key crops and key activities in this area, and only three households grow annual crops and two households grow vegetables in the area. In Tram Kak vegetable and annual crops play role to some villages situated near natural lack such as Trapaing Chak and Kol Kom village. Vegetable is also common to households who is able to dig pond to store enough water for growing vegetable. In Otdar Meanchey, there is scattering of household distributed across each village that growing vegetables and annual crops, although there are not as many as

those who only grow rice. Therefore, five main sources of income for rural households were identified in the survey: rice, animal, cattle, migration, and non-farm activities (**Figure 13**).

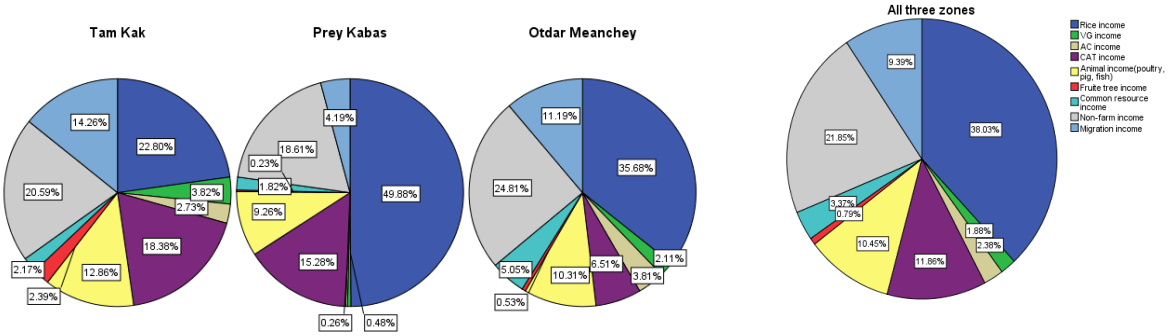


Figure 13 Detailed income sources from both farm and non-farm work

3.2.6 Food security

In the total household survey, 113 (30 per cent) of households said that they have to buy additional paddy rice or mill rice because what the run out of stock of what they produce. According to observation, those who have only a small amount of land produce rice just for home consumption and some cannot even produce enough for the whole year's consumption. However, some do not have enough because they sold rice when they needed[32] income and buy additional rice when it was running out. Some sell rice for income and then buy better quality rice for home consumption, particularly in Prey Kabas. That would explain why there is no correlation between the amount of rice bought and the land size.

Households had to buy more rice for an average period of 124 day a year, with the average quantity of 285 kilograms at an average price of 2137 riel/kg (approximately 0.53 USD/kg). On average, those who lack rice have to buy additional rice at a cost of 119 USD per year (Stdv 16USD). Tram Kak spent 85USD per year (Stdv 48.68 USD), Prey Kabas 181USD per year (Stdv.202.68) and Otdar Meanchey 106 USD per year (Stdv.71.36).

3.2.7 Access to credit

The survey showed that 61.4 per cent of households (235 of 383) are currently in debt, of which 44 per cent of households (97) in Tram Kak, 60 per cent of households in Prey Kabas (102) and 72 per cent of households (184) in Otdar Meanchey. Out of these households, 149 households revealed the amount of debt they were in. Based on this, the average debt that households have is 579.35 USD. The standard deviation is higher than mean value, suggesting

[32] For example, when they need money for contributing to wedding party

that there is high variation on the amount they borrow among households, ranging from 5 USD to 5000 USD.

Table 5 Average debt per household in three zones

Zone	N	Mean	Std. Deviation	Minimum	Maximum
Tam Kak	39	332.69	341.89	25	2000
Prey Kabas	61	894.88	944.82	25	5000
Otdar Meanchey	49	382.88	511.50	5	3000
Total	149	579.35	739.33	5	5000

Table 6 Average debt per household by borrowing source

Source of borrowing by household	N**	Percentage	Valid percentage	Cumulative percentage	Mean	N*	Std. Deviation	Min.	Max.	Sum	Percentage of total sum
Family/relatives	42	11	18	18	430	30	522	25	2000	12913	15
Your neighbor	35	9	15	33	290	18	259	5	1000	5218	6
NGOs	12	3	5	38	150	2	141	50	250	300	0
Trader/Employer/Agricultural firm	6	2	3	41	100	2	35	75	125	200	0
MFI/Bank	103	27	44	85	806	76	906	25	5000	61263	71
Rice bank/village bank	22	6	9	94	281	9	302	50	1000	2525	3
Saving group	14	4	6	100	351	11	303	6	1000	3856	4
Total	235	61	100		583	148	741	5	5000	86274	100
Missing System	148	39									
Total	383	100.0									

*Among those who reveal their amount of debt

**Among those who currently borrowing

Households mainly borrow from family or relatives, which accounts for 18 per cent of total household access to credit, 15 per cent borrowed from neighbors, 44 per cent from micro finance institutions (MFI), 3 per cent from local traders, 9 per cent from rice banks and 6 per cent from a saving group. However, the share percentage of amount of borrowing by the total amount borrowed shows that 71 per cent of the cash is borrowed from an MFI, while 15 per cent from family or relative, 6 per cent from neighbors, 3 per cent from a rice or village bank and 4 per cent from a saving group. Among the three zones, Prey Kabas has highest percentage of household borrowing from MFIs as well as the highest amount of cash borrowed.

The survey showed that 76 per cent of households in Tram Kak, 64 per cent of households in Prey Kabas, and 47 per cent of households in Otdar Meanchey have used their land title as collateral for borrowing.

The main reason for households borrowing money is to do agricultural work such as buying fertilizers, pesticides, repairing agricultural equipment, buying petroleum and other

relevant expend related to farming. This reason of borrowing accounts for 53 per cent of the 235 households who are in debt. 4.68 per cent said they borrow for investments related to self-business. 7.23 per cent borrow to buy food and 7.23 per cent borrow to pay medical treatment. 7.66 per cent borrow to buy land, the majority of them are in Prey Kabas (Table 7). In Otdar Meanchey, interviewees reported wanting more land but none of this reason reported in the purpose of borrowing. But people in the area has highest percentage borrow for doing agricultural activities which account for 77.3 per cent while the other zone 17.1 per cent in Tram Kak and 25.8 per cent in Prey Kabas (see appendix x for purpose of borrowing in each zone)

Table 7 Purpose of borrowing in the three zones

Purpose of borrowing	Frequency	Percentage	Valid percentage	Cumulative percentage
For agricultural work, buy agricultural tools/inputs	125	32.64	53.19	53.19
Investment	11	2.87	4.68	57.87
To feed the family (buy more food)	17	4.44	7.23	65.11
To pay for the medical treatment	17	4.44	7.23	72.34
To pay for children to go to school	9	2.35	3.83	76.17
To organize wedding/festival	10	2.61	4.26	80.43
For migration	3	0.78	1.28	81.70
To repay previous debt	2	0.52	0.85	82.55
To cope with crop failure	9	2.35	3.83	86.38
For young married couple starting business	3	0.78	1.28	87.66
To buy land	18	4.70	7.66	95.32
To buy motorcycle	4	1.04	1.70	97.02
To build household or part of the house	7	1.83	2.98	100.00
Total	235	61.36	100.00	
Missing System	148	38.64		
Total	383	100.00		

Among the 148 household who did not borrow, 15.54 per cent said that they are not able to borrow primarily because they are not sure if they are able to repay back the debt, another 1.35 per cent shared the same reason but due to high interest rates, while 0.68 per cent do not borrow because they have family support. The remaining 82.43 per cent do not borrow simply because they do not need to. This was supported by the field observation, where it was seen that there are some households that are in a situation of being too poor and therefore not able to borrow, which is the reason why they are not borrowing because they are afraid that they cannot afford to pay back the debt.

The net-income (the total gross value added minus the paid labor in production) of the family show that there are 76.2 per cent of households (292) who are income positive, while the remaining 23.8 per cent of households (99) are income negative. Among those who are income positive, 58.6 per cent are in debt. Given their income is positive, this implies that

household will likely to repay the debt. However, among those 23.8 per cent of the income negative households, 70.3 per cent are in debt (64 households). Given their income is negative, these households will likely find it hard situation to pay back the debt. Those who are income negative and do not borrow are likely to borrow in the future or have to take other measures to compensate for the lack of household income.

3.2.8 Settlement in Otdar Meanchey and Takeo

In Otdar Meanchey, migration is more remarkable in new villages than old villages. Migration to Thailand is common in the area. At first, people were not interested in working in Thailand as they could not save much money, especially those who earn less than 300 bath (about 8 USD/day). Secondly, it is illegal migration. However, since then people have become more interested in migrating to Thailand as they see others can earn high income from migration, especially since 2010, when legal migration became open to everyone. This happens due to the effort of the government promoting legal migration.

The qualitative interview with each village chief suggested that the movement of people settling in the area is driven by the growing of family members in the originated area. However, the reasons for settlement shown in the survey results are mainly related to land seeking. The process of settlement in new area begins when the household head arrives to investigate the area. After seeing the possibilities in the area, the household head sells their assets in the original area and comes to buy land in the new area. Once everything is settled, the whole family moves and settles in new village. The year of settlement determines the amount of land they get. Those who came to settle later tend to get less land because there is no more land available or land has become more expensive. This is confirmed in the qualitative interviews with village chiefs and some households. The test of correlation between the class of year settlement and the class of land show there is significantly negative correlation between land and year of settlement. However, this is just the general pattern. There some cases where newcomers have bigger areas of land as due to their financial resources they can buy more land from the locals.

Case Summary

Valid		Missing		Total	
N	Per cent	N	Per cent	N	Per cent
115	62.50 per cent	69	37.50 per cent	184	100.00 per cent

Table 8 Reasons for settlement in Otdar Meanchey

Why do you come to settle in this area?	Responses		Percentage of cases
	N	Per cent	
Seeking non-farm opportunities	3	2.00	2.60
Seeking agricultural land	60	40.80	52.20
To work as wage labor in agriculture	3	2.00	2.60
To live with relatives	5	3.40	4.30
Agricultural land is small in the previous location	19	12.90	16.50
Did not have residential land in the previous location	20	13.60	17.40
Married a with resident here	10	6.80	8.70
To begin new livelihood as previous location is not favorable (for young couple)	5	3.40	4.30
No land in the previous location	4	2.70	3.50
Others	18	12.20	15.70
Total	147	100.00	127.80

Among the 184 households interviewed, 115 responded to the question about the reasons they came to settle in the village and those 115 people ticked 147 boxes, which is about 1.3 boxes per person. This means that many of them have reported more than one reason. We have two sets of percentages. One column uses the total number of responses (147) as a base value for the percentages and the other column uses the number of cases (115) as the base. 52.20 per cent of the respondents said the main reason for settling in the area is to look for land in agriculture. That is 40.8 per cent of all the answers. 16.5 per cent said that they have come here because the agricultural land is small in the previous location. This is 12.9 per cent of all the answers. Not having residential land in the previous location was reported as a settlement reason for 17.4 per cent of respondents, which is about 13.6 of all the answers. 3.5 per cent of respondents said the motivation to settle here was that they did not have land in their previous location.

Many of the answers on the reason for settlement are primarily related to land. If the percentage of case that are related to land are summed up, we can see that about 70.7 per cent of respondents have mentioned reasons of settlement related to land, which take 89.6 per cent of all the answers.

Looking at the distribution of years that people came to settle in the village, we can see the movement of people comes into the area in an influx from 1997 to 2002. Considering those who settled in 1979 and earlier the original residents in the area, we then see that 29 per cent of them are old villagers. People who settle between 1980 and 1996 account for 27 per cent. Those who come to settle later than 1996, there are 82 families, which is 45 per cent of the total 184 households interviewed.

Table 9 Year of settlement in Otdar Meanchey

Year of settlement	Frequency	Percentage	Valid percentage	Cumulative percentage
Home village	18	9.80	9.80	9.80
In 1979 and earlier	35	19.00	19.00	28.80
1980 - 1985	16	8.70	8.70	37.50
1986 - 1990	13	7.10	7.10	44.60
1991 - 1995	20	10.90	10.90	55.40
1996 - 2002	66	35.90	35.90	91.30
2003 - 2005	4	2.20	2.20	93.50
2006 - 2010	10	5.40	5.40	98.90
2011 and later	2	1.10	1.10	100.00
Total	184	100	100	

To see where those 45 per cent of new settlers are coming from, I select those 45 per cent and see their home province. 20 per cent of people coming from various provinces. 18 per cent are coming from Banteay Meanchey and 20 per cent coming from the Siem Reap province. Both provinces are provinces near Otdar Meanchey. The other 43 per cent are people from the Otdar Meanchey province who have moved from nearby districts or communes to seek land due to have no land or a small amount of land in the previous location. This result supports the qualitative interviews, that to be near family members and having a small amount of land in their previous location drives people to move to Otdar Meanchey, particularly those from Siem Reap and Banteay Meanchey.

Table 10 Home province of new settler in Otdar Meanchey

Home province*	Number	Percentage	Cumulative percentage
Kampong Thom	1	1	1
Kandal	1	1	2
Mondullkiri	1	1	4
Pursat	1	1	5
Battambang	2	2	7
Prey Veng	2	2	10
Takeo	2	2	12
Kampong Cham	3	4	16
Preah Vihear	3	4	20
Banteay Meanchey	15	18	38
Siem Reap	16	20	57
Otdar Meanchey	35	43	100

Total	82	100

*Year of settlement after 1996 - and later

Unlike in the Otdar Meanchey region, where the main reason for moving land seeking, settlement in Tram Kak region is mainly driven by marriage to a resident in the region. Among the 97 of respondents, 36 people responded to the question and ticking 38 boxes of answers, which implies that most of them chose on only one answer. 86.1 per cent of people reveal that the reason for settlement in the village is because they get married to a resident there, taking 81.6 per cent of the answer.

Case Summary

Valid		Missing		Total	
N	Per cent	N	Per cent	N	Per cent
36	37.10 per cent	61	62.90 per cent	97	100.00 per cent

Table 11 Reason for settlement in Tram Kak

Why do you come to settle in this area?	Responses		Percentage of cases
	N	Percentage	
To live with relatives	2	5.30	5.60
Marriage to a resident here	31	81.60	86.10
To begin new livelihood as previous location is not favorable (for young couple)	1	2.60	2.80
Others	4	10.50	11.10
Total	38	100.00	105.60

There are 40 families (about 41 per cent of 97) report as old villager (birth village) and did not report the year of their settlement in the village. By considering people who settle in and before 1979 as old villagers, the classification year of settlement shows home villagers account for 75 per cent of respondents. Those who moved in between 1980 and 2000 account for about 15 per cent (15 families). Those who come to the area later than 2001 account for about 9 per cent (9 families). This reveals that majority of people in Tram Kak are old residents and that those who come to the area later did so because they married a resident in the area. By checking their home district, I see that majority of original locations are from the same district in Tram Kak or the same province, Takeo. There are very few from the Kampot and Kandal provinces.

Table 12 Year of settlement in Tram Kak by home province

Year of settlement	Where is your home province?					Total	Percentage	Cumulative percentage
	Kampot	Kandal	Phnom Penh	Svay Rieng	Takeo			
Home village	0	0	0	0	40	40	41	41
Before 1975	0	0	1	0	24	25	26	67
1975 - 1979	0	0	0	1	7	8	8	75
1980 - 1985	1	0	0	0	5	6	6	81
1986 - 1990	1	0	0	0	4	5	5	87
1991 - 1995	2	0	0	0	1	3	3	90
1996 - 2000	0	0	0	0	1	1	1	91
2001 - 2005	0	0	0	0	4	4	4	95
2006 - 2010	0	1	0	0	2	3	3	98
2011 and later	0	0	0	0	2	2	2	100
Total	4	1	1	1	90	97	100	

Similar to the Tram Kak region, the main reason that people settle in the Prey Kabas area is mainly driven by getting married to a resident in the area. Among the 102 households interviewed, 29 peoples responded to the question about reasons for moving by ticking 29 boxes of answer, which implies that each of them has chosen only one answer. 62.10 per cent of people reported that the reason for settling in the village is because they got married to a resident of Prey Kabas. This accounts for 62.10 per cent of the total answers.

Case Summary

Valid		Missing		Total	
N	Per cent	N	Per cent	N	Per cent
29	28.40 per cent	73	71.60 per cent	102	100.00 per cent

Table 13 Reasons for settlement in Prey Kabas

Why do you come to settle in this area?	Responses		Percentage of cases
	N	Percentage	
Seeking non-farm opportunities	1	3.40	3.40
Seeking land in agriculture	2	6.90	6.90
To guard others land	1	3.40	3.40
To live with relative	1	3.40	3.40
Did not have residential land in the previous location	1	3.40	3.40
Marriage a resident here	18	62.10	62.10
Other	5	17.20	17.20
Total	29	100	100

By checking the year of settlement in the village, I can see that there are only three families that settled in the village. One family who were originally from the Kandal province settled in 1990. The other two families are from Kampong Cham and Koh Kong and they moved in 2002 and 2004 respectively. The rest of residents already lived within the Takeo province. Regardless of those who settle before 1979, I can see that the Takeo people began

settle in Prey Kabas mainly between 1980 and 1990, which accounts for about 15 per cent. There are about 20 per cent of families who arrived after 1990.

Table 14 Year of settlement by home province in Prey Kabas

Year of settlement	Where is your home province?				Total	Percentage	Cumulative percentage
	Kampong Cham	Kandal	Koh Kong	Takeo			
Home village	0	0	0	39	39	38	38
Before 1975	0	1	0	16	17	17	55
1975 - 1979	0	1	0	8	9	9	64
1980 - 1985	0	0	0	11	11	11	75
1986 - 1990	0	1	0	3	4	4	78
1991 - 1995	0	0	0	3	3	3	81
1996 - 2000	0	0	0	4	4	4	85
2001 - 2005	1	0	1	5	7	7	92
2006 - 2010	0	0	0	6	6	6	98
2011 and later	0	0	0	2	2	2	100
Total	1	3	1	97	102		

Table 15 below shows the distribution of the district of origin from 97 families in the Takeo province. 4 per cent come from Angkor Borey and 2 per cent from the Sam Rong district, but the majority (92 per cent) come from the Prey Kabas district itself. This can include moving from a different commune within the same district or a nearby village within the same commune of Prey Kabas, mainly due to getting married, as indicated in the table of reasons for settlement.

Table 15 Year of settlement by home district in Prey Kabas

Year of settlement	Home district			Total	Percentage	Cumulative percentage
	Angkor Borey	Sam Rong	Prey Kabas			
Home village	0	0	63	63	65	65
1980 - 1985	1	0	10	11	11	76
1986 - 1990	0	0	3	3	3	79
1991 - 1995	0	0	3	3	3	82
1996 - 2000	0	0	4	4	4	87
2001 - 2005	1	0	4	5	5	92
2006 - 2010	1	1	4	6	6	98
2011 and later	1	0	1	2	2	100
Total	4	2	89	97	100	
Total	4	2	92	100		

Looking at the reported reasons for settling in the three-study area suggests that movement to Otdar Meanchey is driven by agricultural land-seeking. Multiple migration from rural to rural area is done by both outsiders from difference provinces and people within the province. The qualitative interview showed that due to the children's limited access to education and family members moving to the area, rural families in Otdar Meanchey are

motivated to settle in new areas where land is accessible in order to secure their livelihood as well as secure the future for their children through preparing the land for sharing to their children. In Tam Kak and Prey Kabas, the main reasons for settling are the same: the newcomer comes to the village because they married a local resident and they mainly come from the same province, a nearby district or within the same district.

3.2.9 Concluding remark

From looking at the socioeconomic demographics of rural households, we can see that in the three study areas have a young population, with an average age of 27 years old and an average household size of five persons per household. According to the Cambodian definition of youth, youths account for about 40 per cent of the people living in the study area. The majority of rural youth mainly finish schooling at either primary of secondary school. If a youth drops out, there is apparently no alternative for work besides farming. Hence, the percentage of youth who have dropped out and are currently working on farming is high at about 55 per cent while, only 6 per cent work in non-farm labour and 15 per cent migrate. Rural household spend 65.35 per cent of their income on food, of which 33.29 per cent is the contribution from their own farming. Agriculture contributes 69 per cent of total household income, suggesting that farming plays a significant role for rural households. Rice, vegetable, annual crops, cattle and other animal-raising are the main sources of income from farming.

The majority of rural household (approximately 61 per cent) are in debt with an average debt of 579.35 USD per household; however, there is a high variation in the amount of debt between individual households. The main purpose of borrowing is to do agricultural work and investments and to buy land. The main source of borrowing is from MFIs, with a very small amount from a village bank or saving group. This implies that local initiatives such as saving groups or village rice banks are not enough to meet the demand of capital for farming investment, but rather help rural households with small shortages.

While new settlement in Tram Kak and Prey Kabas is mainly driven by marriages with a local from a village in the area, in Otdar Meanchey migration is driven by multiple reasons, such as agricultural land-seeking due to shortages of land in the previous location. Due to the distance from school and past political insecurity of Otdar Meanchey, many youths did not have access to school and are illiterate. Hence, seeking new land in Otdar Meanchey can be a way not only to just secure the family's livelihood but also to secure the future of children who apparently have no alternative for work other than farming.

3.3 Non-farm activities

In this section, I will look at non-farm activities and their roles in contributing to household income. I will also discuss the views of respondent about non-farm activities that may lead to them to view farming is a vital source for sustaining their livelihoods.

3.3.1 A short history of non-farm activities in Cambodia

Two main studies from CDRI provide extensive examination on the evolution of non-farming activities in Cambodia. The first one is Acharya, Kim, Chap, and Meach (2003a) and the second one is Acharya et al. (2003b). The authors link work to history and suggest that the recent development of non-farming activities are just the beginning of the development.

In early of the Khmer history, the Khmer was believed to possess the knowledge of astronomy, geometry and mathematics. This has been drawn from the big architecture of Angkor Wat and the many other temples across the kingdom. However, it is unknown whether the Khmer used this knowledge to create non-farm activities; rather, they used it to develop means of transport, weapons for expanding the country and food processing.

After the Angkor period, there is little knowledge about Cambodian history between the 14th and 19th century. However, in early mid-19th century, Cambodia faced severe famine and attacks from invading armies, that resulted in the country becoming less populous. The Khmer predominantly resided in rural areas and earned a living based on subsistence farming, leaving the non-farm sector to the hands of ethnic minorities such as the Chinese, the Sino-Khmer and the Cham to manage marketing, non-rice garden farming, weaving and commercial fisheries (Willmott, 1966). Technological knowledge was lost and remained possibly only in the Kampong area (a port area situated on the water bank whose residents engage in trade and transport) where the community still possess some skills such as in land navigation, boat making, fish processing, food processing, spinning and weaving in addition to rice growing (Acharya et al., 2003a).

During the French colonial period, cotton processing (ginning, weaving and spinning) was introduced to Cambodia. This knowledge and method survives until this day; however, people use imported yarn because the cotton production could not be revived. Commercial fishing was also first observed a century ago (Acharya et al., 2003a). Since the French colonised Cambodia in 1863, Cambodia's economy was integrated with the southern part of Vietnam (Cochinsin). The export of rice, smoked fish, timber and other Cambodian products were managed by Chinese and Vietnamese traders in Prey Nokor city (currently Hochinminh city) (Chandler, 1999). Rubber farms were established in 1920 but centrally managed by the

French colonists. Between 1930–1940 Cambodia lived isolated from the Khmer-Shino economic zone (Acharya et al., 2003a). By choice or by necessity, the majority of Cambodians at that time started to work as civil servants, land tenants or become a monk in the Buddhist religion, leaving the commercialization in the hands of Chinese and Vietnamese traders. The immigration of Vietnamese was encouraged by French colonials, as they were perceived to be enthusiastic workers and had greater French knowledge than the Khmer. Thereby, the Vietnamese were given many positions in the colonial administration as well. In the capital of Phnom Penh, there were 100,000 habitants in 1936. Half of them were Vietnamese and Chinese immigrants who managed all of the trade and commercial activities. 45,000 people resided around the Royal Palace including monks, home gardeners, handicraft makers, small traders, all of whom reside in different arrondissement in the south and west of the place (Chandler, 1999). This period was remarkable due to the significant grow of urbanization thanks to the establishment of transportation, telecommunication and electrification, as well as the building of a railway in 1932. A number of Cambodian intellectuals travelled to France for higher education. This provides the basis for modernization in the city and subcities such as Battambang, Kampong Cham, Siem Reap and Shihanukville. However, it is not that easy to explain the slow evolution of non-farm activities. Unlike many societies, where non-farm activities emerge because of higher productivities, Cambodian agriculture is very low as predominantly by extensive (Swiden). The taxation to support the palace and the colonists during the colonial period did not permit the growth of land and labor productivities. Along with the absence of agricultural technology, these factors drove rural household communities to work on the land for a subsistence basis only (Acharya et al., 2003a).

After Cambodia gained independence in 1953, the country became small industry-based, with many small and medium industries operating in Cambodia. These included car assembly facilities, scooter factories, soap factories, weaving factories, paper mills, sugar mills, chemical plants and food caning factories. The private investment begins taking root in this period and there was much human resource development, such the creation of higher educational institutions like medical, engineering and other technical training schools. However, these activities were taking place only in the capital and the majority of Cambodians continued to live in rural areas and earn a living based on subsistence farming (Acharya et al., 2003a). In the late 1960s, Cambodia entered the Indo-China War and from 1970 to 1990 the country experienced civil war, particularly the period from 1975 to 1979 where all infrastructures and much human capital was completely destroyed. People were again separated from skill work and engaged only in farming activities. After 1980, some

activities under the Krom Samki cooperative such as rice milling and other food processing were reintroduced. In 1985, street vending and petty marketing were widespread. Large-scale industrialization only began in 1990s (Acharya et al., 2003a).

The study done in 2003 describes the common non-farm activities done in Cambodia, which are mainly traditional ones such as brick-making, fish processing and weaving. The recent integration of Cambodia into the ASEAN community after2000 and the improvement of the investment environment done by the government offer new kinds of non-farming job, particular in the garment sectors, construction work, entertainment industries, tourism and financial and other services. These kinds of job are available mainly in the capital and the main cities of Cambodia. However, some garment factories have recently moved to closer to rural provinces such as Takeo, Kandal, Kampong Speur, Kampong Chhnang and Kampong Cham.

3.3.2 The nature of non-farm activities in the three study areas

3.3.2.1 Five main categories of non-farm activities

The field observation suggests different situations are linked to the non-farm activities available in each area. Otdar Meanchey is driven by land expansion, new settlement on new land and migration to Thailand. Exchange labor and the tractorization of two-wheel-tractors is notable in this area. In Tram Kak, due to its small land size and no access to irrigation, people in this area try to seek non-farm alternatives to complement farming, such as working as a trader, seller, garment worker, tailor or a salaried employee. The only different from Tram Kak in Pray Kabas is that that area has access to irrigation, where people can intensify rice up to three times a year. Farming is also assisted by mechanization, particularly through the use of harvest machines. Weaving (handcrafting) is also common, but it is generally just optional work. However, the situation of migration for non-farm jobs in Pray Kabas is quite similar to the Tram Kak commune, given that both are in close proximity to the capital Phnom Penh. Next, I will look at the survey in order to see more detail about each activity. Table 17 summarizes the main non-farm activities in the study areas based on the activity. The percentage is measured among the total activities undertaken by family members in each zone along with the estimated labor spend on activities and labor productivity.

Non-farm and off-farm activities in the study areas can be categorized into five main categories: migration, agricultural wage labor, self-business, salary-based jobs and labor-based job. Table 16 illustrates the percentage of each main activity to the total activities in each study area. For detail on the activities in each main category, see Appendix 14.

Table 16 Non-farm off-farm activities in the three study areas

Zone	Case Summary of non-farm activities[a]						Average activity per household
	Valid		Missing		Total		
	N	Percentage	N	Percentage	N	Percentage	
Tam Kak	80	82	17	18	97	100	1.35
Prey Kabas	76	75	26	25	102	100	1.43
Otdar Meanchey	159	86	25	14	184	100	1.37

a. Dichotomy group tabulated at value 1.

Zone	Main category of non-farm activities[a]	Responses		Percentage of cases
		N	Percentage	
Tam Kak	Migration	32	30	40
	Agricultural wage labor	15	14	19
	Self-business	25	23	31
	Salary-based job	7	6	9
	Labor-based job	29	27	36
	Total	108	100	135
Prey Kabas	Migration	12	11	16
	Agricultural wage labor	25	23	33
	Self-business	29	27	38
	Salary-based job	10	9	13
	Labor-based job	33	30	43
	Total	109	100	143
Otdar Meanchey	Migration	39	18	25
	Agricultural wage labor	86	39	54
	Self-business	39	18	25
	Salary-based job	27	12	17
	Labor-based job	28	13	18
	Total	219	100	138

a. Dichotomy group tabulated at value 1.

80 households, accounting for 82.5 per cent of the total 97 households in Tram Kak, do non-farm activities. They undertake 108 main activities, of which 30 per cent are migration activities, 14 per cent are agricultural wage labor, 23 per cent are self-business, 6 per cent are salary-based jobs, and 27 per cent are labor-based jobs. At a household level, households with migration accounted for 40 per cent of total households, while of the rest, 31 per cent do self-business, 19 per cent do agricultural wage labor, 9 per cent have a salary-based job and 36 per cent have a labor-based job. The total percentage of households who do non-farm activities is 135 per cent. This implies that some rural household have undertaken more than one non-farm activity. 108 activities were done by 80 households, implying that each household has an average of 1.35 non-farm activities.

In Prey Kabas, 76 of 102 households (75 per cent) do non-farm activities, of which only 16 per cent are migration, 33 per cent do agricultural wage labor, 38 per cent has a self-business, 13 per cent has a salary-based job and 43 per cent is labor-based jobs. On average, a household conducts 1.43 non-farm activities.

In Otdar Meanchey 159 of 184 households (86 per cent) do non-farm activities, of which 25 per cent is migration, 54 per cent is agricultural wage labor, 25 per cent is self-business activities, 17 per cent is salary-based jobs and 18 per cent are labor-based jobs. Households undertake on average 1.37 non-farm activities per household.

In general, Tram Kak and Otdar Meanchey, is notable by migration. Agricultural wage labor is remarkable in zone Otdar Meanchey while in Prey Kabas is remarkable by labor based. Self-business shares the same pattern across the three areas. Table 17 summary of the labor productivities and labor input among the three areas. The percentage is count among the detail activities.

Table 17 Comparison of non-farm activities in the three-study area

Non-farm activities	Tram Kak				Prey Kabas				Otdar Meanchey			
	N	Percentage of all activities	Mean labor productivity (USD/per/day)	Mean labor input (day)	N	Percentage in all activities	Mean labor productivity (USD/per./day)	Mean labor input (day)	N	Percentage in all activities	Mean labor productivity (USD/per./day)	Mean labor input (day)
Salaried employment	8	6	2.4	245	11	8	2.4	245	28	10	5.7	261
Palm sugar production	1	1	6.3	120	0	0	.	.	1	0	0.8	27
Small business	28	21	2.0	295	28	21	3.2	290	41	14	2.9	273
Agricultural wage labor	17	13	3.5	10	27	21	4.6	18	128	45	3.5	10
Construction work	19	14	4.1	87	4	3	4.3	109	11	4	3.9	85
Handicraft work	0	0	.	.	34	26	1.4	181	0.	0	.	.
Garment work	8	6	1.6	308	2	2	1.3	225	2	1	2.1	360
Moto taxi	2	2	3.1	365	1	1	2.5	350	3	1	3.9	184
Other non-farm activities	4	3	6.5	14	9	7	4.7	60.56	10	4	3.7	32
Remittance USD per year/person	46	35	236.3		15	11	251.5		60	21	461.0	.
Total people doing activities	**133**	100			**131**	100			**284**	100		

3.3.2.2 Agricultural wage labour

From the survey as well as the qualitative interviews with farmers, it is suggested that agricultural wage labor and construction wage labor are complementary activities. They are not the key activities developed by a household like a small business. Agricultural wage labor can be done by both men and women, while construction works are purely done by men and mainly male household heads.

Given that Otdar Meanchey is driven by new land clearance, therefore the agricultural wage labor activities available are land clearance, exchange labor, planting cassava, weeding grass out of cassava plantations, ploughing, harvesting rice and cassava, and transporting agricultural product. The land clearance is the reason why there is a higher percentage of people doing this activity in Otdar Meanchey in comparison to the other two zones.

The rapid land expansion in the northern province of Cambodia, particularly in Battambang and Banteay Meanchey, and development of annual crops such as maize and cassava in those new areas provide opportunities for villagers in Otdar Meanchey to seasonally migrate for work (Cham Kar) in those areas. Two cases were found in the survey of this, while another two cases (case 94 and 174) migrated for agricultural work in a different province for 100 and 96 days respectively. By excluding those statistically extreme values (outliers), people in Otdar Meanchey do agricultural wage labor on average 10 days per year, ranging from a minimum of two days to a maximum of 45 days per person per year.

In Tram Kak, agricultural wage labor is mainly rice transplanting and rice harvesting. This is not surprising, as the area is a small rice land, therefore transplanting rice is widely practiced here and the need for agricultural wage labor is mainly for transplanting and harvesting. The average time people do this activity in the area is 10.47 days per year, ranging from a minimum of two days to a maximum of 30 days.

In Prey Kabas, where rice farming is mostly done intensified inputs such as fertilizers and pesticides, the agricultural wage labor available is mainly spraying pesticide and harvesting and transporting the rice product. In this area, people do not transplant rice and harvesting is done by machine. The average labor input for this activity is 18 days ranging from three to 50 days. The average labor productivity in Prey Kabas is higher than in the two other zones wat 4.63 USD per person per day.

When comparing the three zones, we can see that even though agricultural wage labor productivity (3.65 USD/person/day) is higher than small business (2.67 USD/person/day), the average availability is just 11 days per year. Small business, in contrast, is an ongoing activity all throughout the year.

3.3.2.3 Self-business

A self-business or small business is a local self-business developed by rural households as a complementary income to farm activities. The survey indicates that this kind of job is predominantly done woman, particularly housewives, who is account for 68 per cent among family member who have small business activities in the three areas. This activity is closely linked to farm work, as wives manage and help farm work. Self-businesses are the strategical activities developed by household for women as supplementary income to family, where woman can look after children, sell products and help farming during the peak season. While this type of activity is literally an off-farm activity and although the term non-farm activities is employed in this study in the general sense, I refer to both off-farm or non-farm work in

this section. This includes local petty traders, shop keeping (mainly women selling groceries in front of their house), a small-scale home rice mill, which is normally linked to pig-raising, tailoring for woman, hairdressing for women and haircutting for men, buying and selling agricultural products (mainly vegetables) for profit (women), buying and selling poultry for profit (men). The pattern of local activities is similar across the three zones. Among these broad categories, shop keeping (selling groceries in front of the house) is a job predominantly done by women (i.e. wives). Although the cross tabulation by gender shows that man also do this kind of activity, my field observation suggests that it is a kind of shared responsibility among men as family members, whereas the main role of this activities is woman. These kinds of activities are commonly practiced in all of the three zones, suggesting that it is the pattern of rural activities developed by households. The overall labor productivities of this category is 2.23 USD per person per day on average, ranging from 0.49 to 10 USD per person per day depending on the type and scale of self-business.

Palm sugar production, which was the most common and popular non-farm job for rural households in the 1980s and 1990s, is found to be rare in the study area. The survey indicated that, among 383 families interviewed, only two families are still doing palm sugar production, one family in the Tram Kak commune of Takeo and another one in the Kok Khpos commune of Otdar Meanchey.

Unlike previous studies, which reveal that running a moto taxi is a migration job, particularly for those living in the Prey Veng and Svay Rieng provinces who migrate to run moto taxis in Phnom Penh (Pilgrim et al., 2012), moto taxi activity in my study mainly took place within the territory of the study area. This activity is primarily done by the household head, usually men age between 26 to 51 years old. In the survey, there are six household heads who run a moto taxi. This job is complementary to farm activities and none of them had migrated. The average labor productivities are 3.42 USD per person per day on acreage, ranging from 2.5 USD per person per day to 5 USD per person per day with an average labor input of 272 days a year.

3.3.2.4 Salaried employment

Salaried employment as a category is made up of ten different activities, including salary employment in the private sector and government jobs including the military, village chief, local authorities and school teaching. Household who receive a pension are also included in the salaried employment category. There is a high variation among the salary-based jobs.

Local authorities such as village chiefs have a very low income, while the salary paid in a private company are higher than those paid to a civil servant.

3.3.2.5 Labor-based work

Construction work

Construction work is exclusively done by men and it is available outside the village, especially in city centers and the capital. People usually migrate to work in construction during the dry season after rice harvesting for between three to four months. The activity is most prominently found in Tram Kak, which accounts for about 14 per cent of the total activities, while Prey Kabas has 4 per cent and Otdar Meanchey 3 per cent.

In the survey, 34 members of households reported being involved in construction work. They are mostly male heads of households (91 per cent) and sons of the heads of households (9 per cent). Among the three zones, Tram Kak has more family engaged in construction work; follow by Prey Kabas and Otdar Meanchey. All of the people taking part in construction work are married and aged between 23 to 54 years old, of which 30 per cent are aged between 23 to 30, 30 per cent age between 31 to 35 and 40 per cent are aged higher than 35 years old. The average labor productivities of construction work are not different between the zone, with an average of 4 USD per person per day. This job is mainly done by the household head of a youth couple as a complementary income in Tram Kak, where land per household is the smallest out of the three zones. This is the household strategical activities compare to agricultural wage labor. The pie charts illustrate the percentage of family members taking part in the construction work based on total people in each zone (**Figure 14**) and the gender breakdown of construction workers (**Figure 15**).

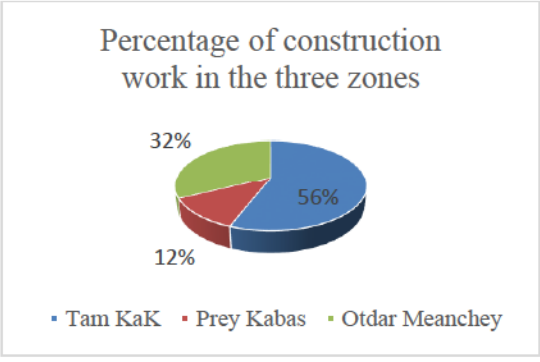


Figure 14 Percentage of construction work by zone

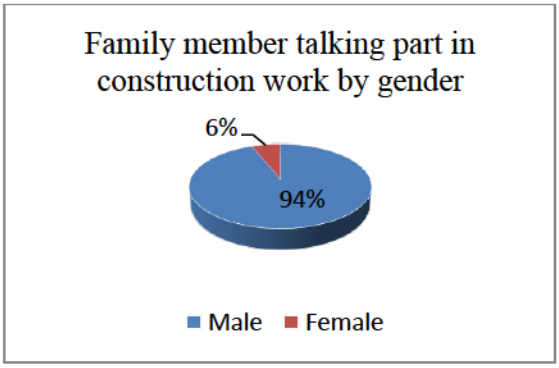


Figure 15 Construction work by gender

Although the qualitative interviews and field observation suggested that construction work is mainly migration work, data shows that construction work is also done in rural areas

in within or nearby villages, which made up 58 per cent of total household members who reported engaging in this activity. This suggests that rural house improvement provides construction jobs to local people. Among the 34 household members who did construction work, only two of them were a housewife. 20 of them (59 per cent) are doing construction work within the village or nearby villages, whereas other 14 of them (41 per cent) do construction work outside the village, of which 9 per cent worked in the interviewee's district, 6 per cent in the interviewee's province, 24 per cent in other provinces and 3 per cent in Thailand (Figure 16).

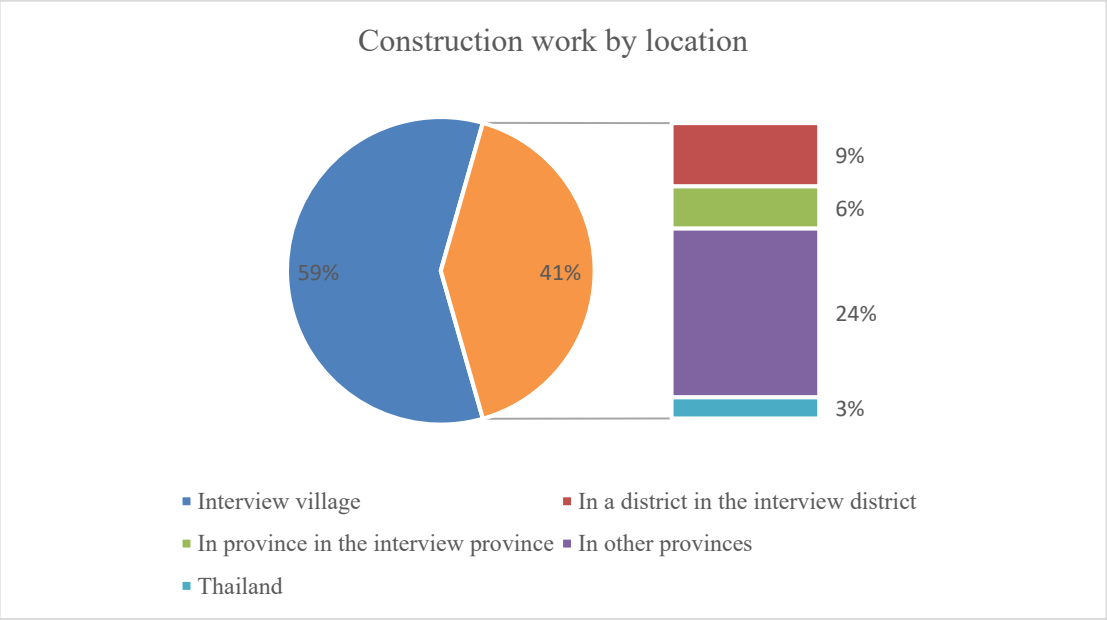


Figure 16 Construction work by location

Handicraft work

Handicraft work is a category which includes weaving and any other handicraft work. However, there is a special kind of handicraft work in Prey Kabas that locally called "Pak Din," which is a kind of activity where middle traders provide garment material and silver or golden thread to stick on the garment's material, which is then used for fashion. This is purely a woman's job, where a housewife does it as a complementary form of non-farm work. 34 family members in the survey reported doing this activity, including a female household head as well as wives, sisters, daughters and daughters in law. Daughters also help doing this activity in addition to attending school. They do this once they are free from farm work, particularly in the afternoon or evening. From the field observation, this activity is the activity

that earns the smallest amount of income. It yields the lowest labor productivity in comparison to other activities. It is just an optional complementary activity.

Garment work

Garment work is purely migration work and the observation of many cases in the survey show that it plays a very important role for many rural families. Usually, it is a job for women who have dropped out of school or for a family who cannot afford their children's education. This activity is closely linked to the farm family and is complementary to small land household in both Tram Kak and Prey Kabas, but particularly in the Tram Kak district. This kind of job is the key strategy for a family who only have a small amount of land to earn a complementary income to sustain their livelihood. A young family or a family with married or single (drop out) youths often seek a complementary income from these activities by letting any family member to do garment factory work. Even though garment work is obviously perceived to be a woman job, this work is available for both men and women.

Among the 12 family members in the survey who were taking part in garment work, 10 are female (83 per cent). 11 of them are single (91 per cent). They are aged between 16 to 32 years old with an average age of 23 years old. Two of them (17 per cent) dropped out at primary school, five of them (42 per cent) dropped out at secondary school, four of them (33 per cent) dropped out of high school and one of them is illiterate (8 per cent). Therefore, garment work is the work for youth who have dropped out and are looking for non-farm work.

Youths can migrate to work in the garment industry, mainly in Phnom Penh. The job is available all year long. However, youth can choose to work seasonally, for example for three to six months per year starting from January to June and then come back home to help with farm work (see **Table 19**). One case from the survey is a male from Tram Kak who does garment work but comes back to do rice farming during the rainy season. In another example (case 375), a 24 years old girl decided to drop out at the twelfth grade at high school so she could be responsible for farm work and earning income to support her family. Usually, the remittance from family members who do this garment factory work is about 50USD per month. Table 18 below shows the income, expenses and remittance to support family from the case 375 in the Prey Kabas commune.

Table 18 Garment worker income from the case 375

Garment work income*	Amount (USD)	Expense	Monthly (USD)	Saving (USD)
Salary base	60.00	Food USD 1/day	30.00	
Overtime	61.00*	Room USD 1/month (share with three people)	6.67	
		Others	10.00	
		Monthly expense	46.67	
		Remittance	50.00	
Total monthly income	121.00	Total expense	96.67	24.33

***Case 375 24 years old girl garment worker returning home for farming, Prey Kabas commune, Takeo province.**

We can see that the average labor productivity for garment work is low compared to other activities but it plays a significant role in accommodating youth employment, especially in the context of an agricultural community with small plots of land such as the Tram Kak commune. The survey shows that the average labor productivity is 1.67 USD per day per person. However, the reported salary paid to case 375 suggests that the labor productivity could reach up to 2.48 USD per person per day; however, this could be just in the specific case of those who have more experience. Case 257 reports that she can earn 30 USD from overtime. This means that at the average person has a labor productivity yield of only 1.44 USD per day per person, which is not very different from the average labor productivities in the survey.

Table 19 Activity calendar of youth engage in both farming and garment work

Activity*	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Rice cultivation												
Finish harvest rice												
Free time: go to garment work												

***Case 257 23 years old girl in Ang Roneab village, Tram Kak**

Other labor-based work

Other types of non-farm activities are labor-based selling include selling wood for cooking fuel, wage labor for digging land, grass harvesting, wage labor for operating a two-wheel tractor or threshing machine, wage labor for washing clothes, and other unspecified services. Based on field observation, these activities are highly paid but available for only few days. Other incomes such as fees from renting land and renting agricultural equipment are also put included in this category as a non-farm activity.

3.3.2.6 Migration

Migration activities include the activities that are labor-based work such agricultural wage labor, construction work, garment work, salaried employment, shopkeeping, urban services and salaried employment with the private sector. However, whether these activities are considered migration is defined by their location of work outside the district interviewed such that the household member could not reside at home while working.

In this study, remittance is described as the amount of money sent by a family member who has economic interdependence to the family but migrates to work in other non-farm activities or a relative who already lives separately and has no economic interdependency with a family but sends some money to help their family in their homeland. In the survey, there are very few cases where households have no economic relationship but send remittance home to support the family. Remittance is highest in Tram Kak and Otdar Meanchey.

Table 20 Remittance per year per person by destination of migrant

Migration destination	N	Percentage	Mean	Std. Deviation	Minimum remittance USD per year/person	Maximum remittance USD/year/person
Interview village	14	12	362	631	13	2100
In province in the interview province	4	3	408	198	130	600
In other provinces	40	33	301	274	13	1000
Phnom Penh (Capital)	18	15	234	151	13	600
Thailand	42	35	443	357	25	1500
Korea	1	1	400	.	400	400
Abroad	2	2	175	35	150	200
Total	121	100	332	349	13	2100

*Among those who report staying in the village but sending remittance, eight of them used to migrate before they reported staying in the village

.

Table 20 shows the remittance based on the location of sender in the three study zones. The crossable table between the destination of migration and study area shows that in Tram Kak and Prey Kabas, the remittance is mainly from other provinces and Phnom Penh, while in Otdar Meanchey it is mainly from Thailand. Those who sent remittance home are mainly youths. Among the senders, 90 per cent were aged under 35 with an average age of 24 years old. It is notable that the minimum age of migration starts from 12 years old. This reflects the hardship or surplus labor of the family that requires family member to move out for non-farm work to contribute to living expenses. However, there is only one case of a 12 year old migrating, and he/she may be on migration with family or a relative with family. The rest began sending remittance at the age of 16 years old. On average, each migrant sends

remittance home about 332 USD per migrant per year. The amount is about the same for zone Tram Kak and Prey Kabas but highest in Otdar Meanchey due to popularity of migrating to Thailand where people can earn higher than migrating within Cambodia.

We can see that there is a diversity of activities that families tried to develop. Small businesses are dominated by shopkeepers who are mainly woman. Although the average labor productivity is low compared to other activities such as palm sugar production, agricultural wage labor, construction work and other non-farm activities, at 285 days per year the availability of this activity is far longer than the four mentioned above. The other activities, especially agricultural wage labor, have very limited availability, with a labor input of 74, 11, 89 and 40 days respectively. The labor productivity varies according to the type of business. Salaried employment (except for the village chief) and other activities such as working for a private company, being a driver, teacher, civil servant, cooker, assistant shopkeeper and casino worker have labor productivities that are higher than the average 3.3USD per person per day. That is why both young people and parents want their children to work in salaried employment, given it is more stable and secure income than farming. Garment work has the lowest average labor productivities in comparison to other activities but plays a very important role in accommodating youth employment, especially in situations where the family has a small plot of land and many family members. Case 280 in the Chrey Thnaot village in Tram Kak commune clearly reveals this situation (Figure 17). Four members of the family have to migrate. Three of them doing garment factory work and one of them does construction work. These four migrants send a remittance to their parents with a monthly amount of 100 USD. This shows the significant role of garment work in supporting youths and families in all three zones.

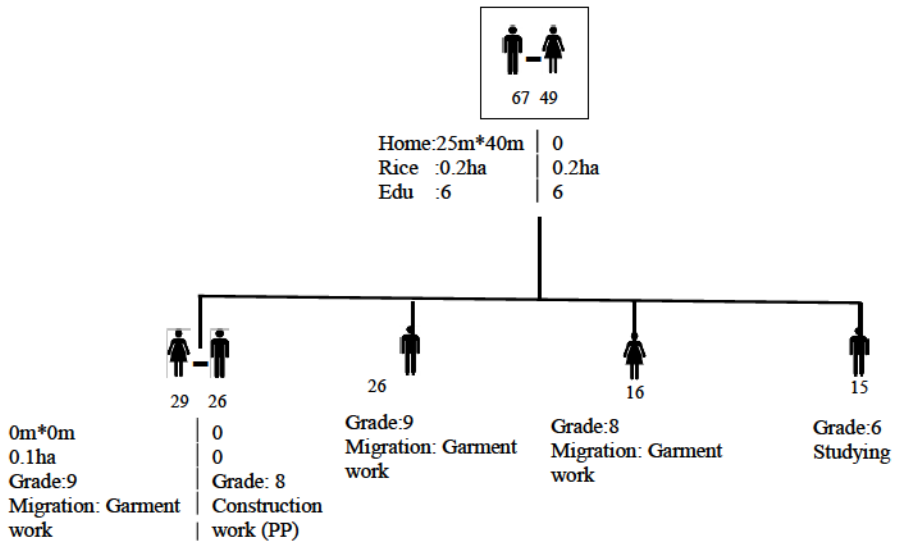


Figure 17 Relationship between non-farm work, migration and farming work

3.3.2.7 Income-based category of non-farm activities

Based on the quality of non-farm activities that has the capacity to generate a high or low income for a household, except migration and agricultural wage labor, the main category of self-business, salary based and labor based were classified into to sub-categories:

- Self-business high income (SB-H): Are the self-business activities generating income more than 2 USD per day or more than 730 USD per year.
- Self-business low income (SB-L): Are the self-business activities generating income less than 2 USD per day or less than 730 USD per year.
- Salary high income (SL-H): Are the salary activities generating income more than 2 USD per day or more than 730 USD per year.
- Salary low income: Are the salary activities generating income less than 2 USD per day or less than 730 USD per year.
- Labor-based high income (LB-H): Are the labor-based activities generating more income than 1 USD per day or more than 365 USD per year.
- Labor-based low income (LB-L): Are the labor-based activities generate more income less than 1 USD per day or less than 365 USD per year.

Figure 18 shows the average non-farm income per household each study area. On average, households in Tram Kak earn 498 USD per household, of which 40 per cent of income comes from migration, 2 per cent from agricultural wage labor, 6 per cent from labor-based high income, 8 per cent from labor-based low income, 23 per cent from self-business high income, 13 per cent from self-business low income, 5 per cent from salary high income and 3 per cent from salary low income.

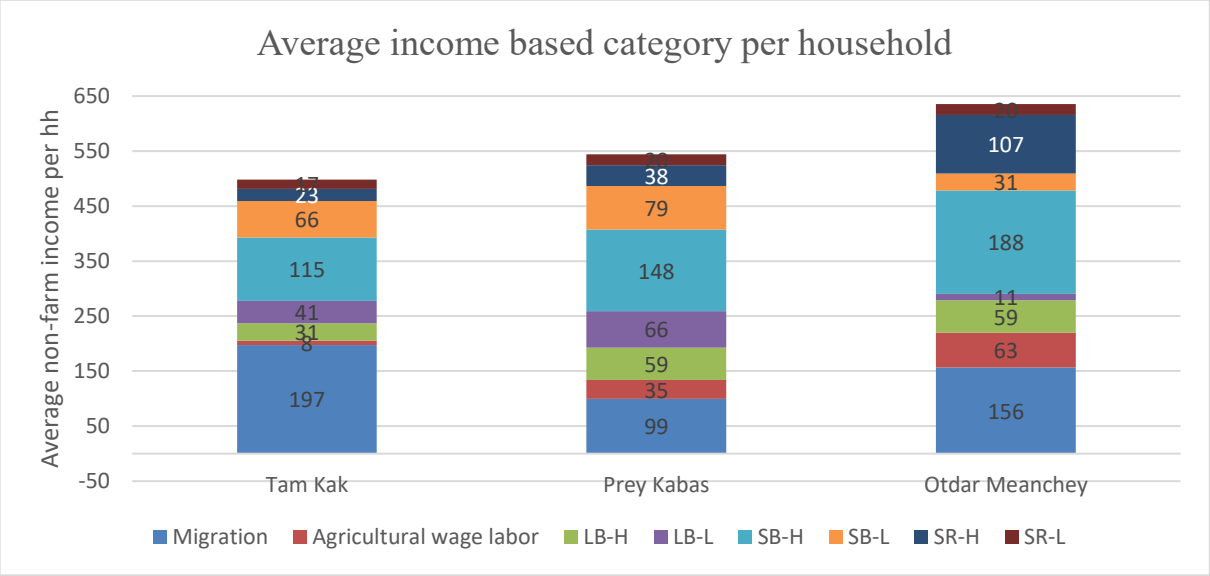


Figure 18 Non-farm income-based category

In Prey Kabas, the average non-farm income per household is 544 USD per year and the major income sources are migration (18 per cent), self-business low (12 per cent) and self-business high 27 per cent.

In Otdar Meanchey, the average earning from non-farm income is 635 USD per year, which the highest among the three areas due to the high contribution of salary high income (17 per cent) and self-business high income (30 per cent). Migration income is also high, accounting for 25 per cent of total non-farm income.

In general, the main contributions to total non-farm income mainly come from migration and self-business, both high and low income. Salary high income occurs mainly in Otdar Meanchey due to some household members there being employed in civil servant or government jobs.

These sub-categories reflect the capacity-generating income of the main categories. It will be useful to explain the different capacity of youth integration capacity in each farm type. This will be discussed later in section farm typology and in next following chapters the different between youth and adult household and their capacity to accommodate youth in each farm type (chapter 4).

3.3.3 Migration and non-farm farm income

The sum of income-earning from each activity by each family member is made up of non-farm, off-farm, or migration/remittance income. Triangulating this income with the situation of migration reported by each family member gives an aggregation of whether it is non-farm income or migration income. Non-farm income or off-farm income is defined as income

generated by any household member within the village, commune, or district where he/she can come and reside in the village. Migration income is defined by an-income earning destination of migration for people who migrate in within the same province, other provinces, capital cities or abroad where he/she is not able to reside in the village.

Remittance, as explained in Section 3.3.2.6 Migration, is an amount of money sent by a family member who has economic interdependence with the family migrates to work on other non-farm activities or a relative who already lives separately and has no economic interdependence with a family but helps by sending some money to help their family in their home land.

The sum of non-farm/off-farm income, migration income and remittance is called total non-farm income, which is the added value generated from activities besides farming. It should be noted that this term is defined in a broad sense which does not attempt to distinguish the nature of its relation to the farming system. For example, if small business activities are developed by a housewife but she also uses her free time to raise pigs and help farming, hence, income from small business by its nature should be the income from farming system. But in this study, I would like to distinguish this into total non-farm income order to see the contribution of non-farm activities to the faming income. At the end, there will be only two main categories: non-farm income (non-farm and off-farm) and migration income (migration income and remittance). The sum of the two is total non-farm income.

After aggregating the sum of the non-farm income of each family member into the three main described categories above, I try to see how many households in the survey do non-farm activities and migration and to what extent the earning from these contributes to the household economy. Some family members generate a very small amount of non-farm income per year, earning sums as little as 5 USD. The number household doing non-farm will be high and not reflecting the significant of the activity if small amount of earning from non-farm activities has to be count. In order to accurately reflect reality, my knowledge from the survey suggests that the minimum account considered as a non-farm activity is 50 USD per person per year. If observed local wage labor is 5 USD per person per year, then those who are considered as doing non-farm activity are those whose spend at least 10 days in a year to generate income within the district they are living.

Based on the criteria of non-farm activity outlined above, the survey shows that among 383 households surveyed, 54.83 per cent conduct non-farm activities. Tram Kak and Otdar Meanchey has similar figures of 51.55 per cent and 48.91 per cent respectively, but

Prey Kabas shows a higher figure of 67.6 per cent, due to the handcrafting activities (Pak Din) which are available only in this district.

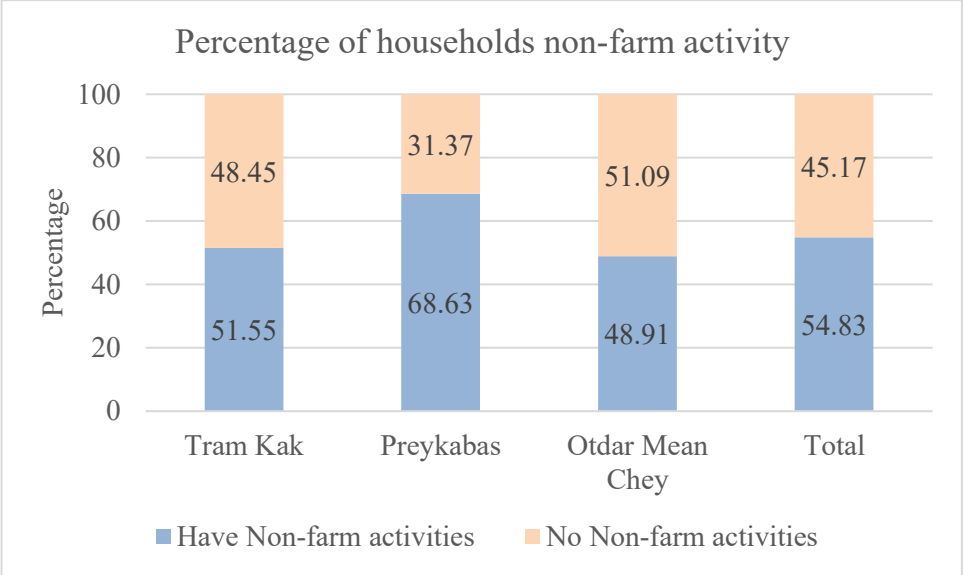


Figure 19 Percentage of households non-farm activities

Household that reported they have family members who have migrated are 123 among 383 households surveyed, which is about 32.38 per cent. In Otdar Meanchey, the percentage of migration is about the same the overall percentage of migration of the three study zones at 31 per cent, while in Prey Kabas only 20.59 per cent of the 102 households have family member who have migrated. In Tram Kak, the percentage is the highest, with 47.42 per cent of the 97 households having a family member who has migrated. This very much corresponds to the field observation, that due to small land holdings per family, farming alone is not enough to support family members in Tram Kak. Therefore, migration is the compensatory strategy of the people in the area. Garment work and construction work are the key compensating strategies for households in Tram Kak.

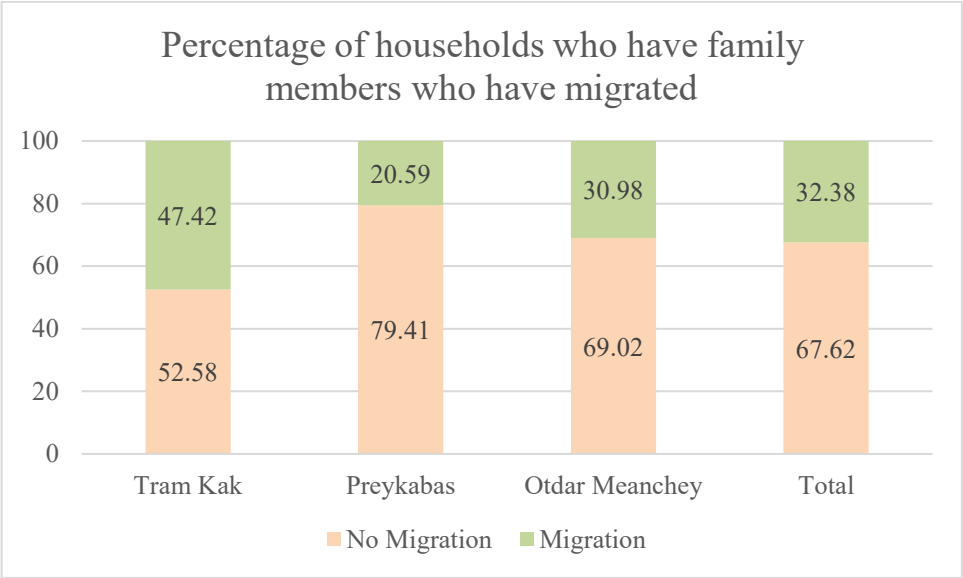


Figure 20 Percentage of households who have migrated family members

The percentage of household with migrated family members is low in comparison to household who having no migrated family members. This reflects the low percentage contribution of migration income to total non-farm farm income. Figure 21 below illustrates that in general, migration income contributes 30 per cent to total non-farm income while the other 70 per cent is income from local non-farm activities. In Otdar Meanchey, migration income contributes about 31 per cent to total non-farm income while 69 per cent is from local non-farm income. In Tram Kak, non-farm income shares 47.42 per cent to total non-farm income while in Prey Kabas, migration contributes only 18 per cent to total non-farm income. Although it is of low productivity in comparison to other non-farm activities, local non-farm activities still contribute more income to the total household non-farm income than migration income overall. This suggests that local non-farm activities play a more important role than migration income.

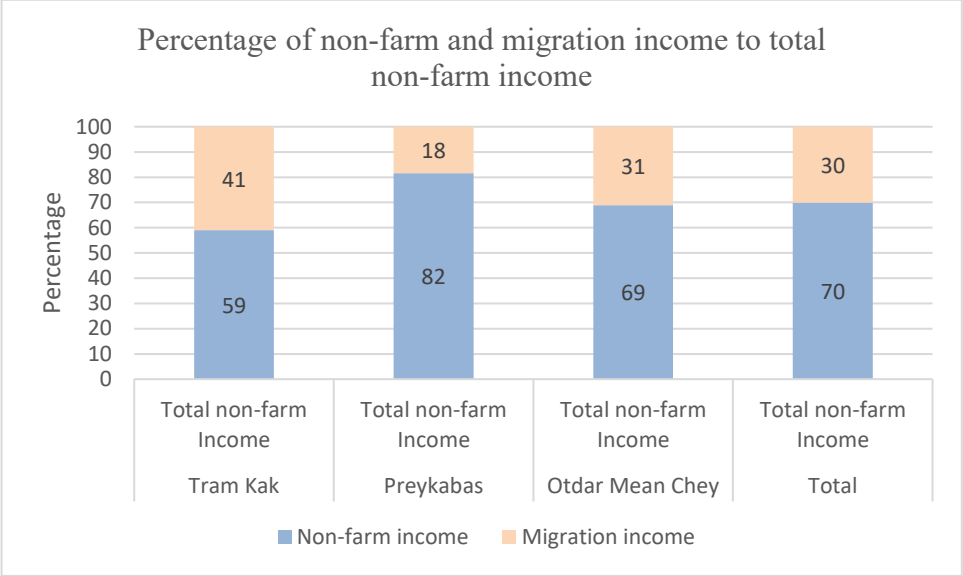


Figure 21 Percentage of non-farm and migration income to total non-farm income

Among the 123 household with members who have migrated, there are a total of 137 family members who are either on migration, used to migrate and generate income or who sent remittance home in the previous year. Classifying their age group and cross-checking with their marital status suggests that majority of them were youths under the age of 30 years old. If the age considered as youth is increased to 35 years old, youths who are migrating or used to migrate account for nearly 86 per cent of the total migrant household members. Among this age group, we can see that single youths make up the largest proportion, followed by the married youths. 77 of them are male (56 per cent) and 60 female (44 per cent).

Table 21 Marital Status of HH member doing non-farm activities by age group

Marital Status HH member	Age group						Total	
	<= 30		31 - 35		36+			
	N	Percentage	N	Percentage	N	Percentage	N	Percentage
1.Single	64	91	2	3	4	6	70	100
2.Married	39	63	10	16	13	21	62	100
3.Widow	2	50	0	0	2	50	4	100
4.Divorced	1	100	0	0	0	0	1	100
Total	106	77	12	9	19	14	137	100

3.3.3.1 Education of migrant

By categorizing the grade of education that migrants reach out, we can see that 46.32 per cent of migrants drop out at primary school, 32.12 per cent at secondary school, 16.06 per cent at high school and more than 5 per cent reach vocational training or a bachelor degree at university. This implies that there are very few youths or household members who migrate for

highly skilled non-farm work but rather low skilled or wage labor such as garment and construction work. This is revealed in the qualitative interview and observation where both youths and families shared similar views that it is extremely difficult to looking for better non-farm work because they do not have the knowledge and skills. Non-farm jobs require higher levels of education and there is higher competition for them, so uneducated youths do not have such an opportunity. That is why farming is still their last resort once they stop migration or have failed in migration. That is why farming is view as a safety net for family members.

Table 22 Educational level of migrant in the three areas

Educaton of migrant	Frequency	Percentage	Valid percentage	Cumulative percentage
No school	13	9.49	9.56	9.56
Primary school	50	36.50	36.76	46.32
Secondary school	44	32.12	32.35	78.68
High school	22	16.06	16.18	94.85
Vocational training	3	2.19	2.21	97.06
Bachelor	4	2.92	2.94	100.00
Total	136	99.27	100.00	
Missing System	1	0.73		
Total	137	100		

3.3.3.2 Migration as a temporal activity

Migration includes temporal activities such as agricultural wage labor, assistant shopkeeper, garment work, construction work and other short-term non-farm activities. With these activities the migrants can come and go from the village and take part in farming whenever they need to. However, migration for salaried employment for certain professions such as teacher, military, civil servant and working for private enterprises are considered long-term migration. The survey indicates that some household members who did not migrate or who had migrated in the previous year have started migration in the year of survey. Among 19 members who had not migrated in the previous year, seven people (37 per cent) have migrated in the year interviewed. Among those who had migrated in the previous year (118 people), there are nine people (8 per cent) who did not migration in the interview year, instead staying in the home village, while the other 109 people (92 per cent) are still on migration.

Table 23 People on migration and on pause from migration in the three zones

Do you migrate in the previous year?	Do you migrate now?					
	No		Yes		Total	
	N	Percentage	N	Percentage	N	Percentage
No	12	63	7	37	19	100
Yes	9	8	109	92	118	100
Total	21	15	116	85	137	100

There are only few cases of migration within the boundary of the province, which is 5 cases (3.65 per cent) of the total number of people on migration. Migration to other destinations, including the capital city, account for 52.6 per cent, of which 21.2 per cent is migration to Phnom Penh, and 31.39 per cent is migration to other provinces. Migration abroad is predominantly to Thailand (27 per cent), with South Korea having 0.73 per cent and other countries beside the two making 0.73 per cent. Therefore, migration abroad is nearly 29 per cent. However, migration to Thailand is mainly done by people in Otdar Meanchey due to its proximity to Thailand. According to the qualitative interviews and field observation, people tend to migrate to Thailand because it is less expensive than South Korea. This tendency is likely to increase due to the efforts of the Cambodian government to facilitate legal migration through providing better access to a Thailand border pass for migrants who wish to seek non-farm or farm work in the provinces of Thailand that border Cambodia. The investment on migration to South Korea is also found in the study even it is said the cost for migration is very high. However, it is said the earning is very high compares to earnings from migration to Thailand. Table 24 shows the destination of family members who were on migration during the study period.

Table 24 Destination of migration by migrants for non-farm activities in the three zones

Where are they now?	Frequency	Percentage	Valid percentage	Cumulative percentage
Interview village*	21	15.33	15.3	15.3
In province in the interview province	5	3.65	3.6	19
In other provinces	43	31.39	31.4	50.4
Thailand	37	27.01	27	77.4
South Korea	1	0.73	0.7	78.1
Phnom Penh	29	21.17	21.2	99.3
Abroad	1	0.73	0.7	100
Total	137	100	100	

***This includes two cases where remittance was received from a relative. 19 cases included those who migrated before the interview took place but currently reside in the village and contribute income or remittance to the family.**

3.3.3.3 Non-farm and migration income per person

Regardless the quality of non-farm activities, meaning the amount they have earned, by considering any family member taking part in generating non-farm income at any particular time during the year as having non-farm activity, then we can see that on average across all zones 1.47 family members per family engage in non-farm work. With the standard deviation of 0.71 (nearly 1), we can see that the average is nearly two household members per household doing non-farm activity. Table 25 below classifies non-farm income per person into class to see the significant contribution of income per family member. For detail separation by zone, see appendix – 14. On average, each household member taking part in a local non-farm activity contributes income of 416.6 USD per person per year. The standard deviation is higher than the mean value, suggesting there is a high variation among the amount of earning undertaken by each family member which is dependent on the type and quality of activity.

Table 25 Average number of HH member doing non-farm per HH by class of non-farm income per person

	Number of household		Non-farm income per person				Number of people working on non-farm			
Class of non-farm income per person (USD)	N	Percentage	Mean	Std. Deviation	Minimum	Maximum	Mean	Std. Deviation	Minimum	Maximum
<= 50	**60**	**22**	**25.91**	**13.16**	**5.00**	**50.00**	**1.65**	**0.92**	**1**	**5**
50.01 - 100	**30**	**11**	**79.23**	**17.97**	**37.50**	**125.00**	**1.27**	**0.45**	**1**	**2**
100.01 - 300	**59**	**22**	**193.86**	**91.63**	**7.50**	**450.00**	**1.53**	**0.75**	**1**	**4**
300.01 - 500	**43**	**16**	**392.53**	**176.45**	**55.00**	**912.50**	**1.53**	**0.70**	**1**	**4**
500.01 - 1000	**51**	**19**	**755.34**	**266.90**	**100.00**	**1800.00**	**1.29**	**0.50**	**1**	**3**
1000.01+	**24**	**9**	**1685.91**	**505.25**	**1050.00**	**3150.00**	**1.38**	**0.58**	**1**	**3**
Total	**267**	**100**	**416.60**	**517.70**	**5.00**	**3150.00**	**1.47**	**0.71**	**1**	**5**

Regardless of the amount of earning per migrant per household, the average migrant per household is 1.52 migrants, ranging from one to five migrants per family. For a detailed separation by zone, see appendix – 14. Table 22 shows the quality of migration income per migrant. On average among a total of 92 migrants, each migrant contributes income of about 455.15 USD per year per migrant. There is high variation between migrant (standard deviation higher than mean value) depending on the type of work, duration of work and destination of migration.

Table 26 Average number of migrant per HH by class of total migration income per migrant

	Number of households		Average migration income per migrant				Average number of migrant per family			
Total Migration income per migrant	N	Percentage	Mean	Std. Deviation	Minimum	Maximum	Mean	Std. Deviation	Minimum	Maximum
< 100	**18**	**20**	**64.51**	**32.98**	**12.50**	**100**	**1.44**	**0.86**	1	**4**
100.01 - 300	**30**	**33**	**202.33**	**67.27**	**112.50**	**300**	**1.77**	**1.01**	1	**5**
300.01 - 500	**12**	**13**	**418.04**	**71.33**	**301.50**	**500**	**1.58**	**0.67**	1	**3**
500.01 - 1000	**21**	**24**	**656.19**	**126.07**	**550.00**	**1000**	**1.29**	**0.56**	1	**3**
1000.01+	**10**	**11**	**1539.13**	**412.07**	**1020.00**	**2160**	**1.40**	**0.70**	1	**3**
Total	**92**	**100**	**455.15**	**463.46**	**12.5**	**2160**	**1.52**	**0.82**	1	**5**

3.3.3.4 Reason for migration and the use of remittance

The reasons for migration are closely linked to the agrarian situation of Cambodia. Since agricultural activities normally offer only three to six months' employment, many young adults are leaving their villages for year-round employment in urban areas in order to complement the farming income, especially in situations where the land held is small and not enough to support a family all year long. Construction and garment work are jobs that are migrated to.

CDRI (2007) found the reasons for youth migration are chronic poverty, landlessness, the depletion of natural resources or common property resources, lack of year-round employment, debt and natural disasters. The factors that compel many young rural Cambodians to migrate are called push factors. The pull factors are due to the high demand for unskilled laborers in the garment industry sectors and construction sectors and the anticipation of salaried employment in urban area.

In this study, the cause of migration are push factors: surplus labor in a family, small land which is linked to the generation of income which is not sufficient to meet the minimum threshold of living. This pattern is consistent across the three zones, especially in \Tram Kak.

In zone Prey Kabas, where agriculture such as rice farming is more intensified with greater pesticide and fertilizer use than in the other two zones, is very mechanized (high use of two-wheel tractors, ploughs and harvesting), the substitution of family labor with hired labor results in a high inputs cost. This means rice farming is prone to being non-profitable if the price is too low. A higher input use generates less added value, driving rural farm households to make the decision for either the household head or another family member to migrate. Another reason for migration is to cope with shock of farming such drought in Otdar Meanchey. In addition to this, there are a large number of youths who are not in schooling

who have no alternative beside settling in farming who must be accommodated by the family or wait for migration. Migration also takes place to pay off debts where households are in debt due to borrowing for investment or when the investment does not meet the desired outcome. Migration also happens when families lack the capital to buy fertilizer and agricultural input.

In Otdar Meanchey, beside the above-mentioned factors, migration is also motivated by the desire to seek financial accumulation to buy two-wheel tractors and to buy additional land additional land for young married couples who only got a small land share at their marriage as well as for families who only acquired a small amount of land during the land occupation. Migration is, hence, an aspiration for accumulating financial capital in order to secure the household's future via expanding land, investing on farming to keep the continuity of farming, investing in children's education and gaining capital for the regeneration of farming production.

This finding is supported by the migration and agrarian studies showing that remittance from migration is agricultural capital for asset accumulation such as buying land and farm machinery used as input into agrarian smallholder production (Kelly, 2011, pp. 494-496). Migration also impacted on income and asset accumulation contributing to improving human or physical capital, which is argued to be a potential source for families enhancing their resilience (Adger, Kelly, Winkels, Huy, & Locke, 2002). Kelly (2011, pp. 497-499) also stresses that if migration is a success, the effect could lift up the socioeconomic class of the family; from illegal migration to legal migration; from landless to land owner and redefining the gender-specific roles in the agricultural production system such as the need for hiring labor in the absence of a husband and making an investment on a place to live after they return home. However, Kelly (2011, pp. 497-499) also finds that the remittance effect does not radically transform rural poor areas; it is life-enhancing rather than life-changing.

Table 27 Usage of remittance

Usage of remittance[a]	Tam Kak			Prey Kabas			Otdar Meanchey		
	Responses		Percentage of cases	Responses		Percentage of cases	Responses		Per cent of Cases
	N	Percentage		N	Percentage		N	Percentage	
For agricultural work, buy agricultural tools/inputs	3	9.4	12.5	2	10.0	16.7	18	24.3	36.0 per cent
Investment	1	3.1	4.2	-	-	-	2	2.7	4.0 per cent
To feed the family (buy more food)	13	40.6	54.2	5	25.0	41.7	25	33.8	50.0 per cent
To pay for the medical treatment	3	9.4	12.5	4	20.0	33.3	9	12.2	18.0 per cent
To pay for children to go to school	3	9.4	12.5	-	-	-	3	4.1	6.0 per cent
To organize wedding/festival	1	3.1	4.2	2	10.0	16.7	3	4.1	6.0 per cent
To repay previous debt	2	6.3	8.3	1	5.0	8.3	4	5.4	8.0 per cent

House building		2	6.3	8.3	2	10.0	16.7	7	9.5	14.0 per cent
To cope with crop failure		1	3.1	4.2	1	5.0	8.3	1	1.4	2.0 per cent
For help child to start agricultural work		-	-	-	1	5.0	8.3	2	2.7	4.0 per cent
For buying land		1	3.1	4.2	1	5.0	8.3	-	-	-
For buying motorbike		2	6.3	8.3	1	5.0	8.3	-	-	-
Total		32	100.0	133.3	20	100.0	166.7	74	100.0	148.0 per cent
Case summary	N	24	24.7		12	11.8		50	27.2	
	Missing	73	75.3		90	88.2		134	72.8	
	Total	97	100.0		102	100.0		184	100.0	

a. Dichotomy group tabulated at value 1.

Table 27 shows the usage of remittance by the household surveyed. The results show that those who responded to the question mainly used remittance for buying food to feed family, which accounts for 54.2 per cent of the total response. The rest is for investment in farming, medical treatment and children's schooling, which account for 12.5 per cent equally. Prey Kabas shares the same pattern of using remittance for buying food, which accounts for about 41 per cent of total responses. Using remittance for medical treatment was 33.3 per cent of the total response. In Otdar Meanchey, remittance is mainly used for operating agricultural activities (24.3 per cent), for buying food to feed the family (33.8 per cent) and for medical treatment (12.2 per cent).

> Case 0083: This is the case of remittance usage of a household in Otdar Meanchey. Mr. Do (invented name), 58 years old man, his wife is 54 years old. They live in Cheur Slab village in the Kok Kpos commune of the Otdar Meanchey province. They shared their story of how they used migration to buy land. This family seems better off. He was a primary school teacher in 1979. However, since the livelihood was not improving, he left his job and focused solely on farming. Because he is an old resident of the village, his first land occupation is 10 hectares, which was expanded later. He has five children. Three of them have married, settled in farming and live independently. They received three hectares of land per couple. Now he retains six hectares of rice land and 0.8 hectares of Cham Kar land. He still has two more children. One is a single male (24 years old) who did not attend school who is currently working with him and helping him take care of the cattle. The youngest son is 20 years old. He did not attend school and just got married to a 24 years old girl. The land was not shared with them. Therefore, this young couple migrated to Thailand in order to earn money to buy agricultural land. The migration to Thailand cost 3,000 bath (90USD). The remittance sent home varied between 4,000 bath to 5,000 bath (120 to 150 USD), to a total of 20,000 to 30,000 bath (approximately 600 to 900 USD). This money has been used to buy three plots of rice land of size 30

metres by 60 metres. The land has already been cleared. In addition to the land, the remittance has been used to a build house and a latrine for the young couple. Now the couple return home and work on this land. He said that farming is a good option for his children because he did not attend school so he has no alternative beside farming. To settle in farming, the young couple was supported by their parents in everything, including the cost of migration, seeds, money, agricultural equipment, advice, labor and a house for living.

3.3.4 View on non-farm activities

The survey asked respondents to share their general opinion on the possibility of finding non-farm activities. The survey shows that the three study areas share almost the same response, with more than 70 per cent of respondents reporting that it is not easy to seek an alternative to farming. 23 per cent state that it is easy while the remaining 6 per cent have no idea concerning the question (Figure 22). The main reason to support their view was explained in the qualitative interview, where because they were farmers in a rural area, they have low education and therefore no alternatives beside farming. Non-farm activities in the urban city require a social network and high completion. In addition to this, some migration work such as construction work, garment work and urban services such as being a security guard for a private company receive a very low income and thus they can only save very little money.

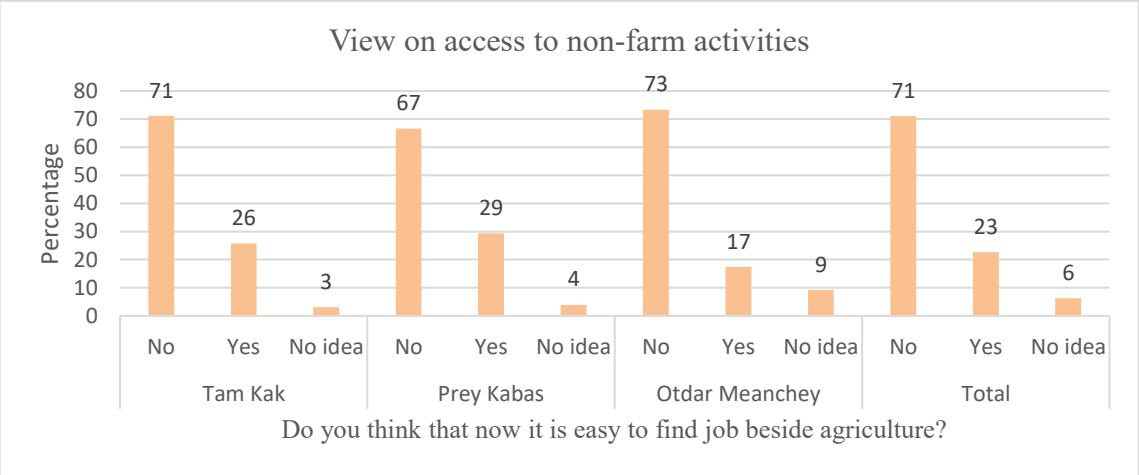


Figure 22 View on access to non-farm activities

Some youths who had migrated to work on non-farm activities reported that the jobs were hard they only earned a low income. This motivated them to come back and return to farming. Although household members who have migration experience also shared the opinion that non-farm job opportunities are not easily accessible and demand knowledge, skill and a social network in the city. However, those who said that seeking non-farm jobs was easy had a social network with their migration experience, for example they had a relative in

the city or another family member who was also on migration and, hence, this migrant is a network or a footprint for facilitating the new family member who had dropped out from school.

The below quotations are impression from interviewees in the three study areas on the non-farm activities and farming:

> Being a farmer in rural area, we have no knowledge and skill. Therefore, we don't know what else besides farming that we can do. If we rely on the off-farm activities which are available in the village or local area, we would starve because it is not it is not enough to support living.
>
> - Said 42 year old woman in the Kantouy Choun village, Beng commune Otdar Meanchey province.
>
> I have a friend who dropped out and migrated to Phnom Penh. I think that it will be easy for me if I decide to migrate to Phnom Penh too. I can just call him and I will share accommodation with him. He said he will help me finding a job there.
>
> - Said 19 years old boy in Chrey Thnaot village, Tram Kak commune, Takeo province."
>
> A 24 year old girl who retired from garment work and got married last year settled with her husband farming in the Deurm Po village, Prey Kabas commune shared her migration experience with garment work. After she married a guy in her village, she started working on her grandparents' farm. They are getting old and will hand over their farm to the new couple. She said: "I started working when I was 18 years old until 24 years old in the garment industry in Phnom Penh but I could only save 300 USD. This money was just enough to buy jewellery for my wedding day. I think that if I was working in garment work, I would save almost nothing. I am better to start a farm with my husband. Perhaps I can save more because this year we can save 100 USD from farming.

The case study of youth who took part in a young agricultural entrepreneur project (YAE) project reveal that except for the youths who had freshly graduated and were taking part in the project, the rest of them had migrated to work to cities such as in Phnom Penh.

They share similar reason why they had decided to join the YAE project. That is because the work available when migrating, such as as private security at a private company, garment work and other low skill or labor-based job, is very hard work and that pays very little income. Upon hearing the announcement of the CEDAC recruiting young people to start farming, the youths decided to return home and starting a farm project with CEDA training program.

Hard work, low income earning, being far away from home and family and having no migration experience as well as a demand for knowledge and skill, high competition and requiring a social network are the main reasons that many rural households had the impression that it is not that easy to find an alternative to farming activities. Although some non-farm work such as garment work provides a low income, garment work plays an important role in helping families by providing temporary work for generating financial capital to help support the farming, especially when there is a crop failure or the degradation of farming activities, for example income lost from rice-farming and pig-raising.

> A 35 year old man in the Tram Kak district experience lost income from pig-raising and his rice cultivation is for just home consumption. This year, he has to look after his four children and his wife must migrate for garment factory work in Phnom Penh in order to earn 100 USD per month.

3.3.5 Concluding remarks

The development of non-farm activities, particularly self-businesses such as selling groceries in front of house (usually done by woman), migrating for garment, construction or other work by the household head or a youth who has dropped out are strategic solutions to the situation of insufficient income-generation from farming. This pattern is found in the three study areas. Non-farm work and migration play a very important role in compensating for when agriculture cannot provide enough to sustain the family. From the observation, households who abstain from non-farm work tend to own large plots of land. Families with small land area with no non-farm work are likely going to be living an unsustainable life and family members are expected to migrate in the future. This also related to children dropping out from school.

In addition to earning money as complementary to farming income, in Otdar Meanchey migration to Thailand is common and the main purpose is to accumulate financial

capital in order to buy more land, to clear land, to buy a two-wheel tractor and to obtain capital for farm investment to cope with crop failures such as drought. Migration in Tram Kak and Prey Kabas is a coping strategy to support the family as complementary income source farming activities when the land is small and especially for young couples who receive little or no land at marriage integrating themselves into migration and non-farm activities. Migration is also a complementary income source when there is a failure in farming.

Non-farm activities developed by the family are mainly working as a shopkeeper, tailor, hairdresser/cutter, running a small-scale rice mill for home use and for servicing the neighboring farms. Small scale rice mills are often linked to pig and poultry-raising. Construction works is mainly done by the household head while migration work such as garment work is mainly for young people. Garment work is also easy accessible for rural youths with few skills. There is a development of local non-farm activities based on knowledge and skill from migration work such as tailor are the skill learning from migration to garment industry but this activity earns very little in rural area.

The migration study of (CDRI, 2007) found that migration has a significant impact on poverty reduction. This study shares a similar conclusion that non-farm activities and remittance from migration do have an impact on poverty reduction and sustaining the rural livelihood. In some cases, remittance support a family all year round and contribute to investing in children's education and land expansion and buying two-wheel tractor to enhance farm production and agricultural transport.

The nature of non-farm and migration determine the quality of earning and remittance sent home. The main sources of non-farm income are migration and self-business. However, local non-farm activities contribute 70 per cent of total non-farm income, suggesting that the role of local non-farm activities developed by rural households is important. Although agricultural wage labor contributes a large percentage in the three areas, the numbers of day of work available to rural households is on average 10 days, which contributes little to the average total non-farm income. The view of respondents on the availability of non-farm activities is confirmed by the small number of salaried jobs available and the percentage to total non-farm income in both Tram Kak and Prey Kabas, except in Otdar Meanchey where the survey found households who had a family member with salaried employment, particularly as civil servants. The average contribution of labor-based work such as garment and construction work to total income is low compared to other activities, it plays an important role to rural households who have a small amount of. Those who migrate work to help lower the burden of farming by accommodating surplus youth on one hand while on the

other hand the remittance from migration helps to enhance the home farming income through providing the capital to investment to ensure the continuity of rural farm household.

3.4 Description of agricultural activities

3.4.1 Biophysical environment in Otdar Meanchey and Takeo province

There is no temperature data in both provinces of Otdar Meanchey and Takeo, this research assumes that Otdar Meanchey shares a similar climate pattern with Banteay Meanchey, a nearby province, and Takeo shares a similar temperature with the Svay Rieng province, a nearby province. The average monthly temperature in the Banteay Meanchey province is obtained over the three-year period of 2013 to 2015 while in Svay Rieng province, it is obtained over a 30-year period from 1985 to 2015.

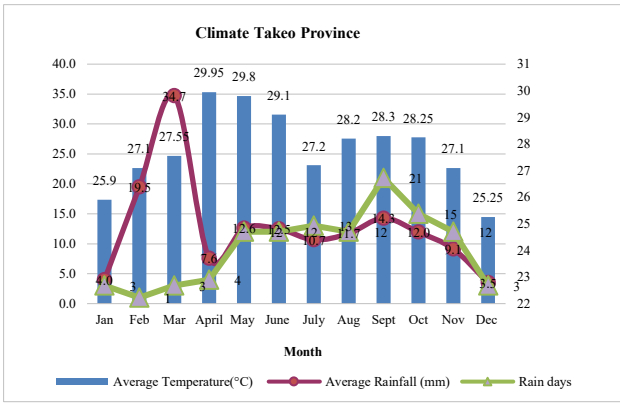


Figure 23 Climate in Takeo province

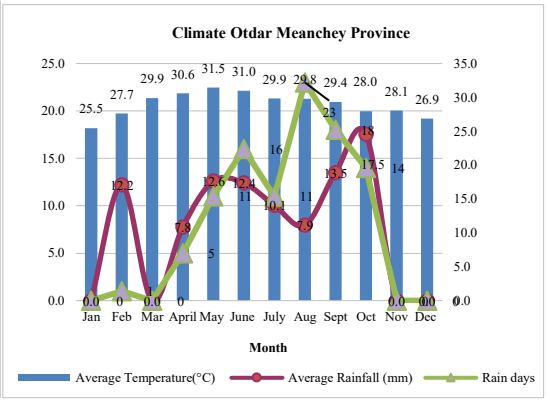


Figure 24 Climate Otdar Meanchey province

Source: Ministry of Water Resources and Meteorology, Cambodia (2012)

In 2012, the total rainfall in Otdar Meanchey was approximately 1,169.9 mm with an average monthly rainfall of 94 mm. The total rainy days in that year was is 99 days. In Takeo, the total rainfall in 2012 was 1345.3 mm with an average monthly rainfall of 94mm. The total annual rainy day in Takeo was 111 days.

According the soil classification of open development of Cambodia, tell the area of soil type in the studied area and its fertility. Prey Kabas has the highest percentage of Alluvial Lithosols (89 per cent) and Cultural hydromorphics soil (11 per cent). Both soil types are categorized as medium fertility, while in Tram Kak red-yellow podzols (54 per cent) and Acid Lithosols (10 per cent) are predominant. The soil in this area is categorized as low fertility soil. Cultural hydromorphics (24 per cent) and Alluvial Lithosols (12 per cent) are considered as medium fertility. Thank to this, Tram Kak consists of a majority of low fertility soil (54 per cent), which is not the case of Prey Kabas. Unlike Takeo province, Otdar Meanchey is predominant covered by low fertility soil, which accounts for 81 per cent, medium fertility soil accounts for 17 per cent and high fertility soil only 2 per cent. According to the

generalized soil-fertility map, Takeo soil is considered medium fertility soil while Otdar Meanchey is considered as low fertility soil (Cambodia Tree Seed Project, n.d; Seng, 2015). The low fertility soil together with the low rainfall mean that Otdar Meanchey is prone to drought, especially in the context of climate change and, in the year the interviews took place, some villages experienced low yield due to drought (Chhinh & Millington, 2015).

Table 28 Soil type in the studied area

Province	District	Soil type	Area (ha)	Percentage	Fertility
Takeo	Prey Kabas	Alluvial Lithosols	23,902	89	Medium
		Cultural hydromorphics	2,856	11	Medium
		Total	26,759	100	
	Tram Kak	Acid Lithosols	5,431	10	Low
		Alluvial Lithosols	6,592	12	Medium
		Cultural hydromorphics	13,501	24	Medium
		Red-yellow podzols	30,465	54	Low
		Total	55,990	100	
	Generalize for Takeo province				Medium
Otdar Meanchy	Trapain Prasat	Acid Lithosols	38,340	26	Low
		Grey hydromorphics	51,399	35	Medium
		Plinthite podzols	516	0	Low
		Red-yellow podzols	57,158	39	Low
		Total	147,413	100	
	Banteay Ampil	Acid Lithosols	10,802	9	Low
		Basic Lithosols	303	0	High
		Cultural hydromorphics	9,895	8	Medium
		Plinthite podzols	37,438	31	Low
		Red-yellow podzols	59,442	50	Low
		Regurs	2,190	2	High
		Total	120,071	100	
	Samrong	Acid Lithosols	25,113	18	Low
		Cultural hydromorphics	8,598	6	Medium
		Grey hydromorphics	4,112	3	High
		Plinthite podzols	41,954	30	Low
		Red-yellow podzols	60,239	43	Low
		Total	140,015	100	
	Generalize for Otdar Meanchey province				Low

Source: calculation based on Crocker (1962)

3.4.2 Rain-fed rice farming in Otdar Meanchey province

Farming in Otdar Meanchey is predominantly by mono rice cropping, where people grow only one cycle rice a year. There are few households that grow annual crops for income-generation, particularly cassava and watermelons. However, other cash crop like maize, sesame and other type of beans are mainly grown for home consumption. Vegetables are cultivated by some households in old villages who have Chamkar land and have access to water such as natural lakes. The most common animals raised in this area are chicken, duck, pigs and cattle.

3.4.2.1 Rice cultivation

The main cropping activities in Otdar Meanchey are rice and annual cash crops, particularly cassava and watermelon. Cassava was just grown in the previous year and this year 2012, mostly as a means for justifying the land possession during the time of the land titling campaign (just being launched by Prime Minister Hun Sen on 07 May 2012, Order 01). Vegetables are mainly grown for home consumption and only a very few families have particular plots for growing vegetables for the market with access to one natural pond. During the dry season, the area has limited access to drinking water, especially when the natural lakes dry out.

Table 29 Cropping calendar in Otdar Meanchey

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Remark
Rice													
Rainy season rice*													Showing
Annual crops													
Cassava													
Maize													
Sesame													
Sugar can													
Water melon													
Ground nut													
Soybean													
Mungbean													
Vegetables													
Cucumber													
Longbean													
Egg plant													
Watermelon													
Other types of vegetables (spinach, waterconvolvulus, chili etc.)													

**Note: The green colour indicates planting season, red colour indicates harvest season*

Rice is extensively cultivated one time a year. Depending on whether the rain stars in May or June, the rice is harvested in November or December. People do not transplant rice like in many other regions in the central plain of Cambodia; rather, they sow rice directly on the cultivated land. Since the end of the civil war, forest land has gradually been converted into agricultural land. After the land is cleared, people grow rice without applying fertilizer for the first or second year. After that, people started to apply fertilizers. In order to get new land, people use their family labor to clear the forest step by step. Some families said that they still have forest land or fallow land because the land is not yet clear for rice cultivation. For those who have enough money but lack labor, they can hire a tractor to clear the land (Hek Dei,

local language), which costs 5,500 bath (people here prefer to state the value in the Thai currency). This amount is equal to about 160 USD per hectare.

People use exchange labour in two main activities: harvesting and threshing rice. The host family has to host lunch and pay back this amount of work accordingly. Therefore, their chickens or ducks are rarely raised for the purpose of selling but for making food to host exchange labourers during the peak labour period. Labour exchange is found to be common in Otdar Meanchey in the three districts of the study area. However, in new areas such as in Trapaing Prasat district, where a new settlement just started in 2008–2012, labour exchange is also found in planting the annual crops. This give me the impression that labour exchange is part of the culture of the people in Otdar Meanchey and also a coping strategy for starting the farm works in cases where farm inputs such as capital and labour are lacking.

> "It is difficult to hire labour to help farming in my village during the peak period because everyone is busy with their farm work; therefore, we can only exchange labour as it will be of mutual benefit.
>
> - Ou Tong village chief."

The proximity to rice field is on average about five kilometres from home. The geographical and agro-ecological condition, i.e. the newly cleared land, require a two-wheel tractor to transport the workforce and farming equipment. Additionally, a two-wheel tractor is also meant for transport such as going to the market (collectively) to buy weekly food and to transport agricultural products from the production area to home. Often, wood remains in the newly cleared rice field which require "slashing and burning." This requires a two-wheel tractor to plough quickly to catch up with the rainfall. During my field study during the rice cultivation season, I rarely saw people using a cow to plough the rice field but two-wheel tractor instead.

The survey shows that among the 184 households interviewed in Otdar Meanchey, 13 per cent of households did not apply fertilizer in the interview year (2012). The cross-tab table show the relationship between the application of fertilizer according to the village. It can be seen that that the newly created villages like Sambour Meas, which have forest land not yet cleared, tend to apply less fertilizer. Table 30 below shows the number of families that did not apply fertilizer:

Table 30 Percentage of people who use fertilizer in OMC

Village	Did not apply fertilizer		Applied fertilizer		Total	
	Frequency	Percentage	Frequency	Percentage	Total	Percentage
Sambour Meas	5	21.7	18	78.3	23	100.0
Romdoul Veasna	0	0.0	14	100.0	14	100.0
Ou Ruessei	0	0.0	13	100.0	13	100.0
Doun Kaen	3	9.1	30	90.9	33	100.0
Ou Torng	1	5.9	16	94.1	17	100.0
Chheu Slab	3	12.5	21	87.5	24	100.0
Beng	1	4.8	20	95.2	21	100.0
Kantuy Choun	1	5.9	16	94.1	17	100.0
Ou Krouch	4	66.7	2	33.3	6	100.0
Thnorl Keng 105	6	37.5	10	62.5	16	100.0
Total	24	13.0	160	87.0	184	100.0

The average use of fertilizer among 160 households is 42.44 kilograms per hectare. The average yield is 1.14 tons per hectare.

Four households, which was about 2.2 per cent of interviewed families who did not have land to grow rice during the interview time had lost the land to the company granted from the government. By excluding those families, the average rice land holding per family is 3.8 hectares per household.

Table 31 Average land holding by village in OMC

Village	Mean (ha)	N	Std. Deviation	Minimum	Maximum
Sambour Meas	4.4211	19	2.75007	1.00	10.00
Romdoul Veasna	3.4757	14	2.04012	1.00	7.00
Ou Ruessei	3.7692	13	2.64272	.50	10.00
Doun Kaen	4.1858	33	3.53375	.68	20.00
Ou Torng	4.1565	17	2.49649	1.00	10.00
Chheu Slab	4.7083	24	2.82041	1.00	12.00
Beng	4.4250	20	4.00748	1.00	20.00
Kantuy Choun	3.1494	17	.94848	1.48	5.00
Ou Krouch	2.0833	6	1.68572	.50	5.00
Thnorl Keng 105	2.3850	16	1.26528	.16	5.00
Total	3.8891	179	2.81755	.16	20.00

Rice is mainly kept for home consumption. The average consumption of rice is about 310 kilograms of milled rice per person per year. This amount is two times higher than Global Rice Science Partnership data of 160.3 kilograms milled rice per person per year (GRiSP (Global Rice Science Partnership), 2013) and national data of 143 kilograms (RGC, 2010). The difference may be due to the way the figure is calculated. I am not sure how the finding is calculated; however, my guess based on the literature suggests that it was based on calorie

intake. In my survey, I asked people the amount of yield they get at the harvest time and the amount they have sold. I, thereby, assume that the remained amount is kept for home consumption. This means that the remaining rice is not for purely for human consumption but also for household use such as feeding the animals. In addition to this, in the situation where there was an urgent need of money, people traditionally sold paddy rice for the cash needed for occasions such as wedding parties or other social ceremonies. This is the first reason to explain why the amount reported in the survey is higher. The second reason is that in rural areas like Otdar Meanchey, often food is purely based on rice. With rice, salt and Prahok (fermented fish), rural people consider themselves as food secure. Therefore, rice consumption is dominant and constituted a higher consumption than the literature stated.

Among 184 families interviewed in the region, there are 112 families (about 61.9 per cent) that produce enough for home consumption for the whole year. Among them, 22 families (19.6 per cent) did not sell rice for income whereas 90 families (80.4 per cent) have sold rice for income generation. 72 out of 184 families (about 39.1 per cent) did not produce enough rice for home consumption all through the year. Of this number, 42 families (58 per cent of 72) had sold rice. This means that they are in need of income for daily living which requires them to sell some parts of rice they have grown and thereby buy more supplementary rice when they run out of stock. Table 28 below illustrates the situation of food security of the family.

Table 32 Percentage of those who sell rice by food security

Is your rice production being enough for the whole year consumption?		Did you manage to sell your rice?		Total
		No	Yes	
No	Count	30	42	72
	per cent within row	41.70 per cent	58.30 per cent	100.00 per cent
	per cent within column	57.70 per cent	31.80 per cent	39.10 per cent
Yes	Count	22	90	112
	per cent within row	19.60 per cent	80.40 per cent	100.00 per cent
	per cent within column	42.30 per cent	68.20 per cent	60.90 per cent
Total	Count	52	132	184
	per cent within row	28.30 per cent	71.70 per cent	100.00 per cent
	per cent within column	100.00 per cent	100.00 per cent	100.00 per cent

Of the 72 families that did not have enough rice for consumption through the year, there are 67 families (93 per cent of 72) that bought rice and another five families (7 per cent) had borrowed paddy rice from their neighbors.

With a paddy to rice conversion ratio of 64 per cent (RGC, 2010), the conversion of milled rice that people bought more to paddy rice tells us that the average milled rice that people bought is 213 kilograms per family per year, which is equal to 333.41 kilograms per family per year. The average duration of lacking rice is about 94.2 days per year, ranging from a minimum of 10 days up to a maximum of 240 days (Table 29).

Table 33 Duration of lacking rice

	N	Minimum	Maximum	Mean	Std. Deviation
Days without rice	70	10	240	94.20	55.47
Average paddy rice bought in kg	70	46.88	843.75	333.41	217.63
Average milled rice bought in kg	70	30	540	213.38	139.28

3.4.2.2 Annual crops

The typical annual crops in this area are maize (13 families) and cassava (21 families). Other crops grown are sesame (one family), sugarcane (two families) bean (groundnut four families, soybeans (two families), mung beans (two families), another type of bean (one family) and watermelon (12 families). Maize is mainly grown for home consumption but cassava mainly for income-generation purpose. Cassava is mainly grown in April or May and harvested in December or January (for other crops, please see the cropping calendar in Table 29).

There is a limited market in the area for cassava; however, in the interview year there was a growing tendency for growing cassava due to two main reasons. First, there is rapid growth in the other provinces which makes people believe that there will be good market for cassava locally, especially as there is a middle trader who is building a warehouse for stocking cassava in the city centre. Second, growing cassava is a means for justifying land holdings. As mentioned in the context of the study area, these actions are in response to the land titling campaign launched by the government. Table 30 shows the frequency of those who grow cassava in the previous year and those who grew it in the study year. Among the 184 households interviewed, 77 per cent of households did not grow cassava, 11 per cent have cultivated in previous years and 11 per cent have just grown this year. This also implies that majority of households do not have the land for growing annual crop or that most of the land is suitable for rice cultivation.

Table 34 Number of people growing cassava in OMC

Do you grow cassava?	Frequency	Percentage
No, do not grow cassava	142	77.2
Yes	21	11.4
Yes, just this year	21	11.4
Total	184	100

There are 13 families (7.1 per cent) out of 184 family that maize, out of which five families (2.7 per cent of the total family) have sold some part of the maize and used the rest for home consumption. The average yield is 1.423 ton per hectare, ranging from 0.31 tons per hectare to 3.75 tons per hectare. Maize produces a gross value of 403 USD per hectare and value added of 366 USD per hectare. This give an average land productivity of 403 USD per hectare and labour productivities of USD5.6 per person per day. Because growing on small plot of land and not intended for commercialization, people tend not to use any other input. This gives a high value for the income rate but the local market is not well developed for maize production.

3.4.3.3 Vegetables

Vegetables that are grown in the study area are cucumbers, long bean, eggplants and other types of vegetables including spinach, water convolvulus and peppers.

Vegetable are mainly grown in old villages such as Chheu Slab, Ou Ruessei and Beng, where some families have access land that is suitable for growing vegetables that close to a natural lake. They are grown to sell locally in the market. NGOs see the potential to develop vegetable cultivation in the area but efforts for people to grow vegetables meets two main challenges. First, people do not have access to water. Second, a majority of them (approximately 50 per cent according to the key informant interviews) are illiterate, which makes it difficult for them to learn new techniques from NGOs.

One key informant who specializes in vegetable growing in Ou Ruessei tells the story of vegetable growing in the village as well as in the city of Otdar Meanchey. Mrs. Kolab (invented name), a 57 years old woman originally from the Takeo province who settled in the village after liberation from the Pol Pot regime in 1979. In 1979, her family migrated from the Battambang province and headed west in order to move to the refugee camp in Thailand but, in that year, they faced a serious drought and had no water for consumption. Many people who migrated were temporarily stationed in the Ou Ruessei village as the village has a natural

lake where there is water all year long. Meanwhile, Vietnamese troops were stationed in the city centre of Samrong City, which is very close to the Ou Ruessei village. In order to feed the troops, the Vietnamese army started growing vegetables. However, they could not grow enough to meet their needs so they asked local villagers in Ou Ruessei the help them grow vegetables in exchange for milled rice to complement what they produced themselves. The case study reported that she learned how to grow vegetables from the Vietnamese troops. Since then, people in the village have been growing vegetables and this village grows vegetables to supply to the local market.

Among the nine families who grow long bean, they use on average 0.12 hectares, ranging from 0.01 to 0.25 hectares per family. One family has a profit loss while the rest of the generate income. The maximum value added from long beans is 147 USD per household, with two families earning about 70 USD per house and the other three earning less than 30 USD. Although long beans have a high economic profit of 1450 USD per hectare and an average net-income rate of 4.7, but long beans contribute an average gross value of only 80 US per household, ranging from 19 USD to 200 USD per household which gives an average value added of 58.5 USD per household.

Among the five families that grow eggplant, only one family can grow eggplant with a high profit and get a high income on 0.5 hectares of land, whereas the other four families grow on a small plot of land (0.03 hectares) and mainly not for a commercial purpose. Those four households did not expense on input in growing eggplants and therefore, no profit rate is calculated compare to inputs cost. So, the net-income rate is from the one family who grow eggplants for commercial purposes, who had a high profit rate of 37. The average gross value per hectare is 1,919 USD, with a maximum value of 3,500 USD per hectare. The average value added per hectare is 1885 while the average profit is 1,772 USD per hectare. Again, in term of households, 10.3 per cent (19 out of 184 families) grow cucumbers on an average land size of 0.11 hectares, ranging from a minimum 0.03 to a maximum 0. hectares. There are only two families growing cucumber for income, with a high value added from 350 USD to 1,500 USD. The remaining families just grow cucumbers for home consumption that gives a value added from 3 to 45 USD per household. This gives an average gross value of cucumbers of 1,327 USD per hectare and value added 1,103 USD per hectare with an income rate of 8.7. However, in terms of value added per household, people can generate only 120 USD of gross value and 106 USD of value added. This means that on the average land size of 0.11 hectares, people can generate value added only 106 USD per family per year from cucumber production.

One family grow watermelon on 0.01 hectares that has a high yield of 100 tons per hectare and a gross value of 5,000 USD per hectare with value added of 3,080 USD per hectare. With the price that people sell and earn at the local market, this give land productivities of 30,800 USD per hectare. However, in term of labor productivities watermelon generates only 2 USD per person per day, which is lower than any other type in the vegetable category. At the household level, watermelons generate only 50 USD gross value and value added 30 USD and profit about 28 USD.

For other type of vegetables, the calculation based on 25 families shows that only 18 families generate income from other types of vegetables and the other seven families just use their home garden for home consumption. If we compare among the total 184 families, we can see that only 14 per cent of families grow vegetable and 4 per cent (seven families) did not generate income, 7 per cent (12 families) earn less than 100 USD per house, 2 per cent (4 families) earn less than 200 USD per year and 1 per cent (2 families) earn from 300 USD to 500 USD per household. This means that other type of vegetables can generate income for a few families who is specialize in vegetable-growing who have land and water for vegetable growing. This means vegetable growing is not well-developed in the area. That is why some NGOs see the potential to promote vegetable-growing in the area. Table 31 belows show the income classification of other type of vegetables, the number and percentage of families growing vegetables and the mean value of income generation from this type of production.

3.4.2.4 Regrouping annual crops and vegetables in Otdar Meanchey

Based on the result of land and labor productivities, I group annual crops and vegetables into two main group to simplify the category of crops: annual crop (AC) and vegetable (VG). AC comprises maize, cassava, beans, cucumbers and sesame. VG comprises watermelon, long bean, eggplant, vegetables, watermelon and sugarcane. The table below is a summary table which combines several tables into a single one in order to make it easier to visualize the data. However, by doing this, I have excluded the minimum, maximum and standard deviation. These can be found in Appendix 1.

After regrouping, the average annual crop land of 0.27 hectares per family gives a gross value of 189.48 USD and value added of 165.86 USD. Standard deviation is higher than mean value. This mean that there is very high variation of value among households. This implies that the quality of production is different than the cropping system cultivated by households. This is the same in the case of vegetables.

In term of land productivities, annual crops can produce 513.88 USD per hectare, while vegetables produce about twice as much as annual crops at 1,099.21 USD per hectare. In terms of labor productivities, vegetable growing can earn 4.47 USD per person per day which is slightly higher than annual crops, which can earn 4.25 USD per person per day. However, there is no statistical difference between VG and AC labor productivity as determined by one-way ANOVA ($F(1,67) = 0.56$, $p = 0.813$).

After regrouping AC and VG, I can now list the families that use the combination of cropping systems between HR, AC and VG. By excluding four families who have no agricultural land, the calculation result of land proportion tells us that among 180 families, 55 per cent (99 out of 180) grow only HR, while another 45 per cent (81 out of 180 families) have some land for growing VG and AC, which gives an average land proportion for rice at 0.85, with 0.10 for annual crops and 0.05 for vegetables.

Table 35 below shows the percentage of combination of cropping systems and land proportion.

Table 35 Land proportion by combining cropping system (HR, AC, VG)

Cropping system	Frequency	Percentage	Valid percentage	Land proportion			Total	
				[HR]	[AC]	[VG]	Proportion	Land (ha)
[HR]	99	53.80	55.00	1			1	3.41
[HR][AC]	47	25.50	26.10	0.8409	0.1591		1	5.28
[HR][AC][VG]	21	11.40	11.70	0.8987	0.0540	0.0473	1	4.80
[HR][VG]	13	7.10	7.20	0.9109		0.0891	1	5.33
Total	180	97.80	100.00	0.8500	0.1000	0.0050	1	4.12
Missing System	4*	2.20						
Total	184	100						

*Land lost and land less families.

3.4.2.5 Animal production

Common livestock in Otdar Meanchey are pigs, chickens, ducks and cattle. 30 percent of families (55 out of 184 families) have pigs. All sell pigs for income generation, with the average price of 2.22 USD per kilogram. However, eight families experienced negative income from pig production due to high expenditure on input and low price. Among 184 families, there are 143 families (77.70 per cent) raising chickens, mainly for home consumption. There are 65 families (45.5 per cent) who raise chickens sell chickens for income with an average income of 41.46 USD per year per family. 24.5 per cent earned

income of less than 30 USD per year with an average income of 15.26 USD per year per family.

33.2 per cent of families (61 of 184) raise ducks, of which 52.5 per cent (32 of 61) families had sell ducks for income. Five families raise fish from 150 to 800 head. All of them generate income from selling fish, earning from 50 to 600 USD per year. For further economic details of each animal, see appendix 1.

The impression from the interview suggests that the reason that families did not sell chickens is because they mainly keep, them for consumption especially during the peak labour demand. During this period, people mostly exchange labour. The host will need to host the lunch or dinner, therefore, chicken or duck are mainly raised to serve this purpose.

The qualitative interview with one development NGO suggested there is the potential to raise income from growing vegetables and raising poultry but the challenge is the low education of the family who struggle to lean the better techniques taught by development NGO.

70 of 184 families surveyed (38 per cent) raise cattle. Among those who have cattle, 36 families had sold cattle in the year interviewed, which is about 51 per cent of total families who raise cattle, from which five families of them have sold their last cattle so they have no more remaining cattle stock.

Each family who raises cattle has an average 3.2 heads per family and they sell on average 1.94 heads per family. The qualitative interviews showed that people sold cattle every one, two or three years, depending on the need of the family. According to the survey, the price varies according to the age and quality of cow, ranging from 125 USD per head for a small cow to 1,000 USD per head for a very good one. However, people reported that the average price for an adult cow is 500 USD per head, while the survey reported an average value of 324 USD per head. Using a value of 500 USD per head, the cattle stock value per family is calculated to determine the household asset. I assume that people sell cattle every three years for the purpose of calculating the economic value of the labor productivity of cattle in order to avoid being misleading. The input cost is calculated on a three-year basis and the input cost calculated per head for the duration of three years. This will be used to multiply the number of cattle sold in the interview year. This cost deducted from the gross value in order to see the value added. The given value added is, therefore, used to compute the labor productivity.

3.4.2.6 Common resource (CR)

The area is characterized as new area, given that a lot of the agricultural land has just been recently cleared from forest. In addition to this, there are several forest communities surrounding the village that people can access to collect forest product. Therefore, firewood, charcoal, wild vegetables, wild mushroom and wild fruit are available in the study area. That is why two-wheel tractors are very important for the people in this area, because the rice fields are a long distance from home and people need a two-wheel tractor to transport agricultural products as well as to plough the new land, which often still has wood remaining wood from recently felled trees. This land cannot be ploughed with cows. Two-wheel tractors have been used to transport firewood from rice fields to home to make charcoal. The rapid expansion of agricultural land has led people to believe that the common resources in the area are in dramatic decline. People collect common resources mainly for home consumption. However, some non-timber forest products (NTFPs) can be collected for income generation such as wild potatoes, wild mushroom, fish and frogs.

Fish are harvested from common pools for home consumption. Traditionally, people mainly keep fish for making *prohok* (fermented fish). People share view that as long as they have *prohok* and rice, they feel secure all year long, because they can find vegetables in the forest or in their home garden to consume with *prohok* and rice. That is why rice is very meaningful to family; it is not just an economic output per hectare but food security. People believe that the cost of buying rice from the others is higher than if they cultivate their own rice.

93 of 184 families (50.5 per cent) have collected firewood; however, the amount collected is not revealed in the survey. Only 3 of 93 families (1.6 per cent) sold firewood. The rest is just kept for home consumption. On average, people collect 8.4 ox-carts of firewood, ranging from two to 32 ox-carts per year. The local price of 30,000 riels per ox-cart (7.5 USD per ox-cart) for the sale of firewood has been used as a standard price for calculating the gross value and value added of firewood. Table 36 shows further detail about the common resources.

Table 36 Average economic value of common resource by type in OMC

Common Resources in OMC	N	Percentage of 184	Quantity	Unit	GV (USD)	VA (USD)	Sell (USD)	Consumption (USD)	PL (USD)	IC (USD)	Labor Productivity (USD/person/day)	Distance (Km)
Fish	85	46	19.18	kg	75.89	73.97	20.31	55.58	0	1.92	3.62	2.12
Firewood	93	51	7.67	Ox-cart	64.70	41.73	1.53	63.17	0	22.97	4.57	4.26
Charcoal	37	20	189.11	kg	66.64	49.42	2.70	63.93	0	17.22	7.33	1.80
Mushroom	50	27	9.95	kg	4.54	4.54	1.67	2.87	0	0	1.75	4.85
Wild bamboo shoots	11	6	106.11	kg	40.30	40.09	21.82	18.48	0	0	6.50	2.33
Wild potato	34	18	58.76	kg	16.19	16.19	15.23	0.96	0	0	1.37	4.50
Wild rattan	4	2	80.50	Piece	5.28	5.28	3.75	1.53	0	0	1.94	6.25
Wild vegetable	35	19	17.10	kg	26.76	26.76	12.29	14.48	0	0	5.52	4.07
Wild fruit	8	4	124.00	kg	21.93	21.93	20.03	1.90	0	0	1.60	4.88
Wildlife	4	2	8.00	kg	17.00	17.00	6.38	10.63	0	0	6.24	5.75
Snail and crabs	63	34	9.02	kg	1.15	1.15	0.08	1.07	0	0	0.35	1.21
Frog	89	48	13.85	kg	12.30	11.20	8.02	4.28	0	1.10	2.56	2.15
Hyng (another type of frog)	27	15	7.86	kg	6.90	6.78	4.08	2.82	0	0.12	2.27	2.84
Mice	18	10	13.03	kg	6.68	6.68	2.83	3.85	0	0.00	1.28	2.63
Others NTFPs	12	7	118.08	kg	32.50	32.27	24.27	8.23	0	0.23	4.20	4.08
Total regroup into CR	129	70			148.99	125.40	113.23	35.76	0.00	23.59		

3.4.2.7 Fruit Tree

In Otdar Meanchey, fruit trees (banana and mango trees) are grown around the house mainly for domestic consumption. 13 out of 184 households (approximately 7 per cent) report having a fruit tree (FT). Eight families manage to sell fruit for income generation.

3.4.2.8 Economic comparison of agricultural activities in Otdar Meanchey

The average rice yield in Otdar Meanchey is 1.16 per hectare, which is considered as in the qualitative interview interviewees reported that the normal yield was 2 ton per hectare. However, yield is also dependent on land quality and farm practices, such as applying fertiliser or not applying fertiliser. As described in the rice cultivation section, when new land was cleared many households did not apply fertilizer, which, combined with the general low-fertility soil land quality of the area, results in an average moderate yield.

The economic output per hectare shows that rice in Otdar Meanchey generates 253 USD per hectare, which is twice lower than the land productivity of annual crop which is 692.45 USD ha. Vegetables generate a land productivity of 1100 USD per hectare, which is four times higher than rice and two times higher than the annual crop. However, the standard deviation of rice, annual crops and vegetable land productivities are respectively higher than the mean value. This implies that the condition of production is more important than the cropping system.

Rice capital investment per hectare is also half as much as the annual crop. However, the annual crops require five times as much labor per hectare than rice but yields an average labor productivity of almost the same as rice. That is why it is more economically interesting to grow rice rather than an annual crop, even though the land productivities of annual crops is twice as high as rice. It can be seen that rice requires less labour input per hectare than annual crops and vegetables but offers highest land productivities. That is apparently the reason why people prefer to grow rice even though land productivity is lower than with other crops and people can save labor for doing other activities such as migration or off-farm work. Vegetable investment per unit of land is slightly less than annual crops but labor input is seven time higher than annual crops. Given vegetables are labor intensive, the low investment per unit of land could be under-estimated or aggregated with the value per unit of land from the small-scale production which some households produce for home consumption would impact the cost actual cost of those produce for income generation.

Although the land productivity of vegetables and annual crops is higher than for rice, in terms of labor productivities, rice generates the highest labor productivity, follow by annuals crop and vegetables. The comparison mean test between the mean labor productivities of rice, vegetables and annual crop shows no statistical difference between the three. For animal production, pigs have the lowest labor productivity in comparison to poultry and cattle.

In terms of the average contribution to household income, rice contributes the highest cross output and added value among the crops. While rice contribute 630USD per household per year, annual crops contribute 256 per household per year, about half as much as rice. Vegetables, poultry, pigs, aquaculture, common resources and fruit trees contribute about the same amount to households of between 125 and 180 USD per household per year. It is interesting to see that cattle contribute a large amount of income to households in comparison to rainy season rice, which contribut4es about 600 USD per year per family. Although cattle labor productivity is low compared to other crops, people believe that it is a safety net for a family that they can sell when they urgently need money. Households reported that cattle have been sold to buy a two-wheel tractor. The environment is conducive for people raising cattle in the area when there is grassland available where people can let the cattle go. However, people admitted that it requires a lot of labor to take care of cattle, meaning that at least one family member has to care for the cattle full time care or the responsibility is shared among family members.

Comparing income from crop with non-farm income and migration income, the average contribution to households from non-farm income is 575.53 USD per household per year, while migration income is 807.69 USD per household per year. Therefore, the main sources of income for people in Otdar Meanchey are predominantly rice, non-farm activities, migration and cattle. The rest of the activities, such as annual crops, vegetables, poultry, pigs, aquaculture, common resources and fruit trees, contribute small amounts where household have tried to diversify based on resource availability such as annual crop land, vegetable land, access to water and proximity to forest resources (see Table 37).

Table 37 Economic of farm activity summary in Otdar Meanchey

Economic comparison of farm activities	Otdar Meanchey										
	HR	AC	VG	CAT	PT	PIG	AQ	CR	FT	NF	MIG
Land (ha)	3.82	0.71	0.27	-	-	-	-	-	-	-	-
GO (USD/ha)	285.34	849.98	2708.21	-	-	-	-	-	-	-	-
GVA (USD/ha)	245.21	664.47	2588.73	-	-	-	-	-	-	-	-
Yield (t/ha)	1.16	-	_	-	-	-	-	-	-	-	-
IC (USD/ha)	40.13	157.79	120.01	12.41	-	-	-	-	-	-	-
PL (USD/ha)	74.52	58.20	38.62	0.00	-	-	-	-	-	-	-
Labor (man-day/ha)	48.82	263.44	1859.07	121.00	-	-	-	-	-	-	-
Labor family (man-day/ha)	29.81	251.24	1849.16	121.00	-	-	-	-	-	-	-
Land productivity (USD/ha)	253.24	692.45	1099.21		-	-	-	-	-	-	-
Labor productivity (USD/man-day)	4.73	4.61	4.47	1.33	3.70	1.17	2.56	4.05	7.01	-	-
Net income/Profit (USD/ha)	170.69	629.93	2550.11	586.90	-	-	-	-	-	-	-
Income rate (USD/1 USD invested)	1.65	2.72	3.09	-	5.11	1.89	1.81	-	-	-	-
Number of household	184	53	35	36	149	55	5	129	13	140	45
GO per household (USD/hh)	1042.10	350.58	189.48	599.31	166.68	328.20	273.85	148.99	131.65	-	-
GVA per household (USD/hh)	902.56	326.07	165.86	586.90	152.95	179.79	126.95	125.40	131.65	-	-
Income per household (USD/hh)	630.17	255.99	157.50	586.90	152.95	179.79	126.95	125.40	131.65	575.53	807.69
IC (USD/hh)	139.54	29.78	23.89	12.41	16.85	148.41	146.90	23.59	0.00	-	-
PL (USD/hh)	272.39	70.97	8.37	0.00	0.00	0.00	0.00	0.00	0.00	-	-
Consumption (USD/hh)	544.87	2.38	8.46	-	140.67	0.00	64.85	113.23	11.35	-	-
Labor (man-day/hh)	-	-	-	121.00	44.13	91.39	51.00	29.36	13.23	-	-
Labor family (man-day/hh)	-	-	-	121.00	44.13	91.39	51.00	29.36	13.23	-	-
Number of cattle per hh, number of pig per hh	-	-	-	3.20	-	-	512.00	-	-	-	-
Number of cattle sold per hh, number of pig per hh	-	-	-	1.94	-	-	512.00	-	-	-	-
Cattle price per head, per kg for pig	-	-	-	324.48	-	-	-	-	-	-	-
Cattle remain	-	-	-	2.37	-	-	-	-	-	-	-

3.4.3 Diversified rice farming system in Tram Kak

3.4.3.1 Rice cultivation

In Tram Kak, land was distributed in 1980, ‘81 and ‘82. Due to the small rice landholdings and lack of access to irrigation, people dug ponds for the purpose of growing rice and vegetables as well as reserving water for home consumption. With water storage, people have

the capacity to allocate a small plot of rice field to grow early season rice (ER), which is grown in May and harvested in July. Late season rice is cultivated in August and harvested in December (Table 38). People grow early season rice by sowing seeds, while in the rainy season people transplant rice instead. Two-wheel tractors are not common in this area. Given the small land size, people prefer to use cows to plough the land.

Table 38 Cropping calendar in Tram Kak

	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Remark
Rice														
	ER/LR (2R)													ER: sowing, HR: transplant
	Rainy season rice (HR)													HR: Transplant
Annual crops														
	Maize													
	Sugar can													
	Water melon													
	Ground nut													
	Mung bean													
	Wax melon													
Vegetables														
	Cucumber													
	Long bean													
	Egg plant													
	Other types of vegetables (spinach, water convolvulus, chili…)													

**Note: The green colour indicates planting season, red colour indicates harvest season*

52 families (53.6 per cent) have diversified rice cropping by allocating a small plot of rice land to grow early season rice. After harvesting ER, people begin growing late season rice (locally called heavy season rice (HR)). I name this cropping system as 2R, which signifies two cycles of rice. The limitations of water storage mean that people can grow only on small plots of land. The average land proportion allocation for early season rice is 0.36 hectares, which is equal to an average land size of 0.15 hectares per family. The average rice's land holding per family is 0.58 hectares per family, ranging from 0.1 hectares to 2.21 hectares. Two families (2.1 per cent of the 97 households) did not have rice land. However, among the two, there is one youth family that was given 0.2 hectares of rice land by their parents at their marriage but they do not cultivate it and instead let their parents grow rice on that land, while the young couple purely rely on non-farm activities (case 276).

43 families (44.3 per cent) grow only rainy season rice. I name this cropping system as HR. There is also one family that has access to grow dry season rice at the edge of the lake. I call this cropping system DR, but given there is only one and the economic value is almost the same to HR, I merged it into HR. Therefore, there are two typical rice cropping systems in the Tram Kak study area: ER and HR.

This also most no significant difference between the average rice land of those who grow early season rice plus rainy season rice (2R, 0.64 hectares) and the average land rice of those who grow rainy season rice (HR) alone (0.51 hectares).

61 per cent of households (59 of 97) grow rice for just home consumption and do not sell it for income generation. However, 20 per cent of total households have to buy additional rice as they do produce enough for home consumption. Among those who did not sell rice for income, 30.5 per cent (18 households) have to buy additional rice, meaning that even if the entire amount of rice produced is kept for home consumption, it is not enough to feed the household and they have to buy more rice.

3.4.3.2 Annual crops

The common annual cash crops, like maize, watermelon and beans, are cultivated mainly in two villages: Trapaing Chak and Trapaing Chak, where annual crop land is situated at the end of the village close to the foot of the Damrei Romeal mountain.

Maize is only grown in the Trapaing Chak and Trapaing Chak village. 6.2 per cent (six of 97 families) grow maize on average 0.3 hectares. Five families are in the Trapaing Chak village and the sixth one is in Kol Kom, a nearby village of Trapaing Chak. Given people sell fresh maize as a snack for consumption, no proper and reliable yield was revealed during the survey, but rather the overall income from maize production. Four families sold their maize for an average income of 155 USD per household, ranging from 45 to 425 USD. One family grow sugarcane on 0.02 hectares that provided an income of 50 USD with land productivities of 5,625 USD per hectare.

21.6 per cent (21.6 per cent of 97) families grow watermelon. Watermelon is a high risk for losing profit due to two main reasons. First, the market is limited as many others also grow watermelons. Second, when there is a rain during the harvest season, the watermelon yield will be ruined. There are two families that lost money from growing watermelon in the year of the survey: 20.75 USD to 52.5 USD per family. By excluding those who made a loss, watermelon provides average land productivity of 466 USD per hectare, which higher than OMC.

14.4 per cent (14 of 97) families grow different types of beans, include groundnut and mung beans. 11 families sold beans for income, while the other three families kept them for home consumption. For detail of the annual crops' economic value generation, see appendix 1.

3.4.3.3 Vegetables

Vegetables are grown in Tram Kak mainly for income generation. The majority of households who grow vegetables sell their production for income and very few of them grow for home consumption. People try to diversify crops through vegetable growing by digging ponds to store water. Long beans, cucumbers, eggplants and different type of leafy vegetables are grown in the region. Among 97 families, there are three families that grows long beans. One of them lost money from the production.

12 families grow cucumber (12.4 per cent). 10 families sold cucumbers for income. Among the 10, three families were income negative from cucumber production. The remaining two families grow cucumber for just home consumption. People allocate an average 0.09 hectares, ranging between 0.02 hectares to 0.2 hectares, for growing cucumbers. Cucumbers have land productivities of 354 USD per hectare and labor productivities 2.87 USD per person per day in Tram Kak, which is lower than cucumber production in Otdar Meanchey.

33 families grow different types of vegetables in two villages, Trapaing Chak and Kol Kom, a nearby village that has a natural lake. Those who grow vegetables are those who live near the lake. Some dig ponds to store water for growing vegetables. Two villages, Ang Roneab and Chrey Tnaot, do not have the same kind of access to water, which is why there no households grow vegetables there. From the survey, there are three household that grow vegetables for just home consumption and do not sell for income generation and five households that produce a very low value of vegetables due to the high expense on intermediary input cost and the low land productivities of vegetable. By include all those extreme cases, the land productivity of vegetables is 2,255 USD per hectare. But when remove those values, the land productivities of vegetables increase up to 2,600 USD per hectare. The standard deviation is twice higher than mean, suggesting there is a very high variation between the mean values. Three families have land productivities from 10,000 USD to nearly 30,000 USD per hectare, while the majority of 14 households had land productivities from 1,000 USD per hectare to 5,000 USD per hectare. Six families had land productivities from 500 USD per hectare to 1,000 USD per ha. The remaining 11 families had less than 500 USD per hectare. This tells us that the quality of production is much more important than the cropping system. Eggplant and leafy vegetables generate high land productivities and labor productivities in comparison to long beans and cucumber. However, in terms of contributing to the household, we can see that only leafy vegetables and eggplant contribute more than 130 USD per household per year.

3.4.3.4 Regrouping Annual Crops and Vegetables in Tram Kak

Based on one economic value – that is the land and labor productivities of each crop together with investment on crops – maize, sugarcane and leafy vegetables can be grouped into a single category as vegetable [VG] and watermelon, beans, long bean, eggplant and cucumber as a single annual crop [AC]. We can see that nearly 30 per cent of the families grow rainy season rice on an average land size of 0.38 hectares without the capacity to combine or diversify with either vegetable nor annual crops (Table 39).

Table 39 Average land by cropping system in Tram Kak

Cropping system	N	Percentage	Valid percentage	Mean land (ha)					
				[HR]	[2R]		[VG]	[AC]	Total
					[ER]	[HR]			
[HR][VG]	2	2.10	2.10	0.40			0.008		0.41
[HR][VG][AC]	4	4.10	4.20	0.63			0.18	0.24	1.05
[HR][AC]	10	10.30	10.50	0.86				0.32	1.18
[HR]	27	27.80	28.40	0.38					0.38
[2R][VG]	15	15.50	15.80		0.21	0.83	0.16		0.99
[2R][VG][AC]	13	13.40	13.70		0.26	0.70	0.23	0.25	1.18
[2R][AC]	11	11.30	11.60		0.14	0.55		0.18	0.74
[2R]	13	13.40	13.70		0.13	0.46			0.46
Total	95	97.90	100						0.75
Missing system	2	2.10							
Total	97	100							

3.4.3.5 Animal production

Like many other regions of Cambodia, the animals raised in Tram Kak are pigs, chickens, ducks, geese, fish and cattle. There are 20 families out of 97 (20.6 per cent) in Tram Kak raising pigs mainly for income generation. All producers can sell pigs for income and none of them raise pigs for home consumption. People can raise pigs up to twice per year (two cycles). The main expense is foraging. Due to the scarcity of local forage, people no long produce their own pig forage. People prefer to buy ready-made or industry forage to feed pigs. This constitutes a high of expense on input cost. The second expense is on buying a pig sow. The income from pig can be either selling pig for meat or sell a pig sow or both, depending on the specialization of the family. However, people mostly sell pigs for pork meat.

79 families raise chickens (81.40 per cent of 97), of which 45 families sold chicken (46.40 per cent of 97). There are only three families that earned more than 250 USD income from chicken-raising per year, 300 USD per year and 864 USD per year in each of the three families. The rest earn an average of 54.74 USD per year, with a value added of 130 USD per year and consumption 95 USD per year. From my field observation, I noticed that having

income from selling chicken of 100 USD per year is considered as an income diversification strategy for families.

37 family raise ducks (38.1 per cent). Five families sell ducks, from which four families have generate more than 85 USD per year, with an average income from those who sell duck of 80.5 USD per year.

There are eight families (8.20 per cent) raising fish in Tram Kak. Among them, there are four families (4.1 per cent) that sell fish for income. Among them there is one family who specializes in fish raising that can earn an income of 1,000 USD per year from this production. Excluding this specialized family gives an average profit that is equal to a value added of 50 USD per family. The labour productivity is 1.72 USD per person per day. Besides those who manage to generate income, the others raise fish for just home consumption as a trial as part of an effort by NGOs to encourage people in the area to raise fish.

Among the 97 households interviewed in Tram Kak, 84 families (86.60 per cent) raise cattle, out of which 41 families have sold their cattle for income, which is about 48.8 per cent of those who have cattle and about 42 per cent of the total households surveyed in the area. Only one family had sold all their cattle. The average cattle remaining is 2.44 head per household. Each family sold cattle at the average of 1.5 head per household and an average price is 433 USD per head. The typical cattle price in the area is 500 USD per head.

It is interesting to see that in the area with small agricultural land, almost every household tried to raise cattle. This is partly because the land is so small, hence farmers do not need two wheel-tractors as drought power: a cow is enough for ploughing and preparing the land for other crops. Therefore, raising cattle provides supplementary income as well as safety net for the family. The only challenge that the people complained about is that it is difficult to find grazing land, given that in the rainy season all land is cultivated for rice, so the cattle have to remain under or around the house. People also agree that cattle consume labor for providing water, grazing and feeding. Similar to other regions, the labor productivities is 1.55 USD per person per day, which is just slightly higher than the Otdar Meanchey region, who had 1.33 USD per person per day. Given there no much expenditure on cattle, the average income is the gross value of the cattle sold. Cattle contribute more income than the land productivities of one hectare of rice. Therefore, cattle play an important role in the household income of rural families.

3.4.3.6 Common Resource in Tram Kak

The common resources in Tram Kak is collecting fish in the rice field, stream and natural lakes. Among the 97 households surveyed, only 15 families collected fish (15 per cent of 97), of which only two families (2.1 per cent of 97) sold fish for household income. There were three families (case numbers 197, 211 and 215) that fished up to 700 kilograms and generated income of 700 USD per year from fishing. The other two families could fish 120 kilograms respectively but generated no income, using the fish just for domestic consumption. These three cases are statistical outliers. By removing this extreme value, we can see that in average, rural families collect about 17.7 kilograms of fish from common areas per family per year, ranging from a minimum of 1.2 kilograms per family per year to 50 kilograms per family per year. They usually collect fish in their rice field or in other rice fields. The maximum distance that people went to collect common resources is two kilometres from the home village with an average distance of 0.37 kilometres.

24.7 per cent of families (24 of 97) collected firewood for household cooking fuel. None of them sell firewood. People collected an average of 4.67 ox-carts of fuel per year at a maximum distance of four kilometres from their home village (0.75 kilometres on average). Assuming a local price of 7.5 USD per ox-cart, the gross value and value added of firewood is calculated.

2.1 per cent of families (2 out of 97) have collected wild bamboo shoots. One of them can collect up to 1200 kilograms per year and generates an income from selling bamboo shoots of 163 USD per year, while another family collected only 20kg for home consumption. These two families having access to bamboo shoots because they live in close proximity to a mountain.

14.4 percent of families (14 of 97) collected some kind of snails and crabs from the rice fields as source of protein. By asking people to estimate the amount they have collected in kilograms, the survey shows that on average people have collected seven kilograms of this kind of common resource per household per year. This collection is usually for home consumption only and it is rarely for income. It also has a low economic value. There is only one family in the Prey Kabas district that can sell this kind of common resource, with a price of 500 riels per kg (0.13 USD per kg). The survey used this local price to calculate the gross value and value added of this common resource.

15.5 percent of families (15 of 97) catch frogs. One family catches up to 42 kilograms per year, which is the extreme value. By excluding this, each household catches an average of

3.14 kilograms of frogs per year, ranging from one to six kilograms per year. Two families sold frogs for a tiny income.

Table 40 Average economic value of common resources in Tram Kak

CR Tram Kak	N	Percent age of 97	Quantity	Unit	GV (USD)	VA (USD)	Sell (USD)	Consumption (USD)	PL (USD)	IC (USD)	Labor Productivity (USD per person/day)	Distance (km)
Fish	15	15	17.73	Kg	135.05	132.22	48.17	86.88	0	2.83	3.39	0.37
Firewood	24	25	4.67	Ox-cart	36.98	30.00	0.00	36.98	0	6.98	4.26	0.75
Wild bamboo shoot	2	2	520.00	Kg	84.25	84.25	81.25	3.00	0	0.00	6.02	1.00
Snail and crabs	14	14	6.96	Kg	0.87	0.87	0.00	0.87	0	0.43	0.26	0.62
Frog	15	15	3.14	Kg	7.71	7.28	3.53	4.18	0	0.00	2.10	0.40
Hyng (frog)	1	1	2.00	Kg	1.50	1.50	0.00	1.50	0	0.00	1.50	1.50
Total regroup into CR	41	42			78.44	73.16	22.88	55.56	0.00	5.28		

In general, common resources are mainly used for home consumption and only one family who specialized in catching fish can generate an income from fishing in the common resources.

3.4.3.7 Fruit Trees in Tram Kak

32 families in Tram Kak generate income from fruit trees (FT), mainly from coconut and mango trees. Fruit trees are grown around the home village. People do not spend labor on taking care of the fruit trees, therefore the estimated labor is on the day they harvest the fruit and sell it to traders who come to buy it at the village. Hence, the labor productivities is high compared to the other crops thanks to this specific characteristic. The average labor productivity is 15.2 USD 0 per person per day, ranging from 4 USD to 30 USD per person per day. Banana and other fruit trees are included into a single category as fruit tree.

3.4.3.8 Economic comparison of agricultural activities in Tram Kak

Table 41 shows the economic comparison of agricultural activities in Tram Kak.

With the capacity to irrigate from ponds, the average yield of 2R rice in Tram Kak is 2.64 tons per hectare. This is higher than HR rice, which is 2.16 tons per hectare. The 2R investment on intermediate cost is 196.5 USD per hectare, which is 62.19 USD higher than HR but the land productivity of 3R is 717.874 per hectare, which is 272.54 USD per hectare higher than the land productivity of HR, which 445.37 USD per hectare. The increased capital of 62.19 to invest on 2R will bring the marginal growth of income from rice 4.38 time. Therefore, it is more beneficial for people in Tram Kak to invest in digging ponds to grow 2R rice. The labor input for 2R is 199 man-days per hectare, which 28 man-days per hectare

higher than HR, which requires 161 man-days per hectare. Given the marginal land productivity of 272.54 USD per hectare and a marginal labour input of 28 man-days per hectare, if people shift from HR to 2R, it would give the marginal labour productivities of 9.73 USD per man-day. Vegetables have the highest land productivities but also require the highest labour input and investment per hectare. Vegetables generate labour productivities of 12.63 USD per man-day. The annual crop investment per hectare is about the same as investing in 2R. However, in terms of land productivity, annual crops produce added value of only 548.46 USD per hectare, while 2R can produce 717.874 USD per hectare, which is 169.28 USD lower than a 2R crop. In the situation that annual crop has to be grown on the Chamkar land where not many people possess land, it is, therefore, economically attractive that people diversify crops by digging ponds in which to grow 2R rice. In addition to this, with the water available from ponds, people can grow vegetables and raise fish.

If converting HR to 2R by allocating 20 per cent of land for digging ponds, 20 per cent of land for growing vegetables, and 60 per cent of land growing for 2R and raising fish, a simulation on 0.5 hectares of land based on the given economic output shows that the total added value increases three times and the growth of labor gives marginal labour productivities two times higher than the conventional HR. Hence, the strategy to improve the cropping system in Tram Kak is to diversify agricultural activities between 2R, vegetables and fish culture.

For animals, raising pigs requires the highest labour input in comparison to aquaculture (fish raising) and poultry. However, pig has labor productivities lower than poultry and aquaculture, which require less labour input.

In term of average contribution of income to a household, 2R contributes 446.62 USD per household per year, which is twice as high as HR, which contributed just 196.97 USD per household per year. Vegetable land productivity is the highest in comparison to other crops but it contributes an average of 151.83 USD per household per year, while annual crops contribute less than other crops at 93.85 USD per household per year. For animals, poultry contributes 145.83 USD per household per year, while pigs and aquaculture contribute 218.79 USD per household per year and 181.20 USD per household per year respectively. Again, like in Otdar Meanchey, cattle contribute the highest income to households in comparison to other crops, animal and even non-farm and migration income. As in Otdar Meanchey, non-farm and migration income contribute an average income of a significant amount in comparison to other crop and animal-raising activities.

Table 41 Economic comparison of agricultural activities in Tram Kak

Economic comparison of farm activities	Tram Kak											
	ER.HR	HR	AC	VG	CAT	PT	PIG	AQ	CR	FT	NF	MIG
Land (ha)	0.65	0.51	0.25	0.18	-	-	-	-	-	-	-	-
GO (USD per ha)	969.56	579.68	700.64	2563.78	635.73	-	-	-	-	-	-	-
GVA (USD/ha)	773.06	445.37	515.71	2286.78	635.73	-	-	-	-	-	-	-
Yield (t/ha)	2.65	2.16	-	-	-	-	-	-	-	-	-	-
IC (USD/ha)	196.50	134.31	184.93	276.99	-	-	-	-	-	-	-	-
PL (USD/ha)	43.80	25.99	0.00	0.00	-	-	-	-	-	-	-	-
Labor (man-day/ha)	188.94	160.75	183.17	236.51	121.00	44.66	103.94	62.50	21.58	5.63	-	-
Labor family (man-day/ha)	169.78	148.64	183.17	236.51	121.00	44.66	103.94	62.50	21.58	5.63	-	-
Land productivity (USD/ha)	717.87	445.37	548.46	2508.95	-	-	-	-	-	-	-	-
Labor productivity (USD/man-day)	4.45	3.26	3.99	12.63	1.55	3.03	1.48	1.96	2.73	15.20	-	-
Net income/Profit (USD/ha)	729.27	419.38	515.71	2286.78	624.71	-	-	-	67.88	-	-	-
Income rate (USD/1 USD invested)	3.13	3.53	3.08	4.98	-	5.87	1.52	4.01	-	-	-	-
Number of household	52	43	38	34	41	83.00	20	8.00	41	35	60	34
GO per household (USD/hh)	600.22	264.48	132.59	182.07	635.73	166.66	409.09	253.75	78.44	95.36	-	-
GVA per household (USD/hh)	487.93	208.57	93.85	151.83	624.71	145.83	218.79	181.20	73.16	95.36	478.35	584.49
Income per household (USD/hh)	446.62	196.97	93.85	151.83	624.71	145.83	218.79	181.20	73.16	95.36	478.35	584.49
IC (USD/hh)	112.29	55.91	38.74	30.24	5.38	20.83	190.31	72.55	5.28	0.00	-	-
PL (USD/hh)	41.31	11.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-
Consumption (USD/hh)	414.73	231.02	1.98	7.06	0.00	109.28	0.00	57.00	55.56	0.00	-	-
Number of cattle per hh, number of pig per hh, number of fish per hh					3.17	-	3.00	357.14				
Number of cattle sold per hh, number of pig per hh					1.54		2.74					
Cattle price per head, per kg for pig					432.99		2.01					
Cattle remain					2.45							

3.4.4 Prey Kabas irrigated rice farming system

Due to having access to irrigation remaining from the Pol Pot regime that was renovated in 1999–2000, people in Prey Kabas are able to intensify their rice cropping, planting and harvesting up to three times per year. A water fee is charged from a rice cultivator based on the amount of land irrigated and the cycle of cultivation. The water fee is charged in paddy rice at a cost of 3.5 kilograms of paddy rice per 0.1 hectares, which is about 87.50 USD per hectare per cycle.

People usually use two wheel-tractors for land preparation, transporting agricultural products and a pumping machine to drain water from the irrigation scheme to irrigate rice. The present irrigation scheme divides rice cropping into four rice cropping systems:

1. Two short cycle rice (2R);

2. Three short cycle rice (3R);

3. Rainy season rice or late cycle rice, also locally called heavy rice (HR); and

4. Water receding rice (DR).

Annual crops and vegetables are rarely grown by the household in the area. From the survey, only two households grow water convolvulus and three households growing watermelon, mung bean and sugarcane on their land. This suggests that vegetable and annual crops are not the key strategic crops for households in this area but rice is. Table 42 shows the rice-based cropping calendar in Prey Kabas.

Table 42 Cropping calendar of rice-based cropping system in Prey Kabas

	Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Remark
Rice														
	2R						R1				R2			Seed sowing
	3R	R3					R1				R2			Seed sowing
	HR													Transplant fragrant rice for home consumption
	DR (water receding rice)													Seed sowing
Annual crops														
	Sugar can													
	Water melon													
	Mung bean													
Vegetables														
	Waterconovolus													

**Note: Green: planting time; red: harvest time.*

In the Prey Kabas commune, people have also used labour exchange for rice cultivation since 1996. However, this habit is gradually fading away due to changes in farming practice, infrastructure improvement in the area and improved wealth for the residents. At that time people transplanted rice; however, since year 2000, people have stopped transplanting rice but sow rice instead. Additionally, in about the same year two-wheel tractors and harvesting machines have become available in service to all villagers. Since then, no more labour exchanges have been conducted in the village.

3.4.4.1 Intensified rice cropping in Prey Kabas

3.4.4.1.1 2R and 3R rice cropping

The most common practice of rice cropping is the short cycle rice. In this practice, the farmer cultivates the first short cycle rice in early May and harvests at the end of July. The land is fallowed in August and then the second short cycle rice is continued in September and harvested in November. Right after harvesting the second short cycle, farming continues with the third short cycle cultivated in December and harvested in February.

2R and 3R are exactly the same practice and used the same rice variety, IR66, which is the recommended variety for irrigated rice. Whether households do two cycles (2R) or three (3R) cycles is dependent on whether the household wishes to maximize production. Some households reported that land that is situated at the end of irrigation scheme can only cultivate twice a year due to the availability of water in the canal. However, according to the field observation, people tend to grow 2R rather than 3R even though their land is fully accessible to the water in the irrigation scheme and those who tend to grow 3R are those who have a small amount of land and who therefore attempt to maximize their production.

The common practice is that each short cycle rice requires 306 kilograms of seed per hectare and 280 kilograms of fertilizer per hectare, which is applied in two phases equally: in the early growing stage and another at flowering stage. Farmers buy fertilizer on credit, with the three months interest rate ranging from 17 per cent to 20 per cent. The price is often higher than the market price due to interest. However, people prefer to buy on credit because they cannot afford to pay in cash at the buying time.

Unlike the low-density area of Otdar Meanchey region, people do not use labour exchange in transplanting and harvesting in Prey Kabas. Instead, people started changing from transplanting to sowing rice and lately they have stopped harvesting by hand but instead prefer to use a harvest machine at a price of 3,500 to 4,500 Riel per 0.1 hectare (0.88 to 1.13 USD per 0.1 hectare).

Table 43 show the combination of rice cropping systems practiced by households in Prey Kabas.

Table 43 Rice land proportion in Prey Kabas

Cropping System	N	Percentage	Rice Land Proportion						
			[HR]	[2R]	[3R]	[DR]	Total	Average rice land (ha/hh)	SUM Land (ha)
[2R]	28	27.50		1			1	0.87	24.45
[2R]/[DR]	38	37.30		0.45		0.55	1	1.94	73.60
[3R]	7	6.90			1		1	0.62	4.35
[3R]/[DR]	8	7.80			0.48	0.52	1	1.14	9.14
[DR]	1	1.00				1.00	1	1.00	1.00
[HR]	4	3.90	1.00				1	0.71	2.84
[HR]/[2R]	4	3.90	0.55	0.45			1	0.65	2.59
[HR]/[2R]/[3R]/[DR]	1	1.00	0.13	0.26	0.23	0.38	1	2.62	2.62
[HR]/[2R]/[DR]	8	7.80	0.33	0.23		0.44	1	2.74	21.95
[HR]/[3R]	1	1.00	0.17		0.83		1	2.08	2.08
[HR]/[DR]	2	2.00	0.31			0.69	1	0.77	1.53
Total	102	100.00						1.43	146.15

* Due to outlier removed, some remain blank.

People mainly grow IR for 2R, 3R and DR to sell to Vietnamese traders. The production utilizes high inputs i.e. pesticide and fertilizer. Walking through the rice fields situated around the village, an outsider can smell the pesticide. The better-off people in the area grow IR to sell and allocate a certain plot of land to grow fragrant rice with low input use or even organic rice. Those who have small land plots and want to maximize production tend to grow three short cycles of rice.

3.3.4.1.2 DR: water receding rice

People grow water receding rice at the lower part of the irrigation scheme by pumping the water from the natural lake. People start sowing water receding rice in February when the water has receded and harvest in April, which the hottest month in Cambodia. That is why people prefer to call this dry season rice, which in the Khmer language is *sré braing* or *srov braing*. The average amounts of fertilizer and seed used are 310 and 374 kilograms per hectare respectively.

Observations from the field interview suggest that DR requires less labour in comparison to other rice cropping methods because it is not necessary to prepare the land. Farmers just spend one day preparing the dike with muddy soil, and then the land is ready to sow the seed. The rest of the process just involves applying fertilizer two or three times, spraying pesticide and pumping water. Harvesting is done using a harvesting machine and then the product is transported to sell directly to Vietnamese traders right after harvesting. The payments of input cost that the farmer bought on credit during the cultivated season can also be made on about the same day.

People said that the high input used and low price paid for rice contributed to some households only making a low profit. However, the analysis of survey data on the mean of the net-income class per hectare shows that there is no statistically different between the IC and PL per hectare. In the survey, people reported they sell rice at prices ranging from 700 riel per kilogram to 1,200 riels per kilogram. People said that if the price paid is between 800 to 1,000 riel per kilogram, dry season rice brings profit. Otherwise, if the price is below or equal to 700 riel per kg, people will face negative income because of the high expenses for inputs. The comparison means test proved this statement. The compare-mean and post hoc test show that in terms of price, those have a net-income of less than 200 USD per hectare are not statistically different that the first two groups who received prices of 770 to 790 riel per kilogram. Nevertheless, the higher income per hectare is received by those that sell rice at a

price of between 859 riel per kilogram to 1,019 riel per kilogram. In terms of yield, those who get a low profit per hectare in the first two groups got the same average yield of 3.79 to 3.89 tons per hectare in the same subset, while those who have a high profit per hectare had an average yield of 5.32 to 7.2 tons per hectare. Therefore, it is the yield and price at harvesting that determines whether a household has a high negative income for dry season rice. The qualitative interviews suggest that dry season rice often generate a high income and plays an important role in supporting young couples to accumulate wealth with which to buy rice land through the cultivation of DR using land they have borrow from their parents for a certain period of time.

3.3.4.1.3 HR: Late cycle rice or late season rice

Late cycle or late seasons rice (HR) is grown from August to December. There is no combination of early season rice and late season rice, like in the Tram Kak region. I use the term HR to reflect the common name the villagers call this rice, *srov thgnon*, which means heavy rice (HR).

The economic value of HR shows that it is more profitable than 3R and 2R and less intensive. The land productivity is also high if we distribute the mean value according to the combination of the cropping system. HR requires less water to irrigate as well as less pesticide and less fertilizer. Hence, growing HR is not just a labor-saving strategy in terms of other activities but has a high economic return.

3.3.4.1.4 Factors affecting the choice of 2R, 3R and HR

In Prey Kabas, because IR rice (which includes 2R, 3R and DR) has a very high chemical input (fertilizer and pesticide), people mainly grow 2R, 3R and DR to sell to Vietnamese rice traders while they grow HR for home consumption, mainly fragrant jasmine rice. Due to the high price, HR is also grown by some families and likely the labour-saving family. This group grows HR for both home consumption and income generation. Therefore, the distribution of land to grow 2R, 3R and HR depends on the choice of intensification level of the households. By looking at the distribution of land proportion for each cropping, I can see how many families that combine the three-rice cropping. I put aside water receding rice (DR) because the separate land and system from the previous 3 rice cropping system.

Table 44 Rice land allocation between 2R, 3R and HR

Land Allocation for Rice Cultivation in PB	Frequency	Percentage	Valid percentage
2R	66	64.70	65.30
[2R] more than 50 per cent and [HR] less than 50 per cent	5	4.90	5.00
[2R] less than 50 per cent [HR] more than 50 per cent	7	6.90	6.90
[2R] 42 per cent [3R] 37 per cent [HR] 21 per cent	1	1.00	1.00
3R	15	14.70	14.90
3R more than 80 per cent, HR less than 20 per cent	1	1.00	1.00
HR	6	5.90	5.90
Total	101	99.00	100.00
Missing System	1	1.00	
Total	102	100.00	

Table 44 shows that 40 per cent (79 families out of 102) grow 2R rice. Among them 83.5 per cent (66 families) distributed all their land to cultivate only 2R rice. 6.30 per cent (five families) distribute more than 50 per cent of land to 2R and less than 50 per cent to HR. 8.90 per cent (seven families) distribute less than 50 per cent of land to 2R and more than 50 per cent to HR. One family of this 2R system allocates 42 per cent to 2R, 37 per cent to 3R and 21 per cent to HR.

16.9 per cent (17 families) grow 3R, out of which 15 families allocate all land for 3R, while one family allocates 0.83 land proportion to 3R and the rest for HR. And another one allocated 42 per cent for 2R, 37 per cent for 3R and 21 per cent for HR.

58 families (57 per cent of 102) have water receding rice land with an average (and mode) land size of 1.01 hectares per family ranging from 0.25 to 6 hectares.

There are total 19 families that allocate land to grow HR, with six families growing only HR and the other 13 families combine HR with 2R and 3R.

Based on the distribution of land proportions among 2R, 3R and HR over the sum of the three study areas, I group those who allocate all land to 3R as the “most intensified rice cropping”, those who allocate all land to 2R as the “less intensified rice cropping” and those who allocate all land to HR as the “least intensified rice cropping”. Those who allocate a proportion among the three systems, I check the proportion of 3R over the sum of land for 2R and 3R and compare HR over the sum of the three lands. The higher 3R over the sum of 2R and 3R and the lower HR over the total land, I give weight to 3R as the most intensified cropping system and vice versa, the lower 2R compare to 2R with low HR, I give weight to 2R as the less intensified system. The low 2R and 3R, and higher HR, I give weight to HR,

the least intensified system. Based on these I can see that 17 families (16.7 per cent) have the most intensified cropping system, 72 families (70.6 per cent) have the less intensified system and 12 families (11.80 per cent) have the least intensified cropping system. One family does not have any land in the irrigated area but uses water receding rice.

By excluding those who do not have dry season rice land, I run a cross-tabulation to test the relationship between the level of intensification and class of dry season rice land. I can see that cultivating dry season rice does not affect the level of intensification of the rice cropping in the irrigated area. The reason for this is that it uses separate land in a different area and the cultivation season is also different. My impressions from the interview suggests that the people intended to grow dry season rice if they had the land to do so.

My qualitative interview reveals that to some families grow rice three times per year because they only have a small plot of land. This supports the common-sense idea that those who have smaller land tend to maximize their production. However, when I check the distribution of land that has been allocated from most to least intensive system, I see that those who have the smaller land also grow HR. To see if it is case in this study area, I test the relationship of Chi-square between the three levels of intensification and the five classes of land in the irrigated area (excluding the DR land). The test shows no relationship between these variables, X2 (9) = 7.718698, p = 0.46142033. With the three categories of intensification, I run again the gross table with the total land size by choosing the Eta test.[34] This tests whether there is no association if the Eta value is close to 0 or perfect association if it is close to 1. The Eta value of the dependent variable total land is 0.138. This means that there is very little association between the land size and the level of intensification. The distribution of data shows that both with small and large plots of land are the most and least intensified. The square value of Eta 0.019 (<2 per cent) tells the effect of the association is small.[35] This was confirmed again by the Partial Eta Squared to estimate the effect size through Univariate Analysis of Variance. The F value of 2 degrees of freedom with an error degree of freedom 98 is F (2, 98) = 3.104, p = 0.049, which gives the Partial Eta Squared of 0.06, indicating there is small effect size on the land and the level of intensification. The P value of 0.049 tells us that there is a statistical difference between the mean lands within each group level of intensification. This implies that the size of the land is not the only factor that

33 10 cells (66.7 per cent) have expected count less than 5. The minimum expected count is .24. This is violet the assumption rule in which is only 20 per cent is allowed. This suggests that the result might not be valid.
34 Nominal and interval data, only Eta test is allowed.
35 0.02 Or 2 per cent: small effect, 0.13 or 13 per cent medium effect and 0.26 or 26 per cent large effect.

affects the choice of intensification, but the labor savings from that method of cropping can be used for doing alternate activities such as non-farm work. Although some households told me during the interview that their land cannot do 2R because it is at the end of the irrigation area, by cross-checking the distribution in the village with the distance from irrigation, I can see that those who are close to irrigation also do HR, which is the least intensified rice-cropping method. This permits me to rule out the idea that it is the access to water in the irrigation scheme that determines the intensity, suggesting that instead it is the choice of the family.

3.4.4.2 Annual crops in Prey Kabas

People in the Prey Kabas area do not have annual crop land; instead, all lf the land is dedicated to growing rice. However, there are three families who do grow annual crops. One family grows sugarcane on the 0.02 hectares of village land of 0.02ha, one family grows watermelons on annual cropland of 0.45 hectares and the third grows mung beans on a 0.24 hectare of land on a hill near the village.

3.4.4.3 Vegetables in Prey Kabas

Like annual crops, growing vegetables is not a key activity undertaken by households in the area. The common vegetables such long beans, eggplants, cucumbers and other leafy vegetables that are cultivated by many households in Tram Kak and Otdar Meanchey are not grown in the Prey Kabas commune. There are only two families that grow water convolvulus. People harvest water convolvulus monthly. No specific yield was reported during the survey but the income and expensed on the production. In terms of their contribution to household income, water convolvulus generates on average 435 USD per household per year.

3.4.4.4 Regrouping Annual Crops and Vegetables

The labour productivity of watermelon and vegetables (in this case water convolvulus) is higher than any other crops, so I merge the two into a single category of vegetable [VG]. I also merge sugarcane and bean into a single category of annual crop [AC]. I can see that even though only three families grow vegetables, this production contributes an income to the households of between 250 USD to 600 USD per year. This amount is almost equal to selling one cow. the contribution to households from annual crops ranges from 50 USD to 250 USD per year. However, given so few families grow AC and VG, these crops are complementary crops rather than strategic crops like rice.

3.4.4.5 Animal production

Like many other areas, the people in Prey Kabas raise pigs, poultry and cattle. There are 28 household (27.50 per cent of 102 families) who raise pigs. There are three factors that determine the income from pig: the price of pigs at the time that the household sells the pig, the age of the pig, the expense on the input used, particularly pig industrial forage, and the degree of specialization of the family in raising pigs. Among those who raise pigs, more than 46.4 per cent that earn less than 200 USD per year from doing so. The income is very different among households who raise pigs. The family that generates the highest income from pig production makes nearly 2,000 USD per year in net income.

Chickens and ducks are raised by 55.90 per cent (57 families out of 102), out of which 33 families sold chickens for income. The rest is just keep them for home consumption. 19 families (18.6 per cent) raise ducks, out of which only four families had sold ducks for income. The rest raise ducks for home consumption. There is one big commercial duck-raising farm in the area.

The two families that raise ducks for commercial purposes on a large scale can generate value from 2,137 USD to 3,818 USD, with high labour productivities of 10 to 16 USD per person per day respectively. But, if these two families are excluded, the average value added is only 42 USD per family, ranging from 5 USD to 163 USD maximum with average labour productivities of 1.7 USD per person per day. There is no family raising fish in Prey Kabas.

Among the 102 household surveys, 89 said that they have raised cattle, which make up 87.3 per cent. Of those who have cattle, 54 (60.7 per cent) of them have sold the cattle at an average of 1.54 heads per household with the average price of 433 USD per head. There is one cow trader who buys and sells cows in the village.

3.4.4.6 Common Resources in Prey Kabas (CR)

People said that fish were more available between September to April than at other times in the year. During this period, some families did not spend any money buying food as they could catch the fish for food. However, they needed to buy daily food from April until August, with the amount is varying according to the family's needs. Among 102 families, 22 families catching fish in the common pool, which makes up 21.6 per cent of the total families. Nine families out of 22 (40.9 per cent) have sold some part of the collected fish in the past year. The rest just keeping fish for home consumption. One family (case 360) fishes up to 600

kilograms per year and another family (case 293) fishes up to 250 kilograms per year. However, these are statistical outliers. By excluding these values, the average amount of fish caught by people in the area is 48 kilograms per family, ranging from three kilograms to 180 kilograms.

Firewood, 19 families (18.6 per cent of 102) collected firewood from the forest near the water receding rice fields. Three families (cases 286, 294 and 309) collect up to 30, 20 and 15 ox-carts of firewood respectively. However, these are statistical outliers. By excluding these extreme values, the average value of firewood collected by families was 2.88 ox-carts per family, ranging from 2 to 6 ox-cart. None of them sold firewood for household income; therefore, collecting firewood is just for home consumption only. One family produced an estimated 600 kilograms of charcoal per year. There are 19 households collecting snail and crabs, 21 household colleting frock, 1 household collecting Hyng, and 6 household hunting mice. Table 45 outlines the common economic value by type.

Table 45 Common resource economic value by type in Prey Kabas

Common resources in Prey Kabas	N	Percentage of 102	Quantity	Unit	GV (USD)	VA (USD)	Sell (USD)	Consumption (USD)	PL (USD)	IC (USD)	Labor Productivity (USD per person/day)	Distance (Km)
Fish (USD)	22	22	48.24	Kg	156.16	154.80	62.27	93.89	0	1.36	4.51	1.30
Firewood (USD)	19	19	2.88	Ox-cart	45.26	38.55	0.00	45.26	0	6.72	6.23	0.95
Charcoal (USD)	1	1	600.00	Kg	120.00	30.00	0.00	120.00	0	90.00	6.00	-
Snail and crabs (USD)	19	19	7.76	Kg	1.23	1.23	0.26	0.97	0	0.00	0.40	0.95
Frocks (USD)	21	21	3.64	Kg	8.15	8.05	2.86	7.77	0	0.11	2.13	0.67
Hyng (USD)	1	1	3.00	Kg	2.25	2.25	0.00	2.25	0	0.00	1.13	2.00
Mice (USD)	6	6	7.67	Kg	11.17	11.17	8.75	2.42	0	0.00	2.03	4.50
Total regroup into CR	43	44			108.04	103.01	75.44	33.81	0.00	5.68		

3.4.4.7 Fruit Trees in Prey Kabas

There are only three families in Prey Kabas who generates income from mango trees and another kind of fruit tree locally named *khvet*. Two families reported they received an income 250 USD per year and 50 USD per year from their mango tree. One family got income 250 USD per year from their *khvet* three. They did not use any labour input for taking care of those fruit tree. In the harvest season, traders come to village and buy the fruit from the tree which they harvest themselves. The seller just collects the money following the harvesting activity done by the trader. As there is no family labour input in the fruit tree production, no labour productivity is calculated.

3.4.4.8 Economic comparison of agricultural activities in Prey Kabas

Among the 11 agricultural economic activities, there are seven main activities done by many households in Prey Kabas. They are rice-based activities including rice (HR, 2R, 3R, DR) and raising cattle, poultry and pigs. Rice is the most dominant activity, with 2R and DR cultivated by the majority of the household.

With the capacity to irrigate, the average yield is almost equal between HR, 2R, 3R and DR at between four to five tons per hectare. The 2R system give average yield of 4.75 tons per hectare, while the 3R system has a yield of 4.75 tons per hectare. The DR system has a yield of 5.43 tons per hectare and the HR system yields 4.2 tons per hectare. Excluding the paid labour, the investment per hectare (IC per hectare) of 2R is 2.29 time higher than HR. 3R investment per hectare is 3.4 times higher than HR, while DR is 1.15 times higher than HR. If both IC and PL are considered as investments per hectare, then 2R is 2.08 times higher than HR, 3R is 3.02 times higher than HR and DR is 1.10 times higher than HR. Comparing the gross output per hectare, the two times investment higher than HR generates a gross output 1.66 time higher than HR. 3.4 times investment give gross output of 3R 2.78 time higher than HR, while DR with 1.1 investment higher than HR produces a gross output 0.96 times lower than HR.

In terms of output per unit of labour, 2R produces 11.13 USD per man-day, which is slightly lower than 2R and 3R, which produce an almost identical labour productivity of 12.11 USD per man-day and 12.13 USD per man-day respectively. Therefore, in terms of economic output per unit of labour, HR, 2R and 3R are about the same. That is why it is also more interesting for farmers who is want to save labor grow HR. This is because HR uses less input, less water and less pesticide than other rice-cropping methods. Moreover, the price of 2R, 3R and DR fluctuates and is not stable, therefore, given the high input cost, these three productions are prone to be income negative if the price is too low (below 700 riel per kilogram); however, they can also bring in a high income if the yield is high and price is above 900 or 1000 riel per kilogram. Hence, growing HR beside for home consumption[36] and labour saving, it is also a backup when other rice becomes income negative to grow. Usually, HR price is stable, ranging from 1,100 to 1,300 Riels per kilogram. DR land productivity is 776.23 USD per hectare, which almost identical to HR whose land productivity is 797.16 USD per hectare. However, the economic output per unit of labour for DR is 2.21 times

[36] Due to high input use such particularly pesticide, usually family in Prey Kabas did not consume IR rice. Instead, they grow HR rice for home consumption.

higher than HR, 2.03 times higher than 2R and 2.02 times higher than 3R. Therefore, 2R and 3R are more interesting to those who are have a small amount of land and need to maximize the economic output per unit of land. However, the economic output per unit of labour is also most the same for HR, 2R and 3R. DR is more attractive since in produces the highest economic output per unit of labour. Since humans are economically rational, then tend to maximize production if they can, in this case if they have full access to irrigation. However, the combination of HR, 2R, 3R shown by the survey could also the choice of household to optimize the family's labour availability and for other non-economic reasons such as health safety of consuming HR, which is produced using chemical-free input.

Table 46 Economic comparison of agricultural activities in Prey Kabas

Economic comparison of farm activities	Prey Kabas												
	HR	2R	3R	DR	VG	AC	CAT	PT	PIG	CR	FT	NF	MIG
Land (ha)	0.55	0.80	0.66	1.04	0.22	0.13	-	-	-	-	-	-	-
GO (USD/ha)	1260.77	2087.02	3510.85	1209.33	3064.81	1793.48		-	-	-	-	-	-
GVA (USD/ha)	902.62	1280.00	2312.11	801.99	2637.96	1689.67	-	-	-	-	-	-	-
Yield (t/ha)	4.20	4.75	5.05	5.43	-	-	-	-	-	-	-	-	-
IC (USD/ha)	352.94	807.02	1198.74	407.34	426.85	103.80	-	-	-	-	-	-	-
PL (USD/ha)	180.07	301.38	410.42	176.49	0.00	25.00	-	-	-	-	-	-	-
Labor (man-day/ha)	71.82	114.67	148.35	54.70	86.67	152.17	121.00	50.69	115.91	22.34	1.06	-	-
Labor family (man-day/ha)	29.63	49.97	63.79	10.63	86.67	152.17	121.00	50.69	115.91	22.34	1.06	-	-
Land productivity (USD/ha)	797.16	1279.47	2261.35	776.23	2637.96	1689.67	-	-	-	-	-	-	-
Labor productivity (USD/man-day)	11.13	12.11	12.13	24.56	29.23	10.46	1.58	3.16	2.44	3.64	100.00	-	-
Net income/Profit (USD/ha)	722.55	978.62	1901.69	625.51	2894.21	1664.67	-	-	-	-	-	-	-
Income rate (USD/1 USD invested)	1.38	0.97	1.32	1.28	6.49	3.22	-	-	-	11.02	-	-	-
Number of household	20	79	17	57	3	2	54	58	28	43	3	73	13
GO per household (USD/hh)	613.21	1594.77	2204.92	1194.68	450.00	150.00	635.73	291.77	622.42	108.04	183.33	621	784
GVA per household (USD/hh)	423.74	970.15	1379.76	780.23	388.75	126.13	624.71	228.88	330.64	102.36	183.33	621	784
Income per household (USD/hh)	330.19	747.41	1214.12	624.05	414.38	120.38	624.71	228.88	330.64	102.36	183.33	621	784
IC (USD/hh)	184.66	624.62	825.16	414.45	61.25	23.88	5.38	62.90	291.78	5.68	0.00	-	-
PL (USD/hh)	93.55	222.75	236.67	156.17	0.00	5.75	0.00	0.00	0.00	0.00	0.00	-	-
Consumption (USD/hh)	263.76	406.40	357.99	77.32	0.00	0.00	0.00	193.61	0.00	75.44	0.00	-	-
Number of cattle per hh, number of pig per hh			-	-	-	-	3.01	-	4.15	-	-	-	-
Number of cattle sold per hh, number of pig per hh				-	-	-	1.52	-	5.18	-	-	-	-
Cattle price per head, per kg for pig			-	-	-	-	482.52	-	1.98	-	-	-	-
Cattle remain			-	-	-	-	2.14	-		-	-	-	-

In terms of income per household (added value minus paid labour) HR contributes 330 USD per household per year. 2R contributes an average income 2.23 times higher than HR, while 3R contributes nearly 3.67 times more than HR. The land productivities is almost the

same as DR but DR contributes twice as much income as HR. The average consumption of HR is 263 USD per household, which is almost the equal to the HR net income of 330.19 USD per household. The qualitative interviews confirmed that HR is mainly grown for home consumption. 2R and 3R also contribute to home consumption about the same amount per household, at 406.4 USD per household and 358 USD per household respectively. In the interviews, people reported that 2R and 3R are produced for income-generation. The consumption of 2R and 3R implies that there some households that have a small amount of land and therefore cannot allocate any land to grow HR for home consumption, so they need to maximize production by growing 2R and 3R and their gross output will be kept for both home consumption and selling for income generation. Usually, DR production is not for home consumption. Consumption of DR occurs when a family has only DR land. Hence for rice cropping, the main source of income is 2R, 3R and DR.

Again, the same as in Tram Kak and Otdar Meanchey, cattle contribute a significant amount of income to households, of about the same as the 2R income. Poultry and pigs contribute moderate income of 229 USD per household and 331 USD per household respectively, which is about the same amount as HR. Non-farm and migration income are also the sources of income (Table 46).

3.4.5 Concluding remarks

In this section, all agricultural activities have been examined and categorized into main groups in order to make cross comparisons within zones and across zones. Among 13 main economic activities, there are 10 main agricultural activities, in which six main activities are crops, four main activities are animal-raising, one main activity is exploiting the common resources and two main activities are non-farm work and migration. The economic performance of each activity and its contribution to household income has been explored.

In all zones, the average income from cattle contributes a significant amount compared to the average income from rice, annual crops and vegetables. Poultry, pigs and aquaculture contribute moderate income to households but they are key elements for diversification. Fruit trees and common resources play important roles to a few households but in general they contribute just an optional and additional source of protein to rural households. Cattle stock in each household is a source of income, providing a safety net for when people are in urgent need of income, such as to buy a two-wheel tractor or pay for medical treatment or children's weddings. Though cattle have lowest labour productivity and require labour look after, having

cattle can be an economic assurance to households that each rural household should take into account.

In Otdar Meanchey, the economic activities of farming were characterized by rain-fed mono rice cropping (HR) and annual crops (mainly cassava, watermelon, maize and beans; the vegetables grown are cucumber, eggplant, watermelon and other leafy vegetables). In Tram Kak, farm economic activities are a rice cropping system of early rainy season rice and late rainy season rice (ER and HR), and rainy season rice (HR). Except for cassava, the other annual crops and vegetables were cultivated the same as in Otdar Meanchey. Prey Kabas is different from the previous two zones due to the access to irrigation in this area allows for intensified rice cropping, include 2 short cycle rice (2R), 3 short cycle rice (3R), rainy season rice (HR) and water receding rice (DR). Annual crops and vegetable are rarely found in this area.

In Otdar Meanchey, HR has low economic output per unit of land but the highest economic output per unit of labour in comparison to other activities. Hence, the key to increase agricultural output is to expand HR land. That is why land size is much more important for people in this area. This provides motivation for migration, which is done not just to seek complementary income but to accumulate financial capital to expand rice land as well as to buy the two-wheel tractors which are necessary for rice farming in the area. Growing cassava is more economically attractive than HR but requires high labour input. Cassava land productivity is 2.74 time higher than HR but yields almost identical labour productivity, with 4.73 USD per man-day for HR and 4.61 USD per man-day for AC. The qualitative interviews suggests that rather than anticipating a high economic return from cassava, people who had just began growing cassava the year interviewed did so as a means to justify the land used and to demonstrate they were owner of the land in order to get the land title rather than the anticipation for high economic return. The local agricultural wage labour is 3.47 USD per man-day, which is lower than HR, AC, VG and poultry-raising. While the labour productivity of construction work is 3.86 USD per man-day, garment workers receive 2.08 USD per man-day, hence, it is if people have enough land, it is preferable to do HR and AC rather than migration. However, wage labour in Thailand is 300 bath per man-day, which is why many people in this area to migrate to Thailand.

In Tram Kak, a combined ER and HR system brings the highest economic per unit of land and per unit of labour in comparison to other farm activities. Since the area has only a small land size per household, people try to diversity through digging ponds to grow ER and

HR rice and vegetables. The key to increasing household income is to diversify rice via digging ponds to store water. Poultry, pigs and fish are the key complementary elements for households to combine with rice farming and non-farming activities. The observations during the interview with all young couples in Tram Kak reveal that a husband or wife has to engage with non-farm activities, for example husband have to work as garment worker or construction worker, and then return to come back home to do rice in the cultivation season. The rice cultivation is to secure the food for consumption and the non-farm income covers the family's daily expenses.

In general, over the three zones, non-farm income and migration income per household are notable in all zones. Both contribute even more than rice based in Otdar Meanchey and Tram Kak.

Due to access to irrigation, bigger land size and access to water receding rice land, households in Prey Kabas can intensify rice up to three times per years. The main source of agricultural income in the area is 2R, 3R and DR Rice cropping. Though land productivities of 2R and 3R is higher than HR, labour productivities are almost identical (2R:12.11 USD per man-day, 3R:12.13 USD per man-day and HR: 11.13 USD per man-day). DR has highest labour productivity at 24.56 USD per man-day with the lowest land productivity. The additional sources of income are cattle and animal-raising, particularly pig and poultry. Vegetable and annual crops are not key activities in this area.

In all zones, agricultural wage labour activities are available for only short periods of time: on average 11 days per year. People therefore view it is just a supplementary income. Rural households cannot solely rely on that income.

Based on land and labour productivities, in the next section we develop a land value index from the household expenses and consumption presented in the section socioeconomic diagnostics. This allows for the calculation of the poverty line in each zone and, therefore, the minimum surface for sustainable integration in farming. Finally, farm household's economics can be examined in a household farm typology that will be developed based on main economic activities presented in this section.

3.5 Land Value Index

When there is a diversity of cropping systems within each of the areas, and even more between the various areas, it increases the potential of each plot of land to generate added value and income, independently of the capacity of the households to take advantage of this

potential. The mean land productivity ranges from 275 USD per hectare for HR in Otdar Meanchey to 2,261 USD per hectare for three rice crops per year in the irrigated plots of Prey Kabas, which corresponds to a range of 1 to 8. Being mean values, these data do not express the individual capacities of the various households to generate added value and income, but rather the agro-ecological potential of the land, mainly linked with the quality of the soil, the local climatic conditions and the access to irrigation.

In order to allow comparisons between the holdings of the households within each of the three areas, I calculate a land value index which compares the potential of each plot of land – carrying a defined cropping system – to generate added value in comparison with a plot of the only system that is common to all the three zones, heavy season rice. The Otdar Meanchey index of cropping system A (LIA) is calculated by dividing the land productivities of cropping system A (LPA) by the land productivity of heavy season rice (LPHR).

$$LVI_A = \frac{LP_A}{LP_{HR}}$$

The higher the LVI is for one specific plot, the more the land will have the capacity to generate a high income. The land potential value (LPV) of one specific household is then calculated by multiplying the area cultivated in each cropping system by the LVI of this cropping system.

$$LPV_A = Land_A * \frac{LP_A}{LP_{HR}}$$

The total land potential value (TLPV) for one specific household is then the sum of LPVs of all the cropping systems A, B, C, D…Z that this household undertakes.

LPV of Household H = (Land cultivated in CS1) *LVI_1+ (Land cultivated in CS2) *LVI_2+ ….

LPV of Household H = ∑ (Land cultivated in CSi) *LVI_i

The LPV represents the holding (virtual number of hectares) that would give the same income to the household as the one actually held *if it was totally cultivated in heavy rice*. The LPV allows us to make comparisons between household's holdings while erasing the impact of the various cultivation systems and their differences in land productivity.

Based on land productivity of each cropping in each zone, land value index is calculated and shown in Table 47.

Table 47 Land Value Index by three zones

Land index of cropping system	Takeo non-irrigated zone	Takeo irrigated zone	Otdar Meanchey
HR	1	1	1
ER.HR	1.35	1.61	n. a
3R	n. a	2.84	n. a
DR	n. a	0.97	n. a
AC	1.16	2.12	2.161
VG	2.31	1.69	1.953

3.6 Minimum Surface for Sustainable Integration in Family Farming (MSI)

The Minimum Surface for Sustainable Integration in Family Farming (MSI) is the minimum amount of land that, for one household in a given agro-ecological environment, can support the creation of an added value equivalent to the income needed to ensure the sustainability and continuity of rural livelihood. For any youth integration in farming, MSI is identified in order to identify the minimum threshold in the land holding that can ensure the sustainability of farming on a full-time basis (without requiring any off-farm or non-farm complement).

The calculation of the MSI, in each of the three areas, requires:

1. Calculating the minimum threshold of income susceptible to allow a sustainable livelihood (poverty line); and
2. Calculating the amount of land that is susceptible to allow the production of such an added value, given the land potential expressed in each of the areas

3.6.1 Calculating poverty line/minimum need per person per day or per year in USD

Option 1: My initial definition of need is defined by using the declaration of household expense consumption and consumption on agriculture and common resources as an expense, then I sum all incomes from the different sources of earning, including farming and non-farming, to see the final balance of family. I will then consider those who have a positive balance are those who meet sustained requirements and vice-versa. However, by doing so, there is ethical question on the expense of family might be different according to the preference of the family.

Option 2: The minimum needs for living as a family is calculated by adding (i) the total rice consumption of the family (as declared, adding the share of the production that is not sold to the quantities that are bought when the stocks are finished), (ii) the occasional poultry consumption, (iii) vegetable consumption and (iv) the consumption of collected common resources from the wild areas. The sum of all these gives us the minimum needs for the family. By dividing this amount by the total number of family members, and I get need per person per family per year, or per day if divided further by 365 days. This is called the poverty line per member of family.

Based on this, I get the general poverty line in the three zones as 370.22 USD per year per person, which is equal to 1.01 USD per day per person. The compare means test shows that there is a significant means difference between the groups at P = 0.00. However, when running the Post Hoc test to see which zone has a significant mean, the subset for alpha = 0.05 shows that Otdar Meanchey and Tram Kak are in the same subset and only Prey Kabas (the irrigated area) has the highest poverty line. This corresponds to the field observation that the area is wealthy, which means it will have a higher poverty line than the other study areas. This is partly because many households invest in children's higher education (see Table 49 Survey poverty line).

According to the World Bank (2009, p. 12), the overall poverty line (per capita income per day) in 2007 in Phnom Penh was 3,092 riels, in other urban areas was 2,704 riels, and in rural areas was 2,367 Riels. However, the Ministry of Planning (2013, p. 9) has updated the new poverty line in 2013 for Phnom Penh as 6,347 riels, for other urban areas as 4,352 riels, in rural areas as 3,503 riels and in Cambodia in general as 3,871 riels. Using the exchange rate effective on March 13, 2009 of 1USD as being equivalent to 4,115 Riel, the poverty line in Phnom Penh, other urban areas and rural areas in Cambodia in USD per day is shown in Table 48.

Table 48 Cambodian poverty line 2009 and 20013

Poverty line	2009*		2013**	
	USD/day/person	USD/person/year	USD/day/person	USD/day/year
Cambodia Phnom Penh	0.75	274.26	1.54	562.98
Cambodia Urban	0.66	239.84	1.06	386.02
Cambodia Rural	0.58	209.95	0.85	310.72
Cambodia			0.94	343.36
World Bank	1.00	365.00	1.00	365.00

* The World Bank (2009)

** Ministry of Planning (2013)

Table 49 Survey poverty line

Poverty line	2012*		2012*	
	Riel/day/person	Riel/person/year	USD/day/person	USD/day/year
Otdar Meanchey	3926.79	1,433,278	0.95	348.31
Tram Kak	3507.94	1,280,399	0.85	311.15
Prey Kabas	5451.06	1,989,638	1.32	483.51
Studied Area	4173.88	1,523,467	1.01	370.22

* Survey data 2012

The poverty line in my study area is very similar to the World Bank poverty line and the Cambodian poverty line but higher than the poverty line in 2009 and slightly higher than the updated poverty line in 2003. I used the poverty line in each zone to estimate the minimum surface for integration in farming (MSI).

3.6.2 Defining the Minimum Surface for Integration in Farming

It is assumed that without any other alternative, people will have to use their land to cultivate rain-fed heavy season rice (HR). So, the MSI will be the amount of land that can generate the value higher or equal to the poverty line. Therefore, by taking the poverty line per person per year divided by the land productivities of HR in each zone, we can determine the amount of land for HR per person. Table below is the MSI for HR per person.

$$MSI = \frac{Poverty\ Line\ per\ person\ per\ year}{Land\ Productivity_{HR}}$$

Table 50 Minimum Surface for Integration in the three zones

Zone	Poverty line USD/ person/year	HR land Productivities	MSI for HR land	MSI for youth family with 2 kids (4 members)
Prey Kabas	483.51	797.16	0.61	2.426
Tam Kak	311.15	471.32	0.66	2.641
Otdar Meanchey	348.31	275.00	1.27	5.066

For the irrigated area in Prey Kabas, the amount of land per person will be lower, as indicated in Table 51 below.

Table 51 Minimum Surface for Integration in irrigated area

Prey Kabas	Poverty Line USD/ person/year	Land productivities	MSI (ha/ person)	MSI for youth family with 2 kids (ha/4 members)
2R	593.46	1279.47	0.46	1.855
3R	593.46	2261.35	0.26	1.050
DR	593.46	776.23	0.76	3.058

3.6.3 Land situation for possible youth integration

We have developed the elements for examining the impact of the current land situation on the possible capacity for youth integration, such as land productivities, the land index and the poverty line. The land index and land productivity allow us to calculate the land potential value. The poverty line in each zone along with the average household size allow us to calculate the minimum threshold for a family to survive. By comparing the total land potential value with the minimum threshold per household, we can see the situation of households who have a surplus. Dividing the amount of surplus by the poverty line per person allow us to examine which households will be able accommodate one additional person into the family and which households are at subsistence level with the current family members and are not able to accommodate more people.

The results show that only 7.4 per cent of total households in the survey have land with the capacity or potential to include one additional member into the household, while another 6.4 per cent are in the situation of subsistence with the current family members. The majority of the households (86.2 per cent) are in the land situation of not being able to accommodate additional members and not even meeting subsistence levels with the current land they have.

Table 52 Land and youth integration capacity in three zones

Zone	Capacity	No of house holds	Percent age	Valid percent age	Number of persons to add more		Total land index (ha)			No youth in farming		No youth migration		No youth doing non-farm		No youth total
					Mean	Sum	Mean	Min	Max	Mean	Sum	Mean	Sum	Mean	Sum	
Tam Kak	Unable	91	93.81	95.79	-3	-315	0.87	0.10	2.91	0.87	79	0.67	61	0.08	7	147
	Subsistence	4	4.12	4.21	0	1	3.32	3.17	3.42	0.75	3	0.50	2	0.50	2	7
	Total	95	97.94	100.00	-3	-314	0.98	0.10	3.42	0.86	82	0.66	63	0.09	9	154
	Missing System	2	2.06													
	Total	97	100.00													
Prey Kabas	Unable	85	83.33	83.33	-2	-184	1.62	0.22	2.90	1.32	112	0.27	23	0.12	10	145
	Subsistence	5	4.90	4.90	0	2	3.14	3.01	3.36	1.40	7	0.60	3	0.00	0	10
	Able	12	11.76	11.76	3	36	4.73	3.60	7.36	1.33	16	0.08	1	0.00	0	17
	Total	102	100.00	100.00	-1	-146	2.06	0.22	7.36	1.32	135	0.26	27	0.10	10	172
Otdar Meanchey	Unable	149	80.98	82.78	-3	-414	3.32	0.16	6.16	1.64	245	0.34	50	0.15	23	318
	Subsistence	15	8.15	8.33	0	6	7.38	6.95	8.08	2.07	31	0.40	6	0.27	4	41
	Able	16	8.70	8.89	5	81	12.15	8.24	30.80	1.69	27	0.63	10	0.06	1	38
	Total	180	97.83	100.00	-2	-327	4.44	0.16	30.80	1.68	303	0.37	66	0.16	28	397
	Missing System	4	2.17													
	Total	184	100.00													

In Tram Kak, 96 per cent of households have land is not able to sustain the current family members, while only 4 per cent are at subsistence levels. None of the households in this area have the land capacity to accommodate at least one additional family member. The

average land value index of those who is not subsistence is 0.87 hectares, ranging from a minimum of 0.1 hectares to a maximum of 2.91 hectares. The mean land value index of those who are at subsistence is 3.32 hectares, ranging from 3.32 hectares to 3.42hectares.

In Prey Kabas, 83 per cent of households have land capacity below subsistence level, with a mean land value index of 1.62 hectares, ranging from 0.22 to 2.90 hectares. 5 per cent of households has land capacity for subsistence, with a mean land value index of 3.14 hectares ranging from 3.01 to 3.36 hectares. However, 12 per cent of households have the land capacity to add at least one additional member. Their mean land value index is 4.73 hectares, ranging from 3.6 to 7.36 hectares.

In Otdar Meanchey, 83 per cent of households are in the situation where the land has the capacity to produce below the subsistence levels. Their average land value index is 3.32, ranging from 0.16 to 6.16 hectares. 8 per cent of households are at subsistence with a land value index of 7.38 hectares, ranging from 6.95 to 8.08 hectares. 9 per cent of households have the land capacity to add at least one additional member, given their average land value index of 12.15 hectares ranging from 8.24 to 30.80 hectares.

Although the majority of households has a land value index below the subsistence level, both households who are under-subsistence and at subsistence in Tram Kak are currently keeping one youth working in farming (0.87 persons per household and 0.75 persons per household), while in Prey Kabas these figures are 1.32 and 1.40 person per household respectively. In Otdar Meanchey, households that have a land capacity below subsistence are hosting 1.64 youths per household and households at subsistence are hosting youths at 2.07 persons per household.

Even though the percentage is not high, there are households that have the land ability to add more youth in Prey Kabas where there is the capacity to irrigate the land. This is the same in Otdar Meanchey, where some households have farms of a large size. The able household has an average capacity to integrate three persons per household (standard deviation 1.79) in Prey Kabas and five persons (standard deviation 8.3) in Otdar Meanchey. The standard deviation of higher than the mean value suggests that there is a high variation among the capacity of households, because some household have large land size with the high capacity to add more people. This makes the average capacity per household high.

Although the analysis survey data suggest that 86.2 per cent of households have a land value index below the subsistence level they are, in fact, currently accommodating youths in farming (Table 53). Total sum number of youths within the below-subsistence households, at subsistence households and households able to accommodate an additional member shows that the households unable to support youths should be minus 913 persons but, in fact, 191 youths are currently working in this group of households (65 per cent), while 84 youths are on migration (29 per cent) and 17 youths doing non-farm activities (6 per cent).

Table 53 Land value index and actual youth in farming

Capacity youth integration	No of household	Land value index capacity to add in person	No youth in farming	No youth migration	No youth doing non-farm	Total youth
Unable	325	-913	191	84	17	292
per cent with total youth			65 per cent	29 per cent	6 per cent	100 per cent
Subsistence	24	9	10	5	2	17
per cent with total youth			59 per cent	29 per cent	12 per cent	100 per cent
Able	28	116	43	11	1	55
per cent with total youth			78 per cent	20 per cent	2 per cent	100 per cent
Total	377	-787	244	100	20	364
per cent with total youth			67 per cent	27 per cent	5 per cent	100 per cent

Looking at the distribution among the households in each zone (Figure 25) shows that average land value index per household is 0.98 hectares in Tram Kak, 2.06 hectares in Prey Kabas, and 4.34 hectares in Otdar Meanchey. The majority of households in the three areas have a land value index below the subsistence level of 3.32, 3.14 and 7.38 hectares in each zone respectively. This suggests that land alone should not be an assessment criterion for youth integration in farming. The contribution of other factors such as the combination of activities such as animal-raising, non-farm work and migration income would enhance the household's capacity. Thus, the land result for youth integration capacity is apparently lower than the current land index.

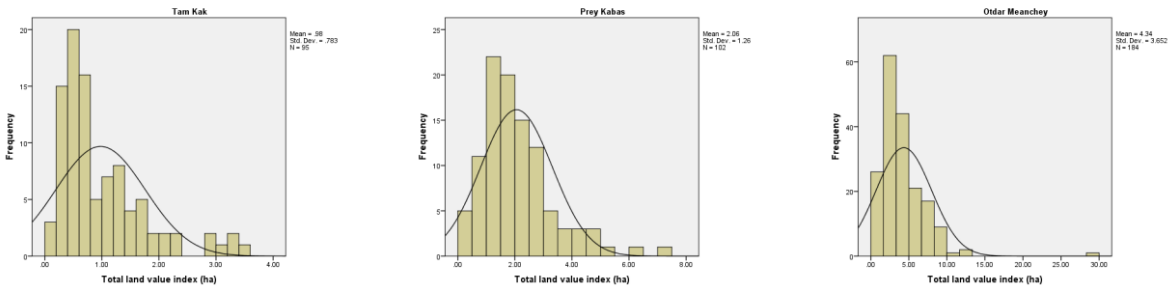


Figure 25 Histogram of land index in three zones

Therefore, a farm typology will be done in order to see the diversity and different strategies of households needed to further examine the youth's integration capacity. The next section discusses the farm typology in each zone, describing the farm types and their

economic capacity and comparing the minimum threshold of a household within each farm type.

3.7 Diversity of household: A typology of farm households

Due to the heterogeneity of farming systems in tropical humid regions, it is challenging to fully understand their variability. Therefore, various tools and methods have been developed and used to comprehended as well as to deal with the farming systems' diversity such as wealth rankings, farm typologies and distribution (Alvarez, Paas, Descheemaeker, Tittonell, & Groot, 2014). Typologies are, then, often used to understand and capture smallholder farming system's heterogeneity. This can be achieved by classifying farms into groups that have common characteristics, i.e. farm types. Since this study employs a socioeconomic survey to understand rural livelihoods, the principal component analysis (PCA) and cluster analysis (CA) methods are used as they are suitable for analysing the socioeconomic characteristics of typical farm households (Bidogeza, Berentsen, De Graaff, & Lansink, 2009). The objective of this section is to use the statistical methods PCA and CA in order to typify farm households into main groups based on their common characteristics in the three zones so that the farm economic capacity of each type can be assessed and the farm strategy identified. The result concerning the farm types will be used to further examine the youth and adult farm households and their integration capacity in the next chapter.

3.7.1 Principle component analysis and cluster analysis

Considering the different situations of the three zones that may impact on different household strategies and different capacities for youth integration, the PCA has been done by zone. The initial idea was to select only two provinces of Cambodia, which represent a high density area (Takeo) and a low-density area (Otdar Meanchey), and the sample survey intended to collect an equal proportion of 200 households from each province. In the actual data collection, we received 199 household surveys in the high-density area and 183 in the low-density area. However, in the high-density area (the Takeo zone), Tram Kak was characterized by small land holdings per family and limited access to irrigation. Therefore, people tried to diversify crops and more family members engaged in non-farm activities and migration, especially garment work, due to the proximity to the capital city Phnom Penh. The Prey Kabas zone, in contrast, , was located in the same province but had access to irrigation that allowed people to intensify rice cropping up to three times per year. In addition to this, they had access to water receding rice fields. The land holding per family in this area is also higher than Tram Kak. Due to the substantial differentiation of characteristics, the study decided to do a farm

typology in each zone rather than general typology that includes the entire three zones together. By excluding two families that were not suitable for data analysis due to insufficient data collected and eight families who were statistical outliers, the study had 372 households for the farm typology. In Tram Kak, there were 96 families, of which one household was excluded. In Prey Kabas, there were 95 families in the zone, of which one family was excluded and another six families were statistical outliers. In Otdar Meanchey, 181 households were included in the analysis, of which two families were excluded due to being statistical outliers. These families are big land owners. Table 54 explains the attributes of the variables and thee descriptions from the survey, including the PCA.

The survey data of farm households in each zone were constructed using the multivariate statistical techniques of principal component analysis (PCA) to reduce the dataset into non-correlated components. After that, hierarchical cluster analysis was used to partition the PCA output into clusters. All analyses were executed in XLSTAT 2016.06.38277 (in Microsoft Excel). The PCA condenses all information from the original interdependence variable into a smaller set of variables. Variables that are strongly independent, correlate very strongly or are double correlated, for example gross output and gross value added, have been examined. Outlier cases were removed before reaching the final PCA analysis. The selected variables were used to construct the factors using PCA. Factors were rotated using orthogonal rotation (the Varimax method). Based on Kaiser's criterion, all factors exceeding an eigenvalue of one were retained for future analysis. Factors retained from PCA were used in cluster analysis using the agglomerative hierarchical clustering (AHC) tool, which is Ward's hierarchical procedure. The numbers of cluster retained from Ward's method, a dendrogram, were used to select the optimal clusters. After that, one-way analysis of variance was performed to see the difference between the clusters.

Table 54 Variable description for PCA

Name of variable	Description	Unit	Include in PCA			Zone Tram Kak (N=96)		Zone Prey Kabas (N=95)		Zone Otdar Meanchey (N=181)	
			TK (1)	PB (2)	OMC (2)	Mean	STDEV	Mean	STDEV	Mean	STDEV
Human resources											
Total active workers	**Total number of active persons doing farm and non-farm activities**	**person**	✓			**2.95**	**1.22**	**2.72**	**1.00**	**3.44**	**1.67**
Active farm worker	**Number of active persons actually working on farm**	**person**	✓	✓	✓	**2.18**	**0.88**	**2.37**	**0.76**	**2.88**	**1.40**
Per cent labor migration	**Percentage of migrants to total number of active workers of the family**	**per cent**		✓		**19.02**	**24.62**	**6.79**	**14.77**	**9.97**	**18.11**
Age of household head	**Farmer's age in years**	**year**	✓	✓	✓	**45.02**	**11.48**	**46.25**	**13.46**	**46.72**	**12.68**
HH size	**Number of household members**	**person**				**4.82**	**1.40**	**4.95**	**1.56**	**5.55**	**2.05**
Land resources											
Farm size	**Total land size used for crops cultivation (rice, vegetable and annual crop) in hectares**	**Ha**	✓	✓	✓	**0.74**	**0.56**	**1.41**	**0.84**	**3.80**	**2.29**
Land labor ratio	**The division of total cultivated land to number of active farm workers**	**ha/ person**	✓	✓	✓	**0.37**	**0.33**	**0.65**	**0.45**	**1.52**	**1.16**
per cent rice land	**Percentage of rice land to total land**	**per cent**	✓	✓	✓	**82.98**	**22.67**	**100.00**	**0.00**	**92.78**	**18.43**
per cent AC land	**Percentage of annual crop land to total land**	**per cent**	✓	✓	✓	**10.13**	**16.98**	**0.00**	**0.00**	**4.32**	**11.54**
per cent VG land	**Percentage of vegetable land to total land**	**per cent**	✓	✓	✓	**5.85**	**11.07**	**0.00**	**0.00**	**0.69**	**2.64**
Financial resources											
Total household assets	**Sum of monetary value of home assets, agricultural asset and cattle stock value**	**USD**	✓			**2589.24**	**1670.19**	**3464.63**	**2291.09**	**2601.34**	**2093.79**
Agricultural assets	**Sum of monetary value of agricultural equipment**	**USD**		✓	✓	**716.77**	**724.60**	**1591.89**	**1826.90**	**1612.15**	**1592.38**
HH expenditure	**Household expenses for basic consumption such as food, clothes, and medical needs**	**USD**	✓	✓	✓	**1033.05**	**495.77**	**1475.50**	**610.29**	**1177.57**	**552.29**
Agricultural expenses (IC+PL)	**Sum of expense all IC (Intermediary Cost) and PL (paid labor)**	**USD**			✓	**207.42**	**218.16**	**1338.25**	**797.01**	**499.38**	**368.45**
Cattle stock value	**Value of cattle not yet sold for income**	**USD**			✓	**1057.29**	**787.63**	**915.79**	**621.65**	**417.13**	**712.03**
Rice IC+PL	**Expense on rice include intermediary cost and paid labor cost**	**USD**				**113.68**	**131.27**	**1212.24**	**749.68**	**389.23**	**290.79**
AC IC+PL	**Expense on annual crop include intermediary cost and paid labor cost**	**USD**				**13.69**	**29.83**	**0.00**	**0.00**	**24.62**	**76.11**
HH income sources											
Agricultural GVA	**Total agricultural gross valued added (sum of all gross values added from agricultural activities)**	**USD**	✓	✓	✓	**971.46**	**860.24**	**2108.12**	**1245.36**	**1296.35**	**785.81**
Rice GVA	**Total sum of gross value added from rice cropping system HR, 2R,3R and DR**	**USD**	✓	✓	✓	**358.51**	**385.89**	**1492.20**	**977.53**	**813.78**	**545.32**
AC GVA	**Gross value from vegetable productions**	**USD**	✓	✓	✓	**39.61**	**75.67**	**0.00**	**0.00**	**61.01**	**184.01**
VG GVA	**Gross value added from annual crops**	**USD**	✓	✓	✓	**55.39**	**124.51**	**0.00**	**0.00**	**27.05**	**128.61**
CAT GVA	**Gross value added from cattle mainly cow**	**USD**	✓			**266.80**	**400.52**	**352.32**	**457.41**	**112.59**	**305.52**
AN GVA	**Gross value added from animal raising include pig, poultry, and aquaculture (cattle is not included)**	**USD**		✓	✓	**185.81**	**212.72**	**214.09**	**496.14**	**183.93**	**175.53**
Total non-farm GVA	**The sum of non-farm income and migration income**	**USD**	✓	✓		**505.58**	**551.23**	**477.34**	**592.70**	**642.66**	**878.72**
Non-farm GVA	**Income from non-farm activities generate by non-migrant family member**	**USD**				**298.58**	**474.55**	**421.84**	**559.55**	**441.85**	**796.04**
Migration GVA	**Income from migration including remittance send home by migrant member**	**USD**				**207.01**	**412.62**	**55.50**	**244.56**	**200.81**	**504.70**

3.7.2 Farm type in Zone Tram Kak

3.7.2.1 Tram Kak PCA result and cluster analyses

From the 16 variables included in the PCA (Table 54), six components have eigenvalues greater than 1 and are been retained for future analysis. These six variables (F1 to F6) explain 78.20 per cent of the total variability. Looking at each column of Table 55, it is possible to define each component according to the variables which are the most strongly associated. To make it easy to identify the largest loading, the highest value of squared cosines has been highlighted in bold, which corresponds to the highest correlation between variable components. The first component (F1), which explains 29.29 per cent of variance, is positively correlated with farm size, total agricultural gross value added, rice gross value added, cattle gross value added and household expenditure. The second component (F2), which explains 13.90 per cent of variance, is positively correlated with per cent of annual crop land and gross value added of annual crop while being negatively correlated with the percentage of rice land. The third component, which explains 12.39 per cent of variance, is positively correlated between total active working family, active farm workers and age of household head.

We can see that the first two components are mostly related to farm size and land use, while the third component is mostly related to family members; that is, the total number of active workers and the educational level of the household head. The fourth component (F4), which explains 9.02 per cent of variance, is positively correlated with the percentage of vegetable land used and its gross value added. The fifth component, which explains 7.08 per cent of variance, is positively correlated to land-labour ratio, while the sixth component, which explains 6.58 per cent of variance, is related to total non-farm activities. Although household assets is positive correlated in component F7, its eigenvalue is less than one, which is below Kaiser's criterion.

The first two components have been used for running cluster analysis and three clusters were automatically generated. Cluster 1 is denoted as TK-1, which signify zone Tram Kak, farm type 1. The same is applied for TK-2 and TK-3.

Table 55 Correlations between variables and factors in Tram Kak

Name of variables	Component						
	F1	F2	F3	F4	F5	F6	F7
Human resources							
Total active workers	0.160	0.109	**0.828**	-0.048	0.079	0.366	0.018
Active farm worker	0.301	0.341	**0.682**	0.208	0.124	0.020	0.333
Age of household head	0.203	0.014	**0.681**	-0.053	-0.181	-0.070	-0.184
Land resources							
Farm size	**0.792**	-0.094	0.001	-0.153	0.485	0.200	0.080
Land labor ratio	0.557	-0.221	-0.319	-0.323	**0.558**	0.215	-0.072
Percentage rice land	-0.518	**-0.676**	0.273	0.006	0.305	-0.167	0.082
Percentage AC land	0.352	**0.784**	-0.109	-0.318	-0.068	-0.084	-0.103
Percentage VG land	0.580	0.171	-0.191	**0.634**	-0.115	0.229	-0.021
Financial resources							
Total household assets	0.496	-0.022	-0.156	-0.116	-0.178	-0.290	**0.686**
HH expenditure	**0.621**	-0.392	-0.061	-0.204	-0.391	0.006	0.114
HH income sources							
Agricultural GVA	**0.858**	-0.321	0.094	0.036	-0.124	-0.174	-0.166
Rice GVA	**0.654**	-0.501	0.135	-0.079	-0.067	-0.052	0.076
AC GVA	0.547	**0.587**	-0.052	-0.326	0.085	-0.083	-0.021
VG GVA	0.548	-0.051	-0.237	**0.617**	-0.015	0.287	-0.005
CAT GVA	**0.668**	-0.178	0.131	-0.027	-0.121	-0.318	-0.447
Total non-farm income	-0.145	-0.220	-0.054	-0.463	-0.442	**0.658**	0.022
Eigenvalues	4.687	2.223	1.973	1.444	1.133	**1.053**	0.892
Cumulative explained variance	29.29	43.19	55.52	64.54	71.62	78.20	83.78

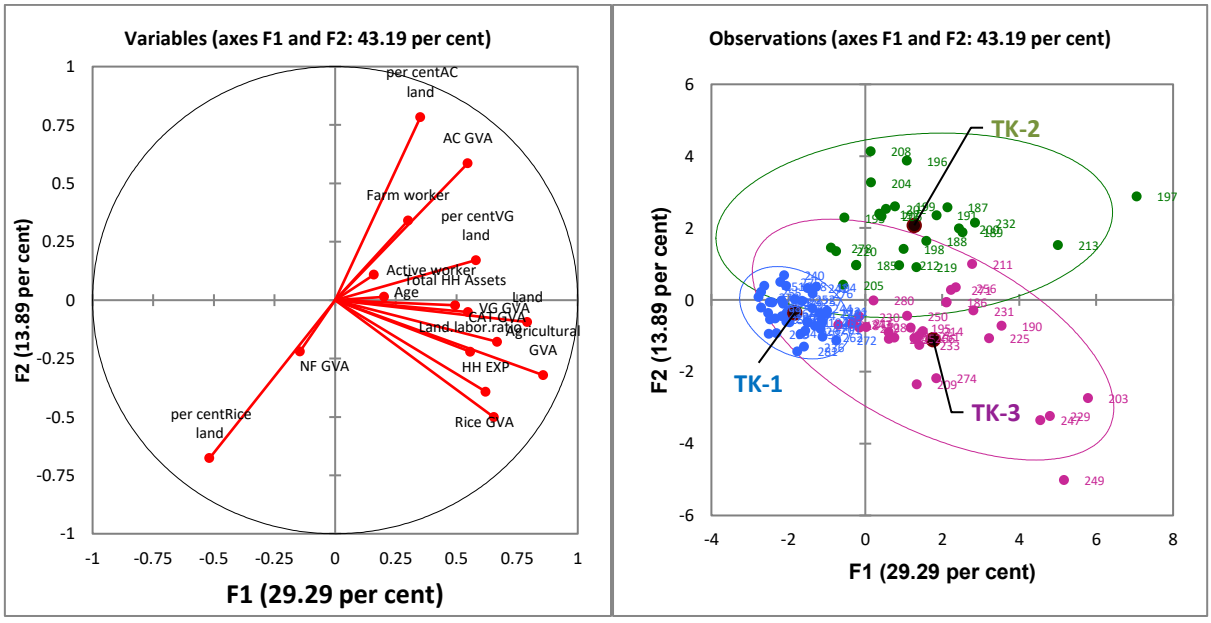


Figure 26 Cluster analysis in Tram Kak

3.7.2.2 Description of farm the typology in Tram Kak

The one-way analysis of variance has been done to find the similarity and the difference of characteristics between the groups (Table 56).

TK-1: This farm type is characterized by small land size and resource-poor households. This cluster I account for 46 per cent of the famer households in Tram Kak. This group differs from the other groups due the small agricultural land of average 0.37 hectares and small household assets of 1,750 USD. This small land is mostly dedicated to rice cropping given the average percentage of land shares uses very little for vegetables and annual crop lands. This implies that the small land means households have less diversified cropping than any other farm type. The income from cattle income is also small, implying that in this group, not many people raise cattle. Given their few sources of income, this group also spends less the other groups, even though the household size is very similar to the other the groups. This group shares the highest percentage (60 per cent) of non-farm income (from both non-farm work and migration income) of the groups.

TK-2: Farm type II is characterized by medium land size, medium resources and a diversified household. This cluster accounts for 24 per cent of farm households. It is characterized by the diversification of agricultural activities that can be seen through the percentage of land use. Land is dedicated to growing annual crops and vegetables at the highest rate out of all three groups. This group also relies on non-farm income, which accounts for 26 per cent of the total average household income.

TK-3: Farm type III is characterized by medium land size, rich resources and is rice based. This cluster accounts for 30 per cent of farm households. This group has the largest farm size and the highest household assets and land per active family member from all the three groups. Due to this resource endowment, this group generates the highest income of the three groups. This type of farm also obtains 21 per cent supplementary income from non-farm activities as well.

In summary, we can simply say that the first group (TK-1) is a resource-poor household that relies on rice and non-farm income; the second group (TK-2) is resource-medium household who diversify their agricultural activities (annual crops and vegetables) with supplement these activities with non-farm income; and the third group (TK-3) is a resource-rich household whose main activities is rice that is complemented by small vegetable and annual crops plus non-farm income. Cattle contribute a significant amount of income to farm types TK-2 and TK-3. Though farm TK-1 has the highest average total non-farm income (from migration and non-farm income) from the three groups, it is not statistically different. This suggests that non-farm income plays an important role in all farm types.

Table 56 Description of farm type in Tram Kak

Characteristics of selected clusters of farm households and P-value of one-way analysis of variance (equality of group mean)									
Name of variables	TK-1	N=44, 46 per cent	TK-2	N=23, 24 per cent	TK-3	N=29, 30 per cent	Total	N=96, 100 per cent	P-Value
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	
Human resources									
Total active workers	**2.82**	**1.15**	**3.04**	**1.26**	**3.07**	**1.31**	**2.95**	**1.22**	**0.63**
Active farm workers	**1.89**	**0.75**	**2.70**	**1.22**	**2.21**	**0.49**	**2.18**	**0.88**	**0.00**
Age of household head	**43.55**	**11.92**	**45.96**	**11.03**	**46.52**	**11.26**	**45.02**	**11.48**	**0.51**
HH size	**4.61**	**1.48**	**4.74**	**1.39**	**5.21**	**1.24**	**4.82**	**1.40**	**0.20**
Land resources									
Farm size	**0.37**	**0.19**	**0.88**	**0.52**	**1.17**	**0.61**	**0.74**	**0.56**	**0.00**
Land labor ratio	**0.22**	**0.14**	**0.35**	**0.19**	**0.58**	**0.49**	**0.36**	**0.33**	**0.00**
Percentage rice land	**96.88**	**15.21**	**53.05**	**15.60**	**85.63**	**12.30**	**82.98**	**22.67**	**0.00**
Percentage AC land	**0.25**	**1.68**	**35.69**	**15.43**	**4.83**	**8.20**	**10.13**	**16.98**	**0.00**
Percentage VG land	**0.59**	**2.34**	**11.25**	**14.99**	**9.54**	**12.20**	**5.85**	**11.07**	**0.00**
Rice IC+PL (USD)	**65.29**	**42.52**	**89.92**	**63.50**	**205.93**	**198.91**	**113.68**	**131.27**	**0.00**
AC IC+PL (USD)	**0.23**	**1.55**	**48.31**	**43.69**	**6.64**	**13.95**	**13.69**	**29.83**	**0.00**
Financial resources									
Total household assets	**1747.57**	**1196.96**	**3137.17**	**1185.20**	**3431.69**	**2016.36**	**2589.24**	**1670.19**	**0.00**
HH expenditure	**825.82**	**351.39**	**1001.11**	**328.70**	**1372.78**	**609.56**	**1033.05**	**495.77**	**0.00**
HH income sources									
Agricultural GVA	**415.78**	**285.12**	**1042.74**	**781.52**	**1758.04**	**880.80**	**971.46**	**860.24**	**0.00**
Rice GVA	**165.96**	**104.48**	**308.62**	**193.72**	**690.23**	**533.58**	**358.51**	**385.89**	**0.00**
AC GVA	**0.79**	**5.24**	**120.70**	**96.84**	**34.21**	**64.93**	**39.61**	**75.67**	**0.00**
VG GVA	**6.53**	**31.99**	**77.52**	**114.83**	**111.99**	**182.19**	**55.39**	**124.51**	**0.00**
CAT GVA	**68.84**	**174.97**	**278.77**	**485.35**	**557.67**	**403.52**	**266.80**	**400.52**	**0.00**
Total non-farm income	**615.01**	**616.62**	**360.39**	**423.17**	**454.70**	**517.20**	**505.58**	**551.23**	**0.17**
Non-farm income	**365.81**	**528.67**	**260.39**	**412.72**	**226.85**	**432.86**	**298.58**	**474.55**	**0.43**
Migration income	**249.20**	**481.45**	**100.00**	**231.60**	**227.84**	**408.50**	**207.01**	**412.62**	**0.36**

3.7.2.3 Economic performance and livelihood strategy of each farm type in Tram Kak

TK-1 has the average added value of 1,031 USD per year per household, where of which the majority (60 per cent) comes from non-farm activities. Among this 60 per cent, 38.87 per cent of income comes from migration, 36.54 per cent from self-business (in which 24.72 per cent is self-business high income and 11.82 per cent is self-business low income) and 0.91 per cent comes from agricultural wage labor, 16.63 per cent from labor-based activities (in which 7.27 per cent is labor based-high income and 9.36 per cent is labor based-low income, 4 per cent is from salary high income and 2.24 per cent is from salary low income). Another 40 per cent of income is from agricultural activities. Rice contributes 16 per cent, 13 per cent comes from livestock excluding cattle (mainly from poultry), while cattle contributes 7 per cent. The rest of the added value is from fruit trees and annual crops.

75 per cent of households in this group have cattle, in which only 16 per cent of total household have sold cattle which contributes to household's added value. 32 per cent have diversified rice by growing early season rice combine with late rainy season rice. The

remaining 68 per cent grow only rainy season rice. In this group, growing vegetables and annual crops is not part of the diversified strategy of the household, with only one household in this group growing an annual crop (bean) on 0.05 hectares which contributes only a small amount of income to the household. 57 per cent of households in this farm type have a family member on migration, while 68 per cent of households do non-farm activities. In this group, four families account for 9 per cent who do not do either non-farm activities nor migration, while 15 households (34 per cent) do both migration and non-farm activities, 10 households (23 per cent) have a family member on migration, and 34 per cent do non-farm activities. Therefore, the key livelihood strategy of this group is non-farm and migration-based combined with rice-based animal-raising (mainly poultry and cattle).

Due to bigger land size (rice land) which provides the capacity to diversify cropping activities with both annual crops and vegetables, TK-2 has the capacity to produce added value of 1,403 USD per year per household, which is 36 per cent higher TK-1. 74 per cent of total added value comes from agricultural activities, in which 22 per cent comes from rice, 20 per cent from cattle, 9 per cent from animal raising, 9 per cent from annual crops, 6 per cent from vegetables, 4 per cent from fruit trees and 6 per cent from common resources. The other 26 per cent of added value comes from non-farm activities, in which 25 per cent comes from migration, 42.73 per cent from self-business (22.02 per cent from SB-H, and 20.71 per cent from SB-L), 10.86 per cent from SR-L, 6.65 per cent from agricultural wage labor, 7.24 per cent from LB-H and from 7.19 per cent from LB-L.

This group diversifies agricultural activities, growing 2R rice, AC and VG. 57 per cent of households in this farm type have diversified rice by growing early season rice combined with later rainy season rice. Only one family in this farm type did not grow either vegetables or annual crops, while the remaining 96 per cent have cultivated annual crops and vegetables.

Only one family (4 per cent) in this farm type does not have cattle, while the remaining 96 per cent have cattle in stock, in which 48 per cent sold cattle which contributed added value higher than group TK-1. Other than cattle, animal production is predominantly poultry. 30 per cent of households in this type have a migrant family member and 65 per cent of households do non-farm activities. Therefore, in farm type TK-2, the main livelihood strategy is diversifying rice (2R), vegetables, annual crops and cattle, with poultry raising the same as in TK-1. Migration and non-farm activities are also complementary to household added value.

Farm TK-3 has the highest gross value added at 2,213 USD per year per household, which is more than twice of the added value of TK-1 and 1.6 times higher than TK-2. 79 per cent total of the household added value come from agricultural activities and 21 per cent from non-farm activities. Among the 79 per cent of farm added value, 31 per cent comes from rice production, 2 per cent from annual crops, 5 per cent from vegetables, 25 per cent from cattle, 14 per cent from livestock (predominantly poultry, pig and fish), 2 per cent from fruit trees and 1 per cent from common resources. Non-farm activities contribute 21 per cent to total household income, with 50 per cent from migration, 32.18 per cent from self-business (SB-H:20.76 per cent, SB-L:11.42 per cent), 7.78 per cent from salaried activities (SL-H:6.83 per cent, SL-L:0.95 per cent) and 9.86 per cent from labor-based activities (LB-H:3.79 per cent, LB-L: 6.07 per cent).

86.2 per cent of households in this type have diversified rice by growing early season rice with late season rice. 37.9 per cent of households grow both vegetables and annual crops. 45 per cent of households have a family member on migration while 48 per cent of households do non-farm activities. It is notable that all households have cattle stock, in which 79 per cent have sold cattle. This is the reason why farm household in TK-3 have largest share of income from cattle. Therefore, with a larger land size than the other groups, the key livelihood strategy of this type of household is diversify rice, annual crops and vegetables but largely rely on animal-raising, predominantly cattle and poultry. Pig is also more frequent in this type in comparison to the other farm types. Migration contributes more than 50 per cent of total non-farm income in this farm type.

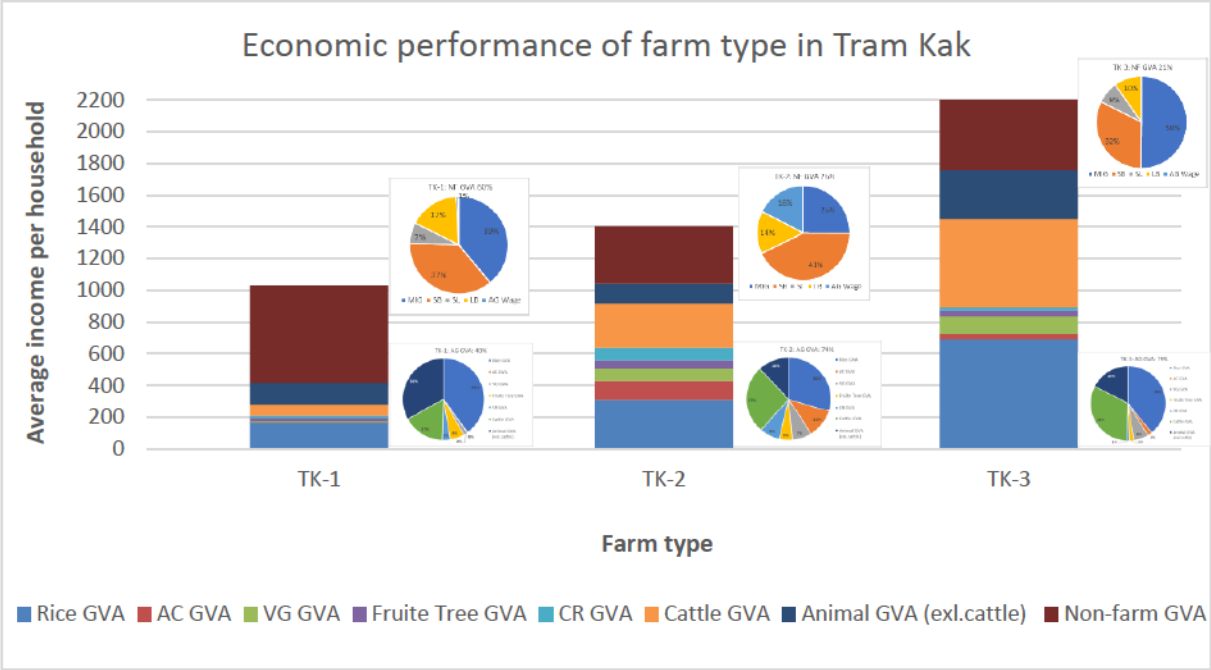


Figure 27 Economic performance of farm type in Tram Kak

Examining the farm type capacity suggests that farm types that have more agricultural resources, such as land, tend to have higher income added compare to non-farm activities, while the absence or little income from farming means farm type TK-1 relies more on non-farm or migration activities. However, the capacity to generate non-farm income is not significantly different between the three groups, which means the group with the have bigger land tend to have higher added value. In addition to this, the capacity to diversify agricultural activities, which can be seen through the combination of activities and is reflected in the composition of household income (Figure 27), tends to occur mostly in TK-2 and TK-3, which have an average land size of 0.88and 1.17 hectares respectively and more household resources (assets). The smallest landholders (TK-1, with an average of 0.37 hectares) have the least capacity to diversify in all most all activities including rice, vegetables, poultry, pig and cattle, but instead are more oriented to non-farm activities and migration.

3.7.2.4 Economic sustainability of farm type in Tram Kak

The sum of agricultural income (net), the value derived from the gross value added minus paid labor of each agricultural activity, and total non-farm income (sum of income from both non-farm and migration) gives the total household income. Subtracting the household expenses from this total household income allows us to find out whether a household is income positive or negative. **Table 57** shows the situation of household income in each farm type with and without non-farm income. With non-farm income, 59 per cent of households in

TK-1 are income positive while 41 per cent are income negative. The situation is better in TK-2 and TK-3, where 83 per cent and 86 per cent of household have income positive respectively. Across the total three groups, in Tram Kak, 73 per cent of households are income positive.

If non-farm income and migration income is not included, situation is worse for TK-1, who rely mostly from non-farm income. 9 per cent of households in TK-1 will be income positive, while in TK-2 48 per cent of households are income positive and 62 per cent of households in TK-3 are income positive. In total across the three group, only 34 per cent of households in Tram Kak are income positive once non-farm income is taken into account. This suggests that without supplementary income from non-farm activities, 66 per cent of households will be income negative. Non-farm income could mean that 73 per cent of households in Tam Kak become income positive.

Table 57 Income situation of household in Tram Kak: with and without non-farm activities

Status of household income with non-farm income	TK-1		TK-2		TK-3		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	26	59	19	83	25	86	70	73
Income negative	18	41	4	17	4	14	26	27
Total	44	100	23	100	29	100	96	100

Status of household income without non-farm income	TK-1		TK-2		TK-3		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	4	9	11	48	18	62	33	34
Income negative	40	91	12	52	11	38	63	66
Total	44	100	23	100	29	100	96	100

3.7.2.5 Farm capacity in comparison to poverty line in Tram Kak

With an average household side of 4.78 people per household and a poverty line of 0.8097USD per person per day in Tram Kak, the minimum threshold for household of living is 1,413 USD per household. Dividing the total household income with the number of family members gives the income per person. The projection of total household income in axis Y and income per person in axis X uses the scatter plot of each individual household, where three different colors represent the different groups. The blue dots represent farm type TK-1, the red dots represent farm type TK-2 and the green dots represent farm type TK-3 (see Figure 28)

The result shows that farm type TK-1 (which is resource poor and rice based) shares the lowest rate of people above the minimum threshold of household poverty line at 16 per cent (7 out of 44 households) within the three group. TK-2 has 35 per cent of households (8 of 15) above the poverty line, while TK-3 has the highest percentage of households above poverty line with 83 per cent (24 of 29). In Tram Kak, the total percentage of families that are above the poverty line is 41 per cent (39 out of 96). This figure is contrary to the farm household economic analysis, which indicates that the majority of households are income positive. This implies that although rural households in Tram Kak are income positive, they are living under the average minimum threshold of poverty.

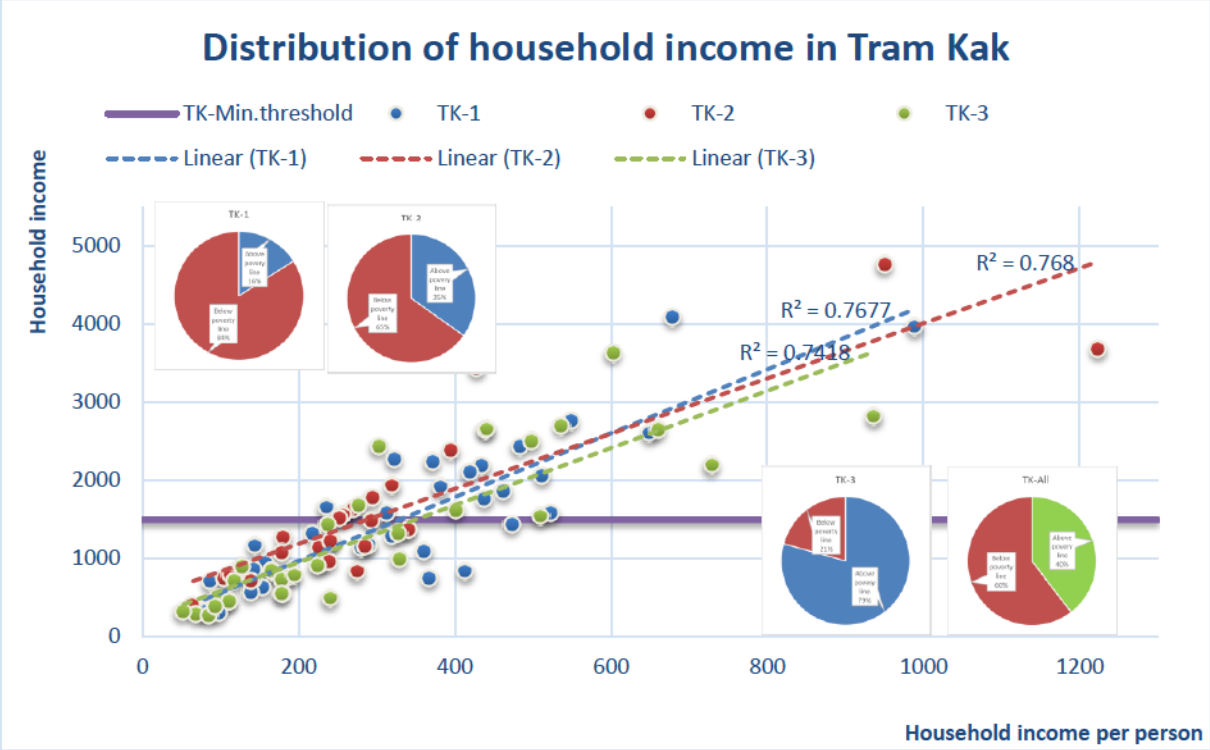


Figure 28 Household income per capita in Tram Kak

3.7.3 Farm type in Prey Kabas

3.7.3.1 Prey Kabas PCA result and cluster analyses

Among the 102 household surveys in Prey Kabas, only 95 households have been included in the analysis. Seven households were excluded because they have variables that are strongly independent. One household does large commercial duck raising, while the other five households have tiny plots of vegetables and annual crops. Given the growing vegetables and annual crops is not the key strategy in this zone, the inclusion of these household will create more groups, of which one group comprises of one household (the commercial duck-raiser),

one group of vegetable growers comprises two households and another group of annual crop growers comprises two households. In total, then there would be six groups, in which three group have only very few households. One last household (case 307) was also excluded because their situation is not applicable to include for analysis. This household is an old widow who has 0.2 hectares of rice land which she is not able to cultivate. She hires someone to cultivate the land and is living with a grandson who is studying at high school. Her living is not based on agricultural activities but based remittance support from relatives.

Five components resulting from principal components analysis of 16 variables have eigenvalues of greater than 1 and have been retain for further analysis. These five variables (F1 to F5) percentage of cumulative variance explains 72.2 per cent of the total variability.

The first component (F1), which explain 27.7 per cent of variance, is positively correlated with farm size, land labor ratio, total agricultural gross value added, rice gross value added and household expenditure. Except for household expenditure, the first component is more correlated with land, the added value produce by land, and land availability per active farm worker. The second component (F2), which explains 16.35 per cent of variance, has a positive correlation with the number of people actively working in farming, the age of the household head and total non-farm income. This component mostly explains the farm's human resources. The third component (F3), which explains 11.23 per cent of variance, mostly represents the percentage of rice land, while the fourth component (F4), which explain 9.79 per cent of variance, is positively correlated with animal gross value added (excluding cattle GVA). The last component (F5), which explains 8.56 per cent of variance, is positively correlated with the percentage of labor migration.

The first two components have been used for cluster analysis and three clusters were automatically generated. Cluster 1 is denoted as PB-1, which signifies zone Prey Kabas farm type 1. The same is applied to PB-2 and PB-3.

Table 58 Correlations between variables and factors: Prey Kabas

Name of variables	Component				
	F1	F2	F3	F4	F5
Human resources					
Active farm worker	-0.046	**0.693**	-0.481	0.200	-0.250
Percentage of labor migration	-0.098	0.401	0.221	-0.435	**0.662**
Age of household head	-0.188	**0.634**	-0.283	-0.334	0.165
Land resources					
Farm size	**0.825**	-0.227	-0.188	-0.257	-0.073
Land labor ratio	**0.735**	-0.501	-0.001	-0.269	0.009
Percentage rice land	-0.095	0.014	**0.683**	-0.079	-0.288

Percentage AC land	0.000	0.000	0.000	0.000	0.000
Percentage VG land	0.000	0.000	0.000	0.000	0.000
Financial resources					
Agricultural asset	0.556	0.338	-0.160	0.152	-0.276
HH expenditure	**0.580**	0.370	0.315	-0.102	-0.033
HH income sources					
Agricultural GVA	**0.789**	0.251	0.091	0.261	0.199
Rice GVA	**0.832**	0.168	-0.049	-0.082	0.055
AC GVA	0.000	0.000	0.000	0.000	0.000
VG GVA	0.000	0.000	0.000	0.000	0.000
AN GVA	0.175	0.229	0.414	**0.677**	0.268
Total non-farm income	-0.072	**0.471**	0.423	-0.350	-0.467
Eigenvalues	3.272	1.962	1.348	1.174	1.027
Cumulative explained variance	27.27	43.62	54.85	64.64	73.20

Values in bold correspond for each variable to the factor for which the squared cosine is the largest

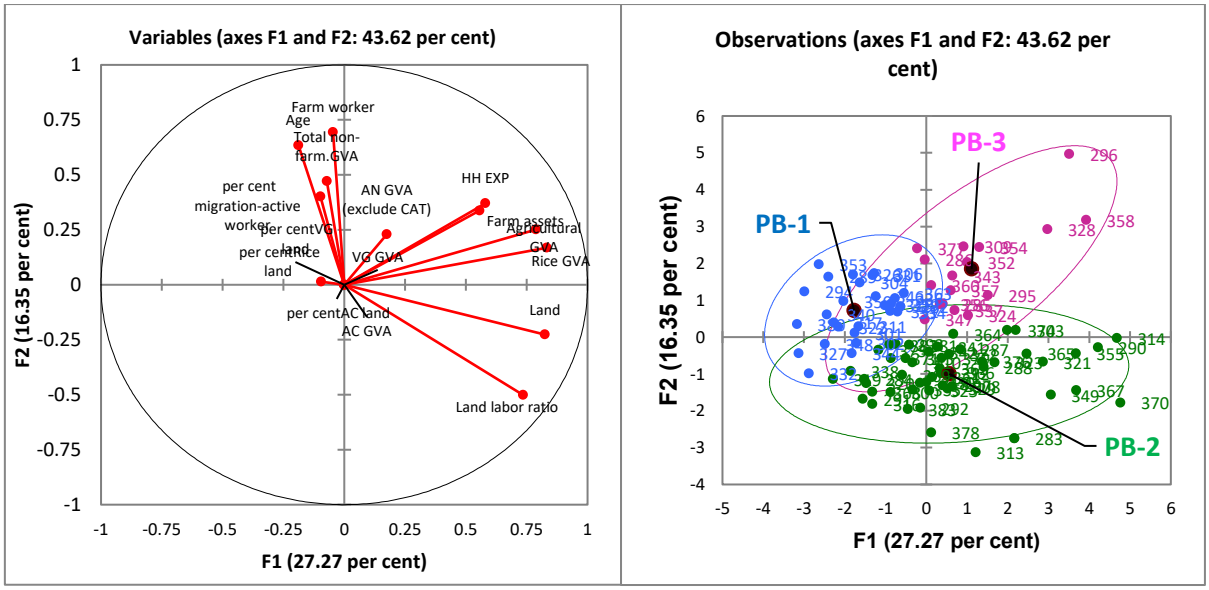


Figure 29 Cluster analysis in Prey Kabas

3.7.3.2 Description of farm the typology in Prey Kabas

Based on the three clusters generated, one analysis of variance has been used to see the differentiation between the cluster. The variables that has p-value value less than 0.05 indicate that there is statistically different between the mean value of each cluster or farm type (Table 59).

Table 59 Description of farm the typology in Prey Kabas

Characteristicsof selected clusters of farm households and P-value of one way analysis of variance (equality of group mean)								
Name of Variables	**PB-1**	**N=27, 28 per cent**	**PB-2**	**N=51, 54 per cent**	**PB-3**	**N=17, 18 per cent**	**Total**	**N=95, 100 per cent**	P-Value

	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	
Human resources									
Active Farm Worker	**2.70**	**0.87**	**2.02**	**0.37**	**2.88**	**0.93**	**2.37**	**0.76**	**0.00**
per cent labor migration	**12.53**	**20.28**	**0.65**	**4.67**	**16.08**	**16.68**	**6.79**	**14.77**	**0.00**
Age of Household Head	**56.70**	**9.95**	**37.69**	**9.84**	**55.35**	**9.76**	**46.25**	**13.46**	**0.00**
HH size	**5.00**	**1.80**	**4.76**	**1.42**	**5.41**	**1.54**	**4.95**	**1.56**	**0.33**
Land resources									
Farm size	**0.74**	**0.36**	**1.71**	**0.88**	**1.55**	**0.70**	**1.41**	**0.84**	**0.00**
Land Labor Ratio	**0.30**	**0.17**	**0.87**	**0.48**	**0.55**	**0.20**	**0.65**	**0.45**	**0.00**
per cent Rice land	**100.00**	**0.00**	**100.00**	**0.00**	**100.00**	**0.00**	**100.00**	**0.00**	**1.00**
Rice IC+PL (USD)	**685.39**	**431.34**	**1452.03**	**812.22**	**1329.64**	**521.21**	**1212.24**	**749.68**	**0.00**
Financial resources									
Agricultural Asset	**875.19**	**1109.07**	**1581.57**	**1406.49**	**2761.18**	**3017.87**	**1591.89**	**1826.90**	**0.00**
HH expenditure	**1226.23**	**401.87**	**1395.95**	**549.07**	**2110.01**	**656.37**	**1475.50**	**610.29**	**0.00**
HH income sources									
Agricultural GVA	**1147.28**	**686.07**	**2265.02**	**1116.93**	**3163.47**	**1276.09**	**2108.12**	**1245.36**	**0.00**
Rice GVA	**764.99**	**445.92**	**1652.23**	**944.12**	**2167.11**	**1023.40**	**1492.20**	**977.53**	**0.00**
AN GVA	**90.43**	**122.01**	**188.51**	**296.38**	**487.25**	**1019.94**	**214.09**	**496.14**	**0.03**
Total non-farm income	**646.92**	**565.57**	**263.54**	**388.79**	**849.38**	**854.64**	**477.34**	**592.70**	**0.00**
Non-farm income	**515.44**	**477.36**	**263.54**	**388.79**	**748.06**	**888.29**	**421.84**	**559.55**	**0.00**
Migration income	**131.48**	**419.51**	**0.00**	**0.00**	**101.32**	**208.83**	**55.50**	**244.56**	**0.05**

PB-1: Characterized by small land size, intensified rice cropping and resource-poor household. This type of household comprises 27 household in Prey Kabas, making up about 28 per cent. This group differs from the others due to small rice land of 0.74 hectares per household on average, the highest number of active farm workers (2.7 persons per household), the lowest land size per farm active worker (0.30 hectares per person), smallest agricultural assets (875USD per household) and, finally, small total agricultural income (1,147 USD per household per year). In this group, 78 per cent of households cultivate 2R, 19 per cent cultivate 3R, 19 per cent cultivate HR and 30 per cent cultivate DR. The distribution of rice cropping activity is similar between the farm types, except for DR. Only 30 per cent of households grow DR, while the in the other farm types, more than 60 per cent of households have DR land. Regarding animal production, 22 per cent of households in this group raise pigs and 40 per cent raise poultry. In total, only 48 per cent of household raise pigs and poultry. Nine households (33 per cent) have a family member on migration. 20 households (74 per cent do non-farm activities.

PB-2: Characterized by medium-resource young-headed household. This group account for 54 per cent of households in Prey Kabas. This group is different from the other due to the young age of the household head. This group has biggest land per active farm worker with

0.87 hectares per person. However, given this group also has the highest expenses for farming, the larger land size does not add much to the total agricultural income. People in this group plant dry season rice, resulting in this group have the biggest farm size per family. The group has the lowest percentage of migration. Non-farm income is the also lowest in comparison to the other groups, with an average contribution of only 11 per cent of the total income. While the other groups have an average of three active farm workers, this group has only two. This corresponds to the age of household head, which suggests that this group is mainly young household-headed families. The group is also differentiated from the others due to a high dependency ratio. 78 per cent of households in this group grow 2R, 14 per cent grow 3R, 66 per cent grow DR and 22 per cent grow HR. 32 per cent raise pigs, 60 per cent raise poultry, 84 per cent raise cattle, in which 55 per cent sold cattle for income. 62 per cent do non-farm activities and 2 per cent (one family) have a family member on migration.

PB-3: Characterized by rice-based resource rich families. This group accounts for 18 per cent of households in Prey Kabas. This group has better resources than the other groups, including big rice land size (even though it is smaller than type II), higher number of active farm workers, the highest income from rice and animals, and the highest income from non-farm activities. This group also has the highest farm asset value. The high percentage of labor migration reflects the highest earning from non-farm income. This group has better farm capacity in both farm and non-farm activities, which is why this group was named rice-based resource-rich farm household. However, not many households fall into this rich group. The group accounts for only 18 per cent of all households (17 out of 95). 83 per cent grow 2R, 11 per cent grow 3R, 61 per cent grow DR and 17 per cent grow HR. 22 per cent raise pigs, 67 per cent raise poultry. 95 per cent raise cattle, in which 56 per cent sold cattle. 50 per cent of households have a family member on migration. 89 per cent of households do non-farm activities.

3.7.3.3 Economic performance and livelihood strategy of farm type in Prey Kabas

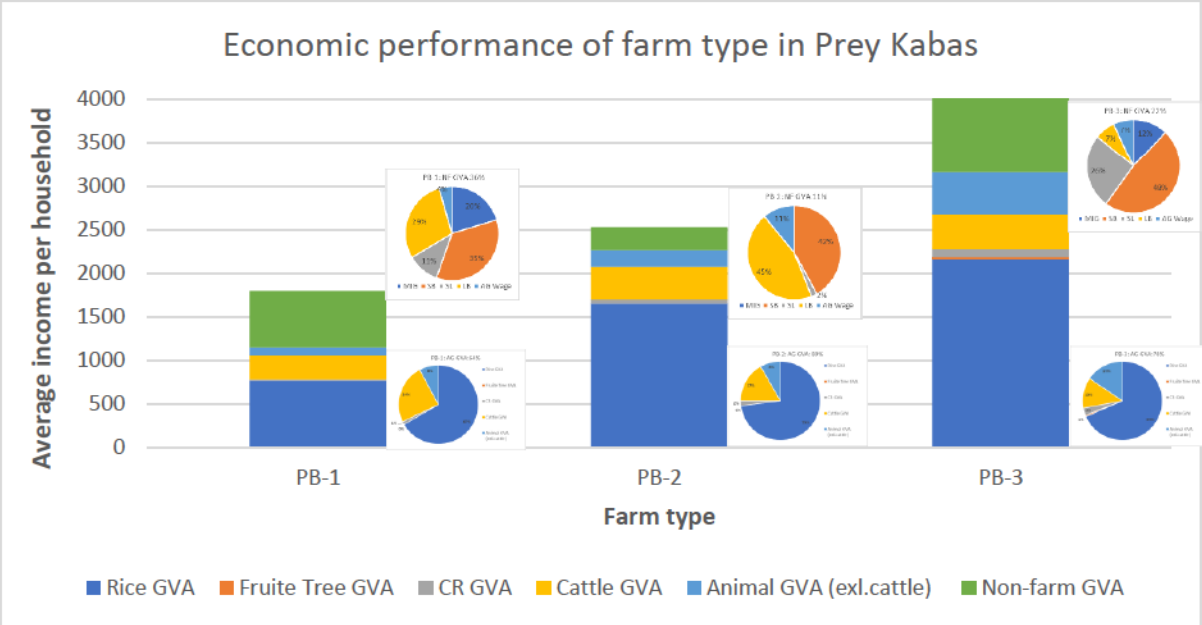


Figure 30 Economic performance of farm type in Prey Kabas

PB-1 has the capacity to generate annual gross value added of 1,780 USD per household, where 64 per cent comes from agricultural activities and 36 per cent comes from non-farm activities. Among 64 per cent of agricultural GVA, 43 per cent comes from rice production, 16 per cent from cattle, 5 per cent from livestock (poultry and pig), 1 per cent from common resources and 36 per cent from non-farm activities. Within this 36 per cent of non-farm activities, 20 per cent comes from migration, 35 per cent from self-business (SB-H: 15.67 per cent per cent, SB-L: 19.41 per cent), 7 per cent from salary-based work (SR-H: 5.15 per cent, SR-L: 5.9 per cent per cent), 4.49 per cent per cent from agricultural wage labor and 29 per cent from labor-based work (LB-H: 17.73 per cent, LB-L: 11.32 per cent).

PB-2 has the capacity to generate an annual gross value added of 2,481 USD per household, where 89 per cent comes from agricultural activities and 11 per cent from non-farm activities. Among the 89 per cent of added value from agriculture, 67 per cent comes from rice, 2 per cent from common resources, 15 per cent from cattle and 8 per cent from pig and poultry. Among the 11 per cent of added value of non-agricultural activities, 11 per cent comes from agricultural wage labor, 45 per cent from labor-based work (LB-H: 18 per cent, LB-L: 27 per cent), 42 per cent from self-business work (SB-H: 26 per cent, SB-L: 16 per cent), and 2 per cent from salary-based low-income (SR-L) work.

PB-3 has capacity to generate annual gross value added of 3,919 USD per household, where 78 per cent comes from agricultural activities and 22 per cent from non-farm activities.

Among the 78 per cent of added value from agriculture, 55 per cent comes from rice, 2 per cent from common resources, 10 per cent from cattle and 12 per cent from pig and poultry. In this group, 78 per cent of households grow 2R, 14 per cent grow 3R, 66 per cent grow DR and 22 per cent grow HR. From within the 22 per cent of non-farm activities, 12 per cent comes from migration, 48 per cent from self-business activities (SB-H: 38 per cent, SB-L: 10 per cent), 26 per cent from salary-based activities (20 per cent SR-H, 6 per cent SR-L), 7 per cent from agricultural wage labor and 7 per cent from LB-L.

Youth migration is high in PB-1 and PB-3 which average youth migration fall into the same subset when doing compare mean with post-hoc test. In PB-1, the average youth migration is 0.5 persons, in PB-2 is it is 0.6 persons, while PB-2 is 0.02 persons. There is a lower number of youth migration in PB-2 because 56 per cent of households in this group are youth household.

3.7.3.4 Economic sustainability of farm type in Prey Kabas

Economic sustainability in Prey Kabas is calculated in the as explained in section 3.7.2.4 Economic sustainability of farm type in Tram Kak. Table 60 shows the income situation of the family in each farm type with and without non-farm income.

The results show that when including non-farm income, 70 per cent of farm households within PB-1 are income positive. 80 per cent of households in PB-2 have income positive. The impressive figure is in PB-3, where only one household in this farm type (6 per cent) is income negative, while 94 per cent of households are income positive. The household is income negative because of the expense of children studying at university. Without this expense, this household would be income positive. However, without non-farm income, there would be only 15 per cent of households in PB-1 that are income positive, 65 per cent in PB-2 and 67 per cent in PB-3. Hence, households in PB-2 and PB-3 are in a better situation, where farming alone can sustain more than 60 per cent of household.

Table 60 Income situation of household in Prey Kabas: with and without non-farm

Status of household income with non-farm income	PB-I		PB-II		PB-II		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	19	70	41	80	17	94	77	80
Income negative	8	30	10	20	1	6	19	20
Total	27	100	51	100	18	100	96	100

Status of household income without non-farm income	PB-I		PB-II		PB-II		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	4	15	33	65	12	67	49	51
Income negative	23	85	18	35	6	33	47	49
Total	27	100	51	100	18	100	96	100

3.7.3.5 Farm capacity in comparison to the poverty line in Prey Kabas

With an average household size of 4.89 and a local poverty line of 1.32 USD per person per day, the minimum threshold of living per family in this area is 2,332 USD per household per year. The projection of total household income and income per family member gives us a picture of how many families reside below and above the poverty line in each group. Of the rice-based resource-poor families in PB-1, 26 per cent of households are above the poverty line (7 out 27 households). Of the rice-based resource-medium young-headed households in PB-2, 61 per cent of households (31 out of 51) are above the poverty threshold. Of the rice-based resource-rich households in PB-3, 83 per cent of households (24 out of 29) are above

the poverty line, which is the highest rate among the three groups. In Prey Kabas in general, 56 per cent of households are above the minimum threshold of poverty line (53 out of 95 farm households). In PB-2 and PB-3, the majority of households (more than 60 per cent) are above the poverty threshold (Figure 31).

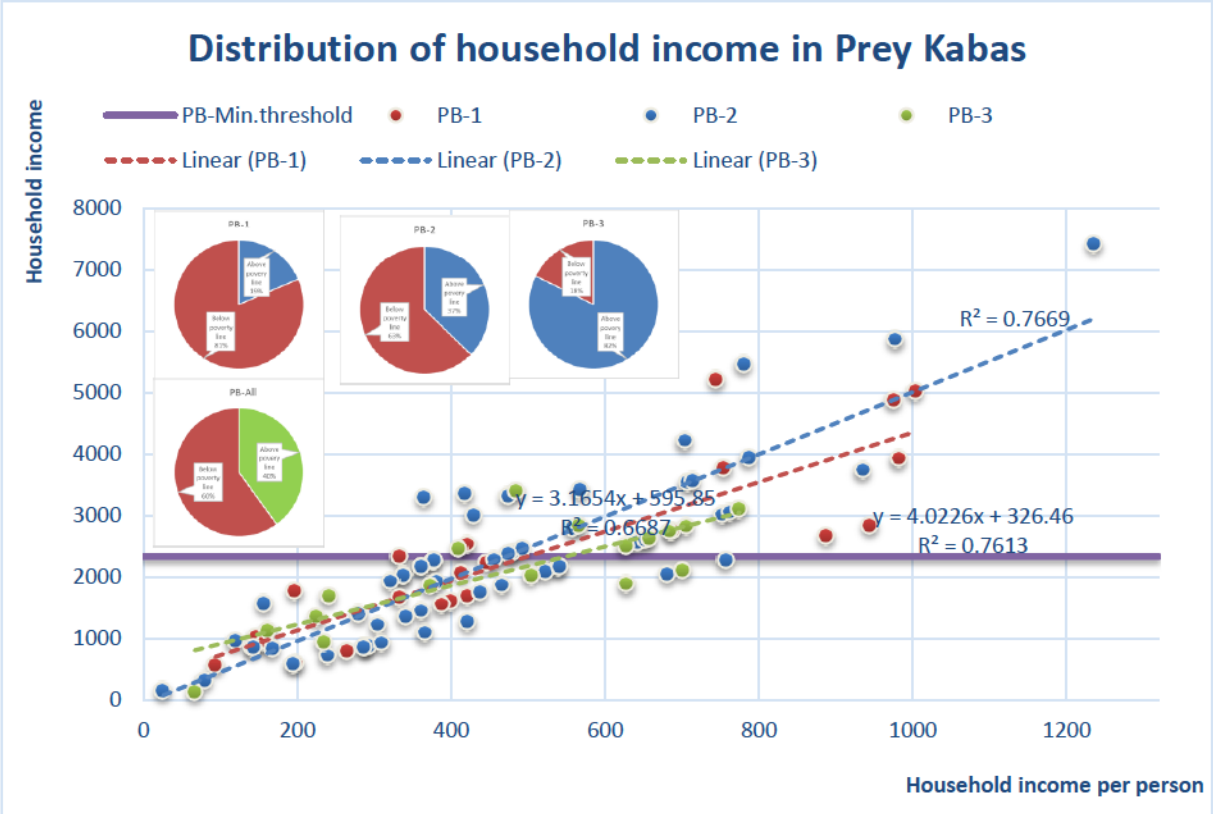


Figure 31 Household income per capita in Prey Kabas

3.7.4 Farm type in Zone Otdar Meanchey

3.7.4.1 Otdar Meanchey PCA result and cluster analyses

In Otdar Meanchey, from the 16 variables included in the PCA analysis, six components have eigenvalues of greater than one. These six variables (F1 to F6) explain 74.57 per cent of the total variability. Component F1, which explains 26.5 per cent of variance, is positively correlated with farm size, land to labour ratio, agricultural investment (IC+PL) and the gross value added of rice production. Component F2 is negatively correlated with the percentage of rice land but positively correlated with the percentage of annual crop land. This variable also positively correlates with the gross value added of annual crops. This implies the opposite tendency between groups with rice land and groups with annual crop land. We can see that the first two components are mainly explained by the land used, aspects related to land and farm economic capacity. Component F3 positively correlates with the number of active farm

workers and the age of the household head. Component F4 positively correlates with the percentage of vegetables and their gross value added. Household expenditure is explained in component F5 and animal gross value added is explained in component F6.

The first two components have been used for cluster analysis. Result shows there are four clusters: small land rice based cropping system: OMC-I, big land rice based groping system: OMC-II. Annual crops based-rice with small: OMC-III, and Annual crops based-rice with big land: OMC-IV.

Table 61 Correlations between variables and factors: Otdar Meanchey

Name of variables	Component					
	F1	F2	F3	F4	F5	F6
Human resources						
Active farm workers	0.049	-0.322	**0.662**	0.197	-0.464	0.057
Age of household head	-0.072	-0.201	**0.730**	0.097	-0.003	-0.068
Land resources						
Farm size	**0.880**	-0.142	0.062	-0.121	-0.246	-0.031
Land labor ratio	**0.734**	0.061	-0.437	-0.306	0.011	-0.114
Percentage rice land	0.159	**-0.758**	-0.191	0.036	0.132	0.060
Percentage AC land	0.031	**0.858**	0.261	-0.249	-0.095	-0.001
Percentage VG land	0.315	0.328	-0.193	**0.675**	-0.104	-0.074
Financial resources						
Agricultural asset	0.447	-0.256	0.182	-0.308	0.034	-0.363
HH expenditure	0.401	0.051	0.112	0.103	**0.705**	-0.034
Agricultural expense (IC+PL)	**0.782**	0.071	-0.141	-0.175	-0.169	0.078
Cattle stock value	0.260	-0.036	0.487	0.154	0.443	-0.115
HH income sources						
Agricultural GVA	**0.870**	0.108	0.201	0.141	0.044	0.118
Rice GVA	**0.849**	-0.233	0.092	-0.032	-0.092	-0.099
AC GVA	0.173	**0.843**	0.259	-0.173	0.033	0.002
VG GVA	0.323	0.242	-0.248	**0.661**	-0.096	-0.252
AN GVA (exclu.cattle)	0.376	0.000	0.024	0.086	0.078	**0.862**
Eigenvalues	4.240	2.496	1.789	1.329	1.062	1.014
Cumulative explained variance	26.50	42.10	53.28	61.59	68.23	74.57

Note: Values in bold correspond for each variable to the factor for which the squared cosine is the largest

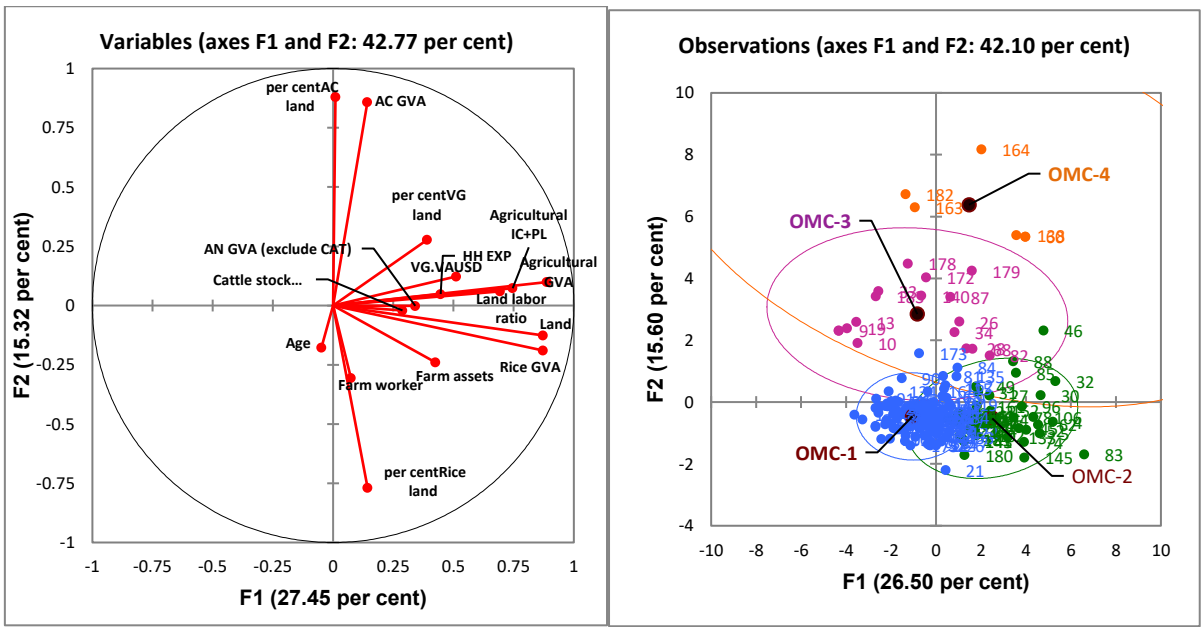


Figure 32 Cluster analysis in Otdar Meanchey

3.7.4.2 Description of farm typology in Otdar Meanchey

Table 62 below is described the different attribute of farm type in Otdar Meanchey using the analysis of variance. The variables that have p-value value less than 0.05 indicate that there is statistically different between the mean value of each cluster or farm type.

Table 62 Description of farm the typology in Otdar Meanchey

Characteristics of selected clusters of farm households and P-value of one-way analysis of variance (equality of group mean)											
Name of Variables	OMC-1	N=111, 61 per cent	OMC-2	N=49, 27 per cent	OMC-3	N=16, 9 per cent	OMC4	N=5, 3 per cent	Total	N=181, 100 per cent	P-Value
	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	Mean	STDEV	
Human resources											
Active Farm Worker	3.03	1.53	2.86	1.14	2.25	1.18	2.00	0.00	2.88	1.40	0.09
Age of Household Head	47.85	13.22	45.02	10.61	47.19	13.95	37.00	12.63	46.72	12.68	0.19
HH size	5.47	2.13	5.98	1.83	5.25	2.18	4.20	1.30	5.55	2.05	0.18
Land resources											
Farm size	2.81	1.42	6.42	1.96	2.65	2.05	4.04	1.65	3.80	2.29	0.00
Land Labor Ratio	1.05	0.55	2.60	1.43	1.32	1.19	2.02	0.83	1.52	1.16	0.00
per cent Rice land	98.55	3.93	97.93	3.76	50.26	31.91	50.41	12.39	92.78	18.43	0.00
per cent AC land	1.29	3.89	1.15	3.24	23.12	19.22	42.37	21.56	4.32	11.54	0.00
per cent VG land	0.17	0.63	0.92	2.12	1.61	4.09	7.22	11.04	0.69	2.64	0.00
Rice IC+PL (USD)	279.43	164.02	685.16	299.44	274.81	337.99	292.65	299.32	389.23	290.79	0.00
AC IC+PL (USD)	6.78	29.74	17.91	57.57	81.43	91.52	304.70	211.63	24.62	76.11	0.00
Financial resources											
Agricultural Asset	1298.92	1611.82	2626.73	1173.62	986.25	1271.09	626.00	1399.78	1612.15	1592.38	0.00
HH expenditure	1090.45	457.39	1406.36	603.14	919.48	507.73	1695.23	1089.85	1177.57	552.29	0.00
Agricultural Expense (IC+PL)	341.41	204.50	853.13	396.41	428.61	388.40	766.32	415.68	499.38	368.45	0.00
Cattle Stock Value	319.82	645.94	663.27	862.34	375.00	562.73	300.00	447.21	417.13	712.03	0.04
HH income sources											
Agricultural GVA	927.44	472.82	2089.65	738.68	1208.46	756.88	1993.27	905.14	1296.35	785.81	0.00
Rice GVA	587.55	259.63	1448.33	573.48	497.90	410.92	628.25	391.94	813.78	545.32	0.00
AC GVA	14.55	50.14	30.50	79.40	232.27	262.01	843.30	409.74	61.01	184.01	0.00
VG GVA	5.62	26.71	52.56	206.72	51.50	164.55	174.55	245.04	27.05	128.61	0.01
AN GVA	150.79	118.54	268.20	254.10	179.21	154.92	108.79	103.55	183.93	175.53	0.00
Non-farm income	430.84	809.48	442.34	723.02	390.38	753.23	846.25	1370.06	441.85	796.04	0.71
Migration income	268.85	529.65	107.70	523.54	76.66	172.72	0.00	0.00	200.81	504.70	0.14

OMC-1: This small land size rice-based cropping group is the largest of the three, making up of 61 per cent of the total households (111 out of 181 sample surveys). This group has an average farm size of 2.81 hectares. It is called a rice-based cropping system because the average percentage of land use proportion dedicated to rice cropping is 98.55 per cent, which leaves minimal land for annual crops and vegetables. This group has high non-farm income but small agricultural income in comparison to the other groups. In this group, 100 per cent of households grow rainy season rice and 14 per cent growing VG and AC. For animal production, 23 per cent of households raise pigs, 80 per cent raise poultry and 32 per cent raise cattle, of which 13.5 per cent of total households in this group sell cattle. 3 per cent of households raise fish. Migration accounts for 37 per cent of household income. In this farm type, 79 per cent of households do non-farm activities.

OMC-2: This big rice land-based cropping group is different from the others as it has the highest farm size of 6.42 hectares. 97.93 per cent of average land use is dedicated to rice cropping. The gross value added from rice production is an average of 1,448.33 USD, which is the highest of the groups. This group is also different from the others due to the high gross value added from animal raising. This group makes the highest total gross value added from agriculture of 2,090 USD. It is also the highest for total agricultural value added. This group also has the highest rice resources, which can be seen through the value of agricultural assets. This group contains 49 households (27 per cent). Beside rice, 20 per cent of households in this group grow AC and VG, 47 per cent of household raise pigs, 90 per cent of households raise poultry and 4 per cent raise fish. 51 per cent households raise cattle, in which 31 per cent of total households within the group sold cattle for income. In this group, 20 per cent of households have one family member on migration and 76 per cent of household do non-farm activities.

OMC-3: This annual crop-based rice farming group consist of 16 household (9 per cent). This group has an average land size of 2.65 hectares, of which the average percentage of land use is 50 per cent dedicated to rice and the rest is to annual crops and vegetables. This group has smaller agricultural assets than the previous two rice-based groups. The total non-farm income is also the smallest amount in comparison to other groups. In addition to growing rice, 70 per cent of this group grow annual crops and vegetables. Pigs are raised by 31 per cent of households, while 75 per cent of households raise poultry. 51 per cent of households have cattle, in which 30 per cent sell cattle. Migration is also notable in this farm type, with 31 per cent of households having one family member on migration. 75 per cent of household have non-farm activities.

OMC-4: This annual crop-based rice-farming low-asset group comprises five households, which account for 3 per cent of total households in Otdar Meanchey. This group is significantly different from the other group due to the farm size, of which the average percentage of land use for annual crops is 50 per cent. It also has percentage of vegetable land and the highest average income from annual crop and vegetable. This group therefore has a high total agricultural gross value comparable to the OMC-II group. This group is also different because the household head's age is younger than the other groups. This group has the highest average non-farm income. Beside rice, 100 per cent of households in this group grow annual crops (AC) and vegetable (VG). 20 per cent of households raise pigs (one household), 60 per cent raise poultry (three households). 40 per cent (two households) raise cattle, in which 20 per cent sell cattle (one household). 20 per cent have one family member on migration (one household) and 60 per cent do non-farm activities (three households).

In general observation, it can be seen that OMC-1 and OMC-3 share similar total agricultural values added, with 927.44 USD and 1208.46 USD respectively (Tukey and Duncan post hoc test). Similarly, OMC-2 and OMC-4 share a similar total agricultural values added, with 2,090 USD and 1,993 USD respectively. This is an obvious grouping of a poor rice and rich rice-based group and a poor and rich annual crop-based group.

3.7.4.3 Economic performance and livelihood strategy of each farm type in Otdar Meanchey

OMC-1: The average annual added value produced by this farm type is 1,549 USD per household, with 65 per cent from agricultural activities, 38 per cent from rice, 1 per cent from AC, 5 per cent from CR, 6 per cent from cattle and 10 per cent from pig and poultry. 45 per cent of income comes from non-farm income, with 29 per cent from migration, 27 per cent from self-business activities (SB-H: 23 per cent, SB-L:4 per cent), 19 per cent from salary-based activities (SR-H:17 per cent, SR-L: 2 per cent), 11 per cent from agricultural wage labor and 14 per cent from labor-based activities (LB-H: 13 per cent, LB-L: 2 per cent). This group has many household with a family member on migration. As mentioned in farm type description, 37 per cent of 111 households with a family member on migration.

OMC-2: This farm type has an average annual added value of 2,534 USD per household. 78 per cent of GVA comes from farming and 22 per cent from non-farm activities. The 78 per cent of added value from farming is derived from rice (57 per cent), AC (1 per

cent), VG (2 per cent), CR (4 per cent), cattle (7 per cent) and other livestock including pigs, poultry and fish (11 per cent). Since OMC-2 has rice land that is twice as big as OMC-1, the contribution of rice income is also nearly twice as high. If we break down the 22 per cent of non-farm income, considering the source of contribution based on 100 per cent of total non-farm income, we can see that migration contributes 20 per cent, self-business activities 53 per cent (SB-H: 47 per cent, SB-L: 8 per cent), salary-based activities 18 per cent (SR-H:14 per cent, SR-L: 4 per cent), agricultural wage labor 3 per cent and labor-based activities 5 per cent (LB-H: 4 per cent, LB-L:1 per cent).

OMC-3: This group has the capacity to generate value added of 1,603 USD per household, which is slightly higher than OMC-1. 71 per cent of this added value comes from farming where, considering the percentage to total added value, 31 per cent comes from rice, 14 per cent from AC, 3 per cent from VG, 5 per cent from CR, 7 per cent from cattle and 11 per cent from pig and poultry. Among the 29 per cent non-farm income, considering percentage of total non-farm income as 100 per cent, migration is 16 per cent, self-business activities 11 per cent (SB-L: 11 per cent), salary-based activities 36 per cent (SL-H: 35 per cent, SL-L:1 per cent) and agricultural wage labor 36 per cent.

OMC-4: This group has the highest capacity to generate added value. The average annual added value produced by this farm type is 2,633 USD per household, where 68 per cent comes from farming and 32 per cent from non-farming. 68 per cent of farm added value comes from 24 per cent of rice GVA, 32 per cent from AC GVA, 7 per cent from VG GVA, 8 per cent from CR GCA, 1 per cent from cattle GVA and 4 per cent from poultry GVA.

32 per cent from non-farm income: 97 per cent from self-business activities (SB-H), 2 per cent from labor-based activities (LB-L: 2 per cent) and 1 per cent agricultural wage labor.

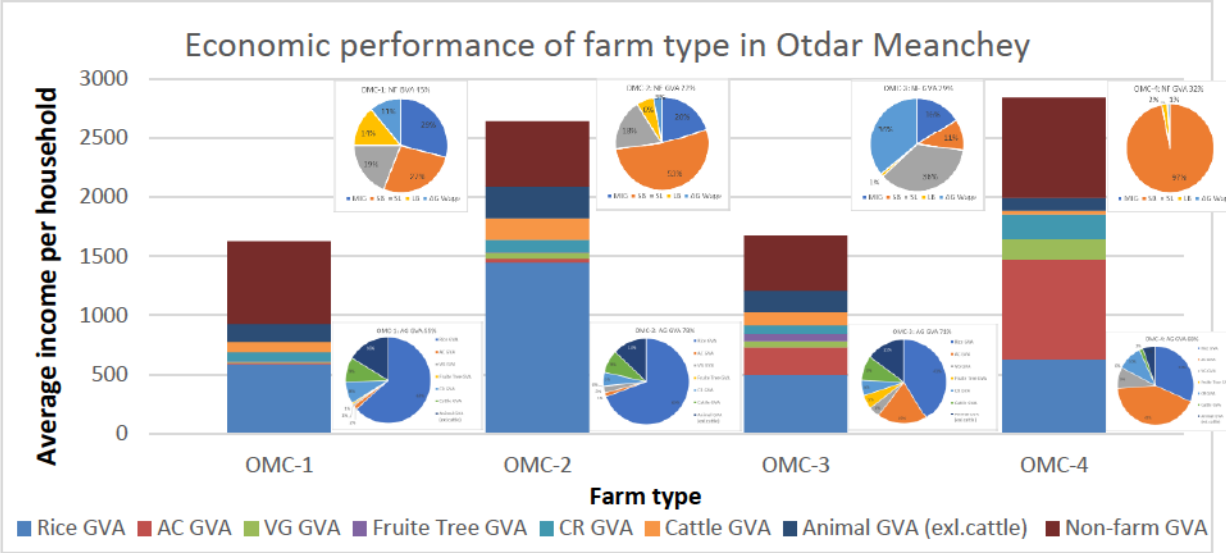


Figure 33 Economic performance of farm type in Otdar Meanchey

In all groups, the land has an impact on the total household added value in each type. OMC-1 and OMC-3 share almost equal value added from farming, since both farm types have about the same amount of farm land. The different is OMC-1 is less diversified with their cropping activities, being purely based on rice, while OMC-2 diversifies rice, annual crops and vegetables. The same observation is found in OMC-2 and OMC-4, where total household added value is about the same. The difference is the combination of cropping activities and non-farm activities. OMC-2 has bigger rice land and grows mostly rainy season rice while OMC-4, although having smaller land than OMC-2, combines rice, annual crops and vegetables. OMC-2 has diverse non-farm income sources, while OMC-4 income is mostly from self-business activities.

The percentage of household with family members who have migrated is also observed to be high in OMC-1 and OMC-2. In both farm types, more than 30 per cent of households have family members on migration. In OMC-3 and OMC-4 migration is less at about 20 per cent equally. This implies that the pattern of migration tends to be high in farm types that have small land that generate little total household gross added value and migration is less in farm types that have big land and generate high gross added value per household.

Although self-business activities are observed to play role in all farm types, self-business activities also contribute a higher percentage to total non-farm income in farm types that have a high capacity to generate added value from agriculture (more than 50 per cent in OMC-2 and more than 90 per cent in OMC-4). Additionally, in these farm types, the percentage share of self-business high income is also higher than self-business low income

across farm types. This implies that household that perform well from farming tend to invest in other non-farm activities, in this case more in self-businesses that have the capacity generate a high income. The observation is also found in labor-based activities and agricultural wage labor activities.

3.7.4.4 Economic sustainability of farm type in Otdar Meanchey

With farming, results show that in Otdar Meanchey, the majority of households (77 per cent) were income positive, with 68 per cent of households in OMC-1, 96 per cent of households in OMC-2, 88 per cent in OMC-3 and 60 per cent in OMC-4.

Without farming, there would be 39 per cent of households in Otdar Meanchey that are income positive: i 27 per cent in OMC-1, 59 per cent in OMC-2, 56 per cent in OMC-3, and 40 per cent in OMC-4. Therefore, non-farm activities including migration play an important role in all farm types to ensure the economic sustainability of households in each type where farming income alone cannot meet the household's need.

Table 63 Income situation of household in Otdar Meanchey: with and without non-farm

Status of household income with non-farm income	OMC-1		OMC-2		OMC- 3		OMC- 4		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	76	68	44	96	14	88	3	60	137	77
Income negative	35	32	2	4	2	13	2	40	41	23
Total	111	100	46	100	16	100	5	100	178	100

Status of household income without non-farm income	OMC- 1		OMC- 2		OMC- 3		OMC- 4		Total	
	No	Percentage	N	Percentage	N	Percentage	N	Percentage	N	Percentage
Income positive	30	27	29	59	9	56	2	40	68	39
Income negative	81	73	20	41	7	44	3	60	108	61
Total	111	100	49	100	16	100	5	100	176	100

3.7.4.5 Farm capacity in comparison to poverty line in Otdar Meanchey

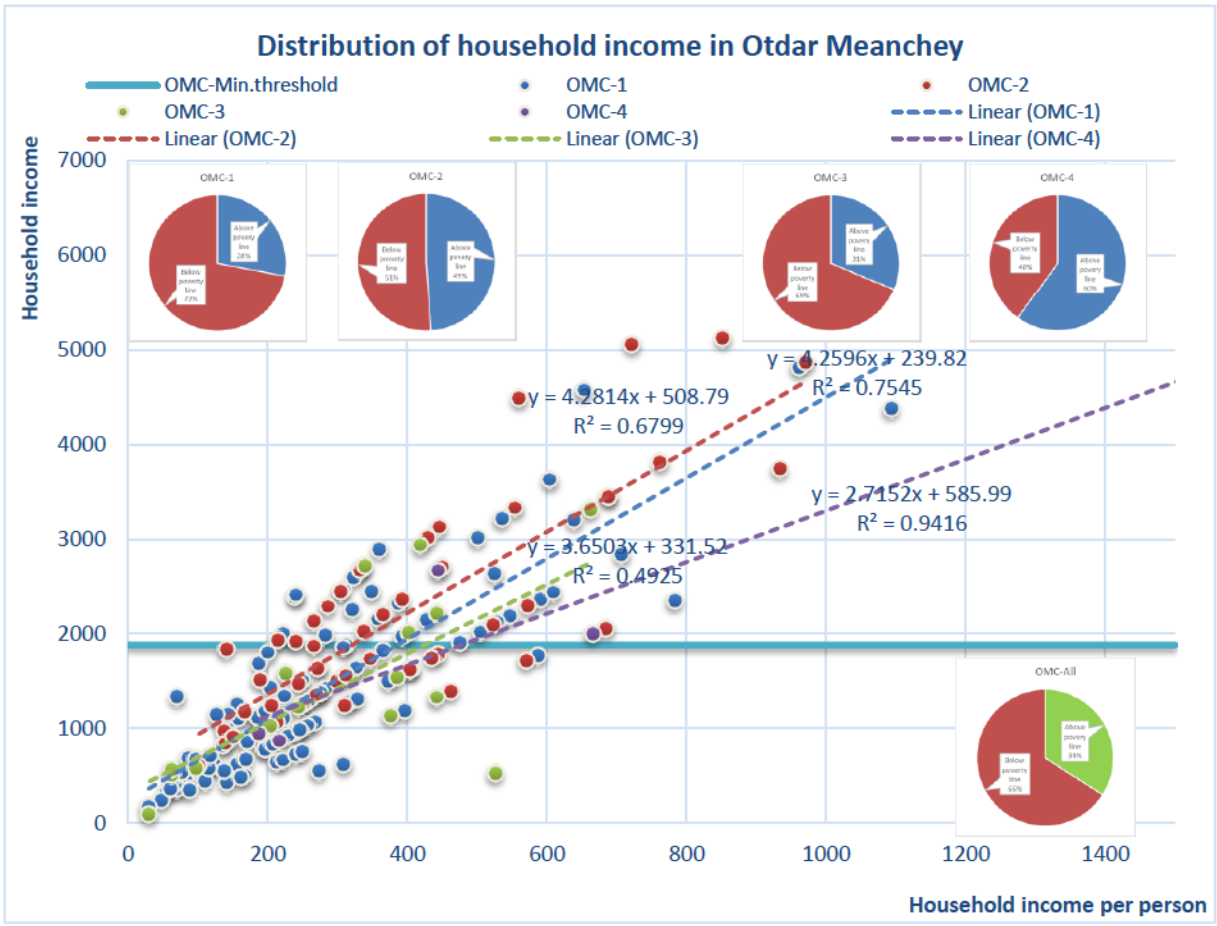


Figure 34 Household income per capita in Otdar Meanchey

With an average household size of 5.1 people and a local poverty line of 0.95 USD per person per day, this gives a minimum threshold of living per family in this area of 1,880.85 USD per household per year. The projection of total household income and income per family member give us a picture of how many families reside below and above the poverty line in each group.

OMC-1 has 28 per cent of households are above the minimum threshold of poverty (31 out 111) households). OMC-2 has the highest rate of households above the minimum threshold of poverty at 49 per cent (24 out of 49 households). OMC-3 has 31 per cent of households above the minimum threshold of poverty (5 out of 16). OMC-4 has 60 per cent of households above the minimum threshold of poverty (3 out of 5).

In general, 34 per cent of the households in Otdar Meanchey are above the minimum threshold of poverty per household. This suggests that although the situation of landholding per household in the area is remarkable high in comparison to other zones, given the low land productivities of rice and the big household sizes and even though the majority of households

are income positive, the poverty threshold suggests people in this area are living in hard conditions.

3.7.5 Concluding remarks

A multivariate analysis approach that combines PCA and CA allows this study to identify farm types in the three studied areas with respect to socioeconomic factors comprising factors: assets, humans, land, financial and income sources.

Data on 16 variables of 96 households in zone Tram Kak, 16 variables of 95 in zone Prey Kabas, and 16 variables of 181 households in zone Otdar Meanchey were evaluated by multivariate statistical methods. PCA identified six factors that explain 78.20 per cent of variance of 16 variables in Tram Kak, 73.20 per cent of variance of 16 variables in Prey Kabas, and 74.57 per cent of variance of 16 variables in Otdar Meanchey. Among these factors, the first two factors (F1 and F2) were used in cluster analysis to classify the farm types. Three farm types were identified in zone Tram Kak, three types in zone Prey Kabas, and four farm types in zone Otdar Meanchey.

In Tram Kak, farm type TK-1 has small-sized land (an average of 0.37 hectare per household) and poor resources. They tend to rely on non-farm activities, which account for 60 per cent of household income. This farm type has the highest rate of household migration, which account for 57 per cent of households within farm type. This farm is least diversified in agricultural activities. The farm type TK-2 that have medium-sized land (average 0.88 hectares per household) and medium resources, with the most diversify agricultural activities (rice, vegetables and annual crops), where 74 per cent of household income is from agriculture and 25 per cent is from non-farm activities. 30 per cent of households in this farm type have a family member of migration. Farm type TK-3 has biggest agricultural land in comparison to TK-1 and TK-2 and shares a similar diversification of agricultural activities to TK-2. The difference is this farm type has a higher migration than TK-2 (45 per cent). Beside migration, non-farm activities patterns emerge in Tram Kak, where the smaller the land the household possesses, the more non-farm activities the household engages in. TK-1 has 68 per cent of household conducting non-farm activities, TK-2 has 65 per cent of households conducting non-farm activities and 48 per cent of household in TK-3 conduct non-farm activities.

In Prey Kabas, all farm types share the same pattern of intensified rice-based cropping (growing 2R, 3R and HR) but the difference is the availability of DR. PB-1 has smaller land

size and, because less DR is grown, has a high percentage of household members on migration. PB-2 has the biggest land size and DR and has least migration, due to the young age of the household heads. PB-3 share similar characteristic to PB-2 but has the highest income due to a high income share from non-farm and migration.

In Otdar Meanchey, there are two distinct farm types: rice based and annual crops based. OMC-1 is a small rice land-based resource-poor household characterized by small land size and poor agricultural assets. Due to the small land size, only 55 per cent of income generated from farming, which is complemented by another 45 per cent from non-farm income. OMC-2 is a big rice-based agricultural resource-rich household. This group has the biggest average land size among the other groups. The contribution of non-farm income is 22 per cent. OMC-3 is an annual crop-rice based agricultural resource-poor household with complementary income from non-farming 29 per cent and 32 per cent respectively. While poor rice-based and poor annual crop-based households have more than 30 per cent of household migration, rich rice-based and rich annual crop-based households tend to have less household migration (20 per cent).

From the farm typology, we can see that in all cases, non-farm income, migration income and remittance play a role in contributing to farm income. Farm types that have more resources (land and assets) have the capacity to generate more income, thereby there is less migration. Additionally, households with better farm types tend to develop and have more high-income self-business. Households in the resource-poor farms tend to rely on low-income small business, agricultural wage labor-based work and migration. The richer farm type has a higher percentage of households above the poverty threshold.

Without non-farm income, agricultural income alone would not sustain the households economically, and many households (59 per cent of 372 households) would experience income negativity. In comparison, with non-farm income, 76 per cent of households are income positive.

The results of a comparison between household income and the minimum poverty threshold per household result shows that there are only 139 households out of 372 (37 per cent) that are above the poverty threshold. This suggests that although majority of households (76 per cent) are economically sustainability, they are in fact living in hard conditions with the majority of them below the minimum threshold of poverty. Table 64 shows a summary of key livelihood strategies of household in each farm type of the three study areas.

Table 64 Summary key livelihood strategies of households in each farm type

Farm type	Main characteristics	Livelihood strategy
TK-1	• Small land 0.38ha per hh • Poor assets	• Land too small to diversify agricultural activities: HR based cropping. • AG income 40 per cent, NF income: 60 per cent • NF: Labor based, self-business, salary > Migration. • Tendency: high migration 57 per cent
TK-2	• Medium land 0.88ha/hh • Medium assets	• Most diversify agricultural activities, 2R, HR, VG, AC and animal • AG income 74 per cent, NF income: 26 per cent • NF: labor based work, agricultural wage labor, self-business > Migration • Tendency: moderate migration 30 per cent
TK-3	• Big land 1.17ha/hh • Rich assets	• Most diversify agricultural activities, 2R, HR, VG, AC and animal • AG income 79 per cent, NF income: 21 per cent • NF: Self-business, salary low, labor based= Migration. • Tendency: high migration 45 per cent
PB-1	• Small land 0.74 ha/hh • Poor agricultural assets	• Intensify rice 2R, 3R and HR, less DR: 30 per cent • AG income 64 per cent, NF income: 26 per cent • NF: self-business, Labor based > Migration. • Tendency: moderate migration 33 per cent
PB-2	• big land 1.71 ha/hh • Medium agricultural assets • Young headed household	• Intensify rice 2R, 3R and HR, More DR: 60 per cent • AG income 89 per cent, NF income: 11 per cent • NF: self-business, Labor based, agricultural wage labor • Tendency: No migration 2 per cent, youth household
PB-3	• big land 1.55 ha/hh • Rich agricultural assets	• Intensify rice 2R, 3R and HR, More DR: 61 per cent • AG income 64 per cent, NF income: 36 per cent • NF: Labor based, self-business> Migration. • Tendency: High migration 45 per cent, youth household
OMC-1	• Small land 2.81ha/hh • Poor agricultural assets	• Rice based HR 99 per cent • AG income 55 per cent, NF income: 45 per cent • NF: self-business, salary low, Labor based, agricultural wage labor > migration. • Tendency: High migration 37 per cent
OMC-2	• Big land 6.42ha/hh • Rich agricultural assets	• Rice based HR 98 per cent • AG income 78 per cent, NF income: 22 per cent • NF: self-business, salary low, Labor based > migration. • Tendency: low migration 20 per cent
OMC-3	• Small land 2.65ha/hh • Poor agricultural assets	• Rice based HR 50 per cent, AC 50 per cent • AG income 71 per cent, NF income: 29 per cent • NF: Salary low, agricultural wage labor, self-business> migration. • Tendency: High migration 31 per cent
OMC-4	• Big land 4.04ha/hh • Poor agricultural assets	• Rice based HR 50 per cent, AC 50 per cent • AG income 68 per cent, NF income: 32 per cent • NF: Self-business> migration. • Tendency: Low migration 20 per cent (small sample)

3.8 Discussion

3.8.1 Socioeconomic conditions: farming have to accommodate more youth

In the study area, on average 65 per cent of total household expenses are on food. Unlike a recent study that claims that non-farm income contributes 60 per cent to total household income (Rahut & Micevska Scharf, 2012), this study shows that that agriculture is still a dominant source of income, with 69 per cent of household income coming from agriculture and 31 per cent from non-farming sources. This implies that farming is the dominant source of income. This is the reason why farming is important to rural households, both ensuring food security and providing a safety net.

The socioeconomic diagnostics show that youths accounted for 40 per cent of total population in the survey. Given the majority of rural youths frequently drop out of school, rarely graduating from high school, there is often few employment options for them besides being accommodated within the family's farm. Access to non-farm activities is perceived to be difficult and competitive as well as requiring an existing social network.

The motivation for land seeking is clearly seen in the low-density zone of Otdar Meanchey, where multiple migration and land seeking is common, as explained due to the historical setting and reasons for settling in the area. Land seeking is done to both expand the capacity to sustaining livelihood and to secure land for future of their children who have no alternative beside farming. The political and historical events that occurred in Otdar Meanchey together with demography (population growth) impacted on youth education (with little or no access to education) and create condition of accessibility to land in the zone pioneer. These conditions suggest there will be more youth who will settle in farming, even though the land availability for parents to subdivided is getting smaller and smaller. Migration, particularly to Thailand, is hence a strategy for supporting families as well as helping to accumulate assets expand land and by agricultural assets, particularly two-wheel tractors.

In Tram Kak, where the land availability is small per household, youth who have dropped out of school have will have no alternative beside contributing their labor to their family's farm or migrating to seek non-farm work. Garment work, construction and other urban service jobs are common for youths in this area. Given the land e is distributed based on family member born in during the land share period in the early 1980s, anyone who was born later will have no land quota for subdivision. Parents, hence, have to motivate children to

perform well in education and mobilize their resources to invest in their children's education if their farm capacity permits them to do so. Otherwise, youths will likely migrate for non-farm work. The same situation occurs in Prey Kabas, but the area is better than Tram Kak as the land holdings are bigger per family and they have the access to irrigation, which means people can do double or triple rice cropping and have access to water receding rice fields, which generate the maximum economic output per unit of labor. As in Tram Kak, youths in Prey Kabas who were born in the late 1980s do not have land quota. Hence, parents in Prey Kabas tend to invest in children's education, given there is no more land for them. However, this is dependent on each individual youth's performance in education. If they fail in their education, meaning they drop out before or at high school, they will have few alternatives beside working on the current family farm or migrating.

61 per cent of total households are in debt. They borrowed money for investing in farming, to buy additional food, to pay for medical treatment and to buy land and other assets. The majority of households live below the poverty threshold, suggested that rural households are living in hard conditions. Although farming seems not a favorable occupation for future youth integration, the socioeconomic situations faced by the youths in the area suggest that many rural youths will have to rely on the current farming given the limited availability of non-farm activities. Migration is one exit strategy but it is only a temporary one. Farming remains a shelter and a safety net for youths returning from migration.

3.8.2 Difficulty in looking for non-farm jobs link to low level of education

My study supports the observation that young people have difficulties in finding jobs outside agriculture if they have a low level of education. Because of their limited education, rural youths face uncertainty in seeking decent jobs beside agriculture, particularly in low-density areas. One youth group leader in Otdar Meanchey stated that youth in rural areas lack knowledge and skills, and hence often lack self-confidence. Therefore, they have difficulties in finding jobs besides farming. Figure 21 shows how respondents from the survey feel about the difficulty of finding non-farm jobs for youths. Our key informant in the Takeo province argues that to get non-farm job requires a high level of education and very strong social network, such as having a relative in the city. One youth group leader in Otdar Meanchey also shares the view that rural youth are lacking knowledge and skill and thereby lack the self-confidence to look for job beside farming.

Pursuing study at higher education, which is considered as an exit strategy to non-farm sectors, is big investment for farmers. Only better-off farmers can afford to send their children to secondary and high school, meaning the majority of youths drop out. It was observed that some households sold land and borrowed micro finance in order to support their children who perform well in education. For example, Case 350 in PB-1 sold 0.36 hectares of land at price of 3,000 USD to support two daughters studying university in Phnom Penh. The cost of investment on education per youth will be discussed in detail in the next chapter 4 (See 226).

3.8.3 The degradation of farm economies and rural poverty: Farming as a safety net

The situation of being below poverty line suggests rural farm households are living in difficult conditions, even though the economic analysis suggests that majority of them are income positive given the combination of both farm and non-farm activities. This implies that rural household tend to adjust their expenses to what they have earn so that some household expenses are less than the poverty line or minimum threshold per family. As indicated in the socioeconomic diagnostic section of this chapter (3.2 Socioeconomic diagnostics of rural household), rural households spend more than 65 per cent of their income on food. Though non-farm income contributes to household's economic sustainability, agriculture still contributes 79 per cent of total household income. This implies that agriculture is a vital source of household income for many rural households. However, the tendency is found in farm types that have small land sizes to rely more on non-farm activities to earn a complementary income, such as in TK-1 and OMC-1 where non-farm income contributes 60 per cent and 45 per cent to household income respectively. With the other farm types, although majority of income is from farming, they also require the complementary income from non-farm activities or migration activities. To get more land in order to increase farm income is seen as the motivation of households in Otdar Meanchey to move to a new area where land is accessible via occupation or purchasing in order to expand land as well as to secure the future of their children who do not have access to education and no employment alternatives beside farming.

3.8.4 Role of migration as a supplementary income to farming

Although migration is one of the major sources of income in both low and high-density areas, it cannot totally substitute for farming activities as it is just a temporary job. In many cases, rural people migrate just to earn enough capital to invest in their farm, such as to buy more land, a two-wheel tractor, fertilizer and to sustain their livelihood. One purpose is to earn

enough money to meet a shortage of income. Another purpose is to earn money to invest in farming to maintain sustainability and the continuity of farming. Migrating to Thailand is common in Otdar Meanchey, while having youth who have dropped out from school migrate to do garment work or construction in Phnom Penh is common in Takeo in Tram Kak and Prey Kabas. However, in comparison to other local non-farm activities, migration contributes a lower percentage to total non-farm income. However, to households who have small plots of land in Tram Kak, having a household member migrate for garment, construction work or other labor or service work is a significant contribution to ensuring the sustainability of the rural household.

Farm types that have a small land size and poor agricultural assets, such as TK-1, PB-1, OMC-1, OMC-3, then, rely more on non-farm income and have a higher rate of migration. Most of the households in all farm types try to develop non-farm activities, particularly self-business. The poorer farm types tend to earn supplementary income from labor-based activities, agricultural wage labor, low-income small businesses and migration, while the richer farm types tend to develop high income small businesses and earning less from labor-based activities and agricultural wage labor.

3.9 Conclusion

From a land perspective, based on the land availability possessed by households in the survey, only a minority of households have big enough land to accommodate additional more youths. However, given the socioeconomic condition of youths such as a low level of education and limited job availability in non-farm sectors, they are apparently able to integrate into farming once they get married on land which is even under the MSI. They, thereby, have to combine with non-farm activities or migration activities. In order to integrate youth, households have to consider non-farm activities developed by any household member.

Given that most of rural youth drop out at secondary school and high school and there are not so many non-farm opportunities are available for them, it is likely that many youths are going to take part in farming. However, given that farming alone cannot sustain livelihood, youth will have to combine non-farm activities (as well as migration) with farming in order to sustain livelihood. Although migration contributes less to total household income than other non-farm activities, it plays important role to some households. Ellis and Freeman (2005) and Rigg (2006) observe that migration is now becoming the central feature of rural livelihood in developing countries, and thereby suggests that rural development should no longer focus only on farming but also on creating more non-farm activities for youth.

Therefore, there is a need to develop skills related to farming to increase production to generate more income and to reduce the need to buy additional food such as fish and other meat. Many rural development projects have been trying to do this through distributing seed, chickens and pig and providing some training on agricultural techniques. However, the fieldwork experience and knowledge from field observation gave the impression that the support is just for immediate relief and is temporary. After the project is over, farmers will go back to the status quo. Hence, there should be stronger and systematic support for rural youths and their family. It is likely that an integration of agricultural skills in secondary or high school could be a part of solution. In addition to this, since rural youth often lack self-confidence and life skills, personal and livelihood skill development should be included in the training in order to inspire youths and their family to foresee the future challenges. This suggestion is in line with the work of one NGO who has been trying to work on the integration of youth in farming. The NGO-CEDAC claims that they are now working with stakeholders to advocate the agricultural training to be included in high school.

As indicated in the household economy section, the majority of farming families encounter hardship which is demonstrated by looking at households in relation to the poverty line. This situation can be explained by institutional theory (derived from the mental model theory of Mantzavinos (2001) and Mantzavinos, North, and Shariq (2004), which can explain the rationale of youth and their family's decision to quit or to stay farming. In this case, the problem people face in their livelihood, i.e. that the income from farming does not meet daily consumption needs, becomes a learning process which later becomes shared knowledge among family members and become a rule where either youth, household member or farm household try to analog when they meet the similar problem. In this case, the degradation of rural livelihood, that is when the farm's earnings are unable to meet the daily need and there is a low profitability in farming, needs rules that youths and their parents have to figure out solutions, such as dropping out from school and migrating to city to seek non-farm jobs in order to sustain livelihoods and keep the continuity of farming, as it is their family's safety net. And, vice versa, the experiences from migration, such as it is hard work and can pay a very small income that is only enough for self-survival where other values (like working independently, being one's own boss, personal freedom, enjoying time with family member and available leisure time) is also motive for them to come back home and set up a farm, especially when they are getting married. Migration, hence, can be considered as a temporary strategy to overcome livelihood stress.

Cambodia has special circumstances – i.e. political integration, population pressure, small holding farming challenges and limited opportunities for non-farm activities – which provide challenges for youths and their family farms, as they need a combination of both farm and non-farm activities. Acharya et al. (2003b) found that there are very few occupations away from agriculture. The slow emergence of non-farm activities in the country is largely due to historical fact (Acharya et al., 2003b). The suggestion of Pillot (2007) that Cambodia should consider employment-regulating agricultural policy is a sound proposition. Kydd and Dorward (2004) reveal that smallholder agricultural-based countries often face challenges due to the weaknesses of the institutional environment[37] and, thereby, face serious coordination failure.[38] Hence, countries require a continuous effort in regard to technical innovation. Therefore, a coordinated market economy (CME) approach would be more appropriate than a liberal market economy (LME) (Kydd & Dorward, 2004). However, this is very unlikely for Cambodia, as the country does not even have a general youth employment policy. It will be very long way to go before regulating employment in farming or Cambodia positioning itself in a free market economy. In addition to this, the Cambodian government favors large-scale plantations over smallholder farming. This can be seen through the large-scale economic land concessions granted, which is now a controversial topic of for political discussion and a source of land conflict in the country.

The question of the subdivision of land and land availability for children at their marriage is become more and more challenging, especially in high-density areas in Tram Kak and Prey Kabas. Even in low-density areas, people admit that land is now becoming more and more scarce and expensive. All land has an owner and there is no more available land for people to encroach as previously did. Education is expected to be an exit strategy for children from family farming; hence, farmers try to mobilize resources including micro finance or even selling agricultural land to fund their children's schooling.

One way to make farming attractive to youth is to make farming more profitable. The program director of one NGO who work on youth integration in Cambodia said, "The biggest challenge is that there is not so many examples that youth can get a higher income from farming." People tend to view farm work as a low-income job, but those who earn more from

[37] The *institutional environment* is the set of fundamental political, social, and legal ground rules that establishes the basis for production, exchange, and distribution, *institutional arrangement* is an arrangement between economic units that govern the ways in which these units can cooperate and/or compete. (Davis & North, 1971)
[38] Coordination defined as effort or measures design to make players within the market system act into a common or complementary way or towards a common goal.

farming view it as good job. The study found that state of being one's own boss rather than working for others is a benefit for many youths that respondents interviewed would like. Although some studies indicate youth are growing disinterested in farming, the qualitative interviews with youths and with parents and the group discussion with youths who are currently studying give the impression that farming is one of their aspirations. They saw that those who migrate out of their village did have not gains more than to those who stayed working on farm. Those who migrate at some point will have to settle on farming, especially after getting married.

The quotation below is an example of how rural youth experience with the hardship of being earn and save very little from their migration for garment work:

> I have been working for more than five years in garment work in Phnom Penh but I have only saved 300 USD. This amount I used to buy jewellery for my wedding. I think that if I can save almost nothing working in garments, I better start farm work with my husband. Perhaps I can save more, because this year we can save 100 USD from farming."
>
> - 24 years old woman in Prey Kabas commune in the year she got married (2012).

Although, smallholding farming faces challenges, it is still the dominant source of income and food in Cambodia. Given the global fact that smallholding family farming in developing countries spend between 60 to 80 per cent of their income on food, agriculture still plays a vital role as a safety net to family and migrant. In many cases, it was found that parents send rice and food to migrants who work at the city (even if they have migrated for study). Migration is a strategy to improve farming income. Earnings from migration and remittance are used to invest in farming, such as enlarging farm size, buying input and machinery and supporting daily need.

This chapter examines the rural youth situation in smallholding farming in Cambodia by looking at socioeconomic background of youths and their family in low and high-density areas to see to extent to which small-holding farming can accommodate a new generation of youth and the factors that integrate and disintegrate youths from farming. The study concludes that although smallholding farming faces challenge in sustaining livelihoods, many more youth will settle in farming. This is partly due to the historical context (such as political

integration), population pressure due to a baby boom, limited non-farm opportunities and the low educational level of rural youths, which means rural youth do not have many alternatives besides farming. In addition to this, higher education is an expensive investment that not many rural families can afford and opportunities for non-farm activities require a high level of education and a social network and are highly competitive.

Cambodian youth are deeply engaged in smallholding farming, partly because there are so few non-farm activities in rural areas and partly because rural youth lack assets and skill, particularly the low level of education which means they have poor confidence about seeking alternatives.

In such a context, though, migration contributes to some extent to household income but, given the fact that the major expense of rural people is food, the study concludes that agriculture is more than just employment/occupation to rural youth but it is a source of livelihood which plays a vital role in accommodating youth in term of generating income, food security, giving a safety net to households and migrant members, and providing a source of basic education. However, traditional farming is challenged by the low profitability of farming, which requires rural youth to rely on parents' resources and on migration as part of the strategy to sustain their living and to invest more on their farm. Therefore, making smallholding farming in Cambodia become more profitable remains the big challenge.

In this chapter, I have explained the institutional environment, farm production and its economic capacity, discussed the capacity of youth integration and the extent to which family farming in rural Cambodia can accommodate youth in farming and identified the role of non-farm activities, including migration.

The majority of smallholding farms have on average a small land size of 0.7 hectares, which is not enough to generate income to sustain the average family size of people. Non-farm activities and migration play a very crucial role in sustaining livelihood. Without non-farm income complementary, about 70 per cent of rural households would be income negative, whole with non-farm incomes, 70 per cent are income positive. However, although the economic result from farm families show that majority of household are income positive, when this income is compared to the poverty line and the average minimum threshold for sustainable living for a family, the result shows that the majority of rural households (60 per cent) are living under the poverty line. This implies that rural households live in a difficult situation.

The next chapter will discuss the capacity for youth integration and the factors that contribute to choosing to settle in farming undertaken by youth and adult households based on the farm typology developed in this chapter.

CHAPTER 4: YOUTH INTEGRATION IN FAMILY FARMING IN CAMBODIA

4.1 Re-defining of youth in farming

Although the studies adopted Cambodian youth definition as those whose age between 14 and 30 years old (UNICEF, 2009), the closer look at the family history linking to migration and settlement in farming of the families in the survey in the three zones suggests that in order for one to able to see a better picture of the family farming, the age of youth should be extended to 35 years old. As settlement in farming took place after getting married, some single male tends to living a single life up to maximum 36 years old based on observed case from survey in this study. Women tend to drop out of school earlier and therefore getting married at younger age practically between 18 to 24 years based on the observed case from survey. Therefore, the possible combination of youth family could be people between the age 18 to 36 years old. In this case, if Cambodian youth definition is applied, some youth families in the survey may be theoretically excluded while actually they are new youth couple who also have just settled in farming. I, therefore, re-define youth definition in this study for this chapter as youth are people whose ages are between 14 to 35 years old.

Youth family is defined as couple who is either husband or wife aged between 14 to 35 years old or family that has household head age below and equal to 35 years old. However, that is not the only criteria to call youth family. Some certain household even age of household head is more than 35, this study categorizes as youth family given that the he/she just get married and settle in farming and just have baby. This is due to man married to youth woman age below 35 (age between 21 to 25 years old observed from the survey).

Adult family is defined as couple who both husband and wife aged above 35 years old. Usually, adult family can have single youth or married couple residing within the household. Young couple who just got married and are currently living with adult family can be temporally in order to have enough couple experience to live independently from parent or can be permanently because there is no land share to the young couple or can be the last son or daughter (mostly daughter) who traditionally live and take care of parents when they are getting old. They apparently inherited the farm land and household assets.

In this chapter, I am going to look at the socio and economic characteristic of youth and adult family to see how many of them have settled in which farm type defined in the

previous chapter. After that, I am going to see the different economic performance and the capacity of youth and adult family that are able to integrate one more family member into the current farming system and finally draw lesson learnt and conclusion on the youth integration capacity of each type of family within each farm type.

The above definition and justification and result from the survey show that there are 110 youth household of 372 households which account for 30 percent of which 26 percent in Tram Kak, 34 percent in Prey Kabas and 29 percent in Otdar Meanchey.

Youth average educational level both husband and wife are higher than adult household apparently because younger generations have better access to education than the adult. However, the youth household in Tram Kak both husband and wife have average educational level at grade secondary school while adult is primary school. In Prey Kabas youth and adult household have similar educational level at primary school and so do in Otdar Meanchey. In terms of household size, youth and adult family in Tram Kak have average member of 4 and 5 while in Otdar Meanchey, adult household have more member than youth household of 4 and 6 respectively.

Table 65 Youth and adult household characteristic: age, education, and household size

Zone	Household	Frequency	Percent	Age husband	Edu. Husband	Age wife	Edu. Wife	HH size
Tam Kak	Youth	25	26	31	8	28	7	4.12
	Adult	71	74	50	5	53	4	5.07
	Total	96	100	45	6	46	5	4.82
Prey Kabas	Youth	32	34	31	6	30	6	4.47
	Adult	63	66	54	5	52	4	5.19
	Total	95	100	46	6	44	5	4.95
Otdar Meanchey	Youth	53	29	31	4	28	3	4.26
	Adult	128	71	53	2	50	1	6.09
	Total	181	100	47	3	44	2	5.55
Total	Youth	110	30	31	6	29	5	4.29
	Adult	262	70	53	4	51	3	5.60
	Total	372	100	46	4	44	3	5.21

4.1.1 Youth household

This type of family either husband or wife can engage in migration or developing non-farm activities. However, it is usually husband who migrates, while wife is at home looking after children, responsible for household chore, contributing to farming such as rice farming, animal raising, or developing small business at home mainly as grocery seller.

The qualitative interview together with the examination of the household composition in the survey give an impression that youth usually takes up farming at their point of marriage. The observed cases tell that youth getting marriage after migration for a while by both man and woman or any of them. At their marriage, they get land share such as village land or agricultural land from one or both sides depending on the resource availability of the both sides of the family. In case of marriage in to the village, traditionally groom comes to live with the bride side; in this case if the groom is an outsider, land share is usually from the bride side while the groom side contributes as dowry. Thanks to migration experience, any of them can migrate again in case the farming is not sufficient supporting the livelihood. There are 110 households which account for 30% of 372 households. Among 110 youth household, there are 10 households who did not get land share at their marriage.

4.1.2 Adult household

Adult household is a family that has single youth or under youth children or youth family (couple) age 14 (legally 18) to 35 years old) and currently living with parents. Any member of youth family can be on migration or engage in non-farm activities or currently attending school. This family can also have single youth age of 14 to 35 years old both male and female who dropped out from school working at home or on migration or currently studying. Youth couple wife lives with parent looking after children and engaging in non-farm work such as small grocery, hair dresser, or help parent doing farm work. Husband can engage in farm work in case of old age parent, or working on non-farm such as teacher, salaried employed in local workhouse (for example husband doing iron smith, wife hairdresser case: 0068-OMC-3-Adult-AH). Adult family with youth married mainly has daughter who mainly dropped out and live with parents. It is a rare case for male because of tradition of Cambodia the married couples are going to live with the bride side. Youth couple in this family is usually the last child mostly daughter. However, adult family with youth couple may extend their stay with the family longer apparently because their parents do not have land to share or any support for them to start independent household. That is why young couple resides with parents and thereby, surplus labor such as husband or wife engaging in migration or non-farm activities such as construction work or garment work. Among 372 households, there are 262 adult households which account for 70% of total household. Among 262 adult households, there are 66 households that have young married couple (between 1 to 4 couples) are living with which account for 25% of total adult household. Among 262 (70%) adult household, there are 162 (60%) household have children getting married in the past 10 years. 74% of 162 households have manage to give land to the married couple.

4.2 Description of youth and adult household

4.2.1 Distribution of youth and adult household in each zone and type

Among 372 households include in the analysis and making farm typology, there are 30% youth households and 70% adult households. Youth household is distributed 26% of 96 households in Zone Tram Kak, 34% of 95 households in Zone Prey Kabas and 29% of 181 households in zone Otdar Meanchey. Table 66 illustrates the distribution of youth within each type of farming where the percentage is calculated between youth and adult household within total youth and adult.

In Tram Kak, majority of youth account for 60% of total youth in zone is in farm type TK-1, the other 20% are in TK-2 and rest 20% are in TK-3. This suggests that majority of youth settled in farming mainly on TK-1. Adult households 41% are in TK-1 while 25% are in TK-2 and 34% are in TK-3.

In Prey Kabas, 2 youth households accounted for 6% in PB-1, 1 household accounted for 1% are in PB-3 while the majority of youth 29 household accounted about 91% in PB-2. That was why PB-2 was characterized by young headed household and less migration because youth in this farm type, farm active worker was dedicated to rice farming. 25 adult households accounted for 40% in PB-1 while 22 households accounted for 35% in PB-2 and 16 household accounted for 25%.

In Otdar Meanchey, among total 53 household youth, 30 household accounted for 57% in OMC-1, 16 household accounted for 30% in OMC-2, 4 households accounted for 8% in OMC-3 and 3 household accounted for 6% are in OMC-4. The distribution shared similar pattern for adult household. Among 128 household, 81 household accounted for 63% in OMC-1, 33 household accounted for 26% in OMC-2, 12 household accounted for 9% in OMC-3 and 2 household accounted for 2% in OMC-4.

In general, both youth and adult household distribute in all farm type in each zone but the majority is obviously seen in small land and poor asset farm type that is TK-1 in Tram Kak and OMC-1 in Otdar Meanchey except zone Prey Kabas where youth household is remarkably seen in PB-2 where majority accounted for 91% in this farm type.

Table 66 Distribute youth and adult household among the type of farming

Zone	Farm type	Youth HH		Adult HH		Total	
		N	%	N	%	N	%
Tam Kak	TK-1	15	60%	29	41%	44	46%
	TK-2	5	20%	18	25%	23	24%
	TK-3	5	20%	24	34%	29	30%
	Total	25	100%	71	100%	96	100%
Prey Kabas	PB-1	2	6%	25	40%	27	28%
	PB-2	29	91%	22	35%	51	54%
	PB-3	1	3%	16	25%	17	18%
	Total	32	100%	63	100%	95	100%
Otdar Meanchey	OMC-1	30	57%	81	63%	111	61%
	OMC-2	16	30%	33	26%	49	27%
	OMC-3	4	8%	12	9%	16	9%
	OMC-4	3	6%	2	2%	5	3%
	Total	53	100%	128	100%	181	100%

4.2.2 Youth and adult household: land shared at marriage and current land

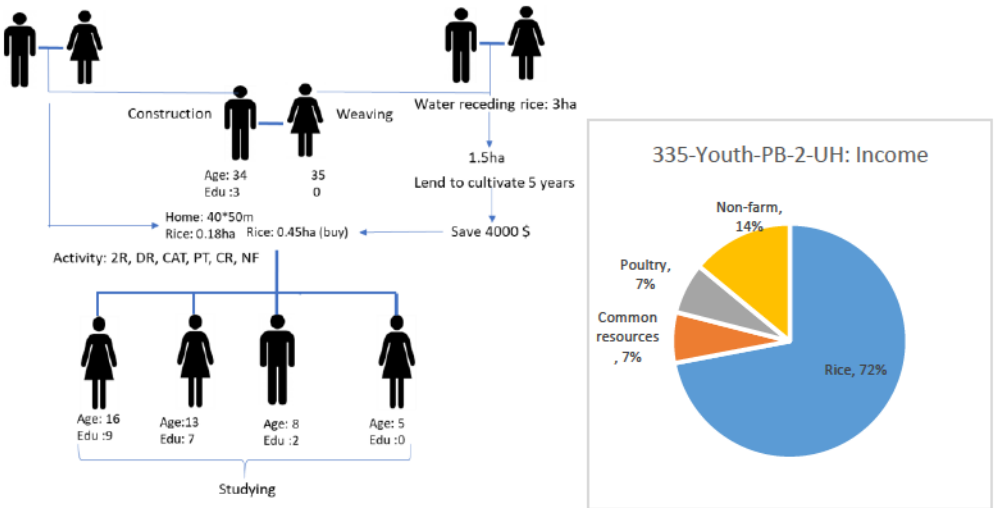
Though the observation in the qualitative interview and survey show the impression that settle in farming mainly take place at the point of married, however, land is not always shared to young couple at marriage. For example, among 110 youth household, there were 10 youth households accounted for 13% reported that they did not get land share at their marriage. Dependent on situation of land of the family, in some cases youth shared living on parents' land for a while and land was shared later or with the support from parents in any side or both side, youth could buy land later after several years of marriage for example until parent can lend youth couple the certain portion of cultivated land for youth to cultivate and accumulate the financial capital. Once youth has enough capital, parent can contribute some money to support youth to buy land.

The case in Box 1 below is an example how parent lend cultivated land for youth to accumulate the capital so that youth is able to buy agricultural land and expanse their farming in zone Prey Kabas.

Case 335-PB-2-Youth-UH

Mr. A is a 34 years old man dropping out at primary school grade 6 and his wife 35 years old without any schooling got married at age 17 and 18 respectively in 1994. At his marriage, he got land share from his parents of 0.18 ha for farming and 40*50 meters for building a house.

But he came to live at his wife side after he got married in 1994. He left his 0.18 ha at his parents in his home village. At his wife village, his parents in law has 3 ha of water receding rice. His parents in law lended him 1.5 ha to cultivate rice but in exchange he had to help cultivate the rest 1.5 ha. After five years, he managed to save money to buy land at his home village. He bought 0.18 ha at price 1500$, and another 0.18 ha at price 2000$ and 0.09 ha price 500$. Now has 0.63 ha of rice land that can cultivate 2R and DR rice. During dry season of March and April, he is doing off-farm work-construction work and can earn income 100USD a month. His wife does weaving (handcrafting work-Pak Din) at can earn 17.5$/month. His total annual income is 2267.20$ where 72% from rice cultivation, 14% from off-farm work both him and his wife, 7% from poultry and 7% from common resources.



Box 1 Case 335 Story of parents supporting youth to accumulate assets-land for farming

In the same way for parent support, in zone Otdar Meanchey, parents who share 1 ha of rice land to youth couple supported money for young married couple to migrate to Thailand in order to save money to buy land, to buy two-wheel tractor and to build house.

Among 272 (70%) adult household, there are 162 (60%) household have children getting married in the past 10 years. 74% of 162 households have manage to give land to the married couple while the rest 42 accounted for 26% did not share land to the youth couple at the marriage implying that among adult households having children getting marriage 26% are in the situation of land is not able to sub-divided to youth.

Based on the number of actual youth couple who still sharing the living with parents' roof of the current adult household, survey show that among 262 adult households, there are 66 adult households account for 25% that have young married couple (between 1 to 4 couples) are living with the adult household and share economic and livelihood relation.

Among 272 (70%) of adult household, there are 162 household accounted for 60% said that they have marriage couple in the past ten years. 74% of 162 households said that they have manage to share the land to youth couple while the other 42 adult household accounted for 26% do not share. The reason is mainly land is too small to subdivide. Given some youth couple already live separately, some adult household already help youth settle in farming more than one couple already, therefore, adult household that still have couple living with tend not to share land them because the land is already too small to subdivide or the share is morally done but size is too small for example 0.1ha has been share to youth couple in zone Tram Kak (case 280-TK-3-Adult-UH see Box 2). In this situation, youth can keep this land with parent to cultivate and engage in migration or they manage to come to cultivate during the rainy season. In this case, youth have to integrate themselves into nonfarm sectors notably garment industry worker, construction worker or any urban services. In return, remittance from migrant couple help contributing to enhance parent's household living whose land generate values below the poverty threshold.

At the point of installation in farming survey show that there is a tendency that youth got agricultural land share from parents at marriage less than the adult household. So do the accumulation of land among youth and adult household. The current land ownership of youth household tends to be smaller than the adult household. That is the reason why adult family have rice gross value added higher than youth family in each farm type. The combination of land share at marriage determines the amount of land at the point of installation. Looking at the distribution of land share by both sides of parents in each farm type in the three zones, result shows that usually those who got land share from both side of parent tend to have bigger farm size than those who got only from one side of parents. Table 67 summaries the average land share at marriage of youth and adult household in zone Tram Kak, Prey Kabas and Otdar Meanchey where "F" denote bride side, "M" denote groom side and both "MF" denote both groom and bride side. For detail distribution of land share at marriage of youth and adult household in each farm type, please see appendix - 07.

Table 67 Land share at marriage and the current land accumulation

Zone	Type of household	Couple strategy	Number of household	Land share at marriage		Land ownership		Change
				Mean	Std. Deviation	Mean	Std. Deviation	
Tam Kak	Youth HH	[F]	6	0.48	0.61	0.73	0.60	0.25
		[M]	5	0.26	0.08	0.71	1.18	0.45
		[M][F]	13	0.44	0.17	0.58	0.35	0.14
		Total	24	0.41	0.32	0.64	0.62	0.23
	Adult HH	[F]	12	0.34	0.20	0.62	0.51	0.29
		[M]	3	0.11	0.08	0.28	0.14	0.16
		[M][F]	27	0.50	0.32	0.96	0.65	0.46
		Total	42	0.43	0.30	0.81	0.62	0.39
Prey Kabas	Youth HH	[F]	12	0.59	0.39	1.80	1.05	1.21
		[M]	2	0.24	0.08	0.86	0.70	0.62
		[M][F]	16	0.64	0.37	1.55	0.76	0.92
		Total	30	0.59	0.37	1.60	0.89	1.01
	Adult HH	[F]	5	0.71	0.32	1.36	0.75	0.66
		[M]	6	0.25	0.13	1.26	1.11	1.01
		[M][F]	16	0.56	0.30	1.25	0.63	0.69
		Total	27	0.52	0.31	1.27	0.75	0.76
Otdar Meanchey	Youth HH	[F]	13	2.10	1.60	4.20	2.48	2.10
		[M]	12	2.67	1.81	3.81	2.50	1.14
		[M][F]	15	3.67	1.72	3.34	1.31	-0.33
		Total	40	2.86	1.80	3.76	2.10	0.90
	Adult HH	[F]	25	2.21	1.72	4.32	2.65	2.11
		[M]	10	1.60	0.52	4.57	2.61	2.97
		[M][F]	19	3.94	1.91	5.25	2.76	1.31
		Total	54	2.71	1.88	4.70	2.67	1.99

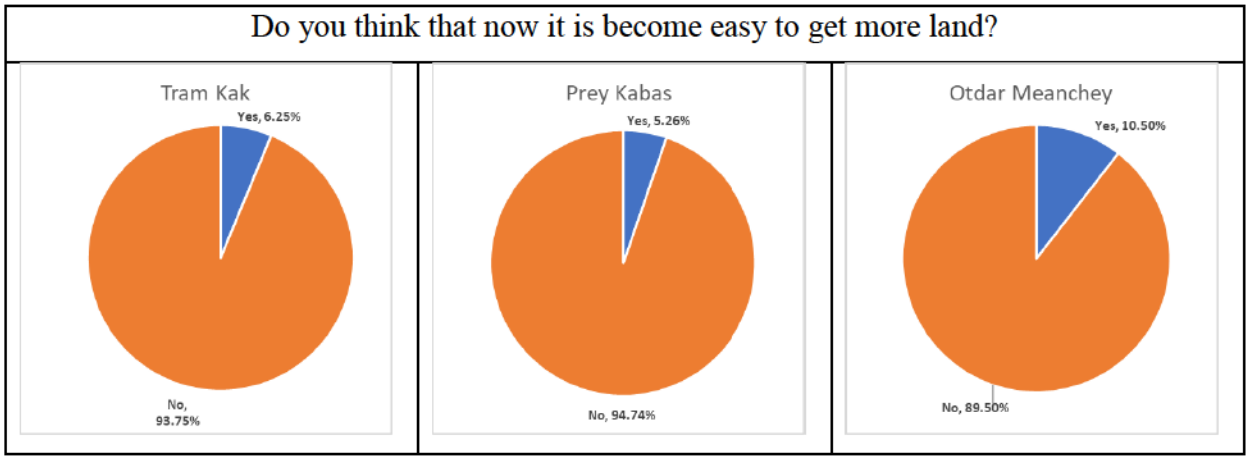


Figure 35 Respondent's view on accessible to land

People share view that land now become very scarce and expensive to buy. Land sell in Tram Kak and Prey Kabas is very rare and very expensive. The situation in both area is that it is very rare and there is no one is willing to sell the land.

"Land now is very expensive. Even if we have money, it is difficult to find people who is willing to sell." Said a 42 years old woman in Chrey Thnoat village, Tram Kak commune (Case 279-TK-1- Adult-UH).

"Land is so expensive and we don't have capital. I am thinking to buy more land but I wait the remittance from my children who migrate to Thailand." Said 63 years old woman in Chrey Thnoat village, Tram Kak commune (Case 278-TK-2-Adult-UH)"

"Land now becomes very scared and expensive. The point is there is no want willing to sell their land." Said 63 years old woman, in Prey Kabas 'K' village, Prey Kabas commune, Take province (Case 333-PB-Adult-HH).

*"Land is very expensive. A 60m*60m land cost 4000 UDS (11111$/ha), we cannot afford with such higher price." Said a 51 years old man in Prey Kabas 'Kha' village, Prey Kabas commune (case 306-PB-1-Audult-UH).*

"It is very expensive, 1a (0.01ha) price 300,000-400,000 Riel (7500 to 10000$/ha), we cannot afford it." Said 63 years old man in Ou village, Prey Kabas commune (Case 357-PB-3-Youth-AH).

In Otdar Meanchey the land is still available for purchase although the majority of people tend to view that the price is increase and they mostly can afford to buy it. My field observation of some households shares to opposite view that land is available for sell though the price is increasing but that is because the land is already cleared. The qualitative interview shows that land is still available for villagers in Otdar Meanchey to buy because there are some big land owners who wish to sell the land. But the land price is increase if compare to what people used to occupy freely.

"It is difficult of get more agricultural land because there is no more land for freely occupying. The rest of the land is belonged to company, we cannot even buy from them." Said a 46 years old woman in Ou Krouch village, Trapaing Prasat commune and district, Otdar Meanchey province (Case 183: OMC-3-Adult HH).

"Land can be bought at the price of 600 USD/ha but for villagers, it is difficult to find 600 USD" Said a 61 years old man in Thnal Keng village, Ph'av commune, Trapaing Prasat district Otdar Meanchey (Case 165: OMC-1-Adult-UH).

"If we have money, it is easy to buy the land. Land that is close to village price 400 USD/ha for rice land, and 300 USD/for forest land which is not yet cleared.", said a 57 years old man in Thnal Keng village, Ph'av commune, Trapaing Prasat district Otdar Meanchey (Case 164: OMC-4-Adult-AH).

Table 68 Land price per hectare in the three zones

Zone	Average amount of land purchased (ha)	Average Price ($/ha)
Tram Kak	0.25	5294
Prey Kabas	0.32	9352
Otdar Meanchey	1.70	586

Table 68 shows the average land price per hectares and the average land size that people purchased and sell. This average value is calculated based on number plot of land that people said they have bought recently. In Tram Kak, average land size buys or sell is 0.25ha with the average price of 5294$/ha. In Prey Kabas, average land size buy is 0.32ha with the average land price 9352$/ha. In Otdar Meanchey, average land size buy is 1.7ha with the average land price 586$/ha. The field observation give impression that the size of land sell is correspond amount of land distributed by the state in 1980s in zone Tram Kak and Prey Kabas. 0.2ha in Tram Kak and 0.18ha in Prey Kabas is the mode of land sell in the area wile in Otdar Meanchey is 1ha or 2 ha. The average land price is confirmed with the qualitative information given by the key informant each area. In Otdar Meanchey, people said that land is available to purchase at price from 300$ to 600$ per hectare. At this price, it is affordable for village to earn from migration work especially to Thailand. That is the reason why some youth couple in Otdar Meanchey often migrates to Thailand in order to seek financial capital to expand land and to buy two-wheel tractor which is necessary for rice cultivation and annual crop cultivation in the area.

"I support my son and daughter in law money of 3000 Bath (90USD) to migrate to Thailand. The remittance they sent home each time 4000 Bath to 5000Bath (120 to 150 USD) in total 20000 to 30000 Bath approximately 600 to 900 USD. This money has been used to buy 3 plots of rice land

*size:30m*60m. The land has been cleared already. Beside land, the remittance has been used to build house for young couple and latrine.", Said 58 years old man, in Cheur Slab village, Kok Kpos commune of Otdar Meanchey province (Case 0083-OMC-2-Adult-AH, see also in chapter 3).*

4.2.3 Economics characterization of youth and adult household

As already explained in previous chapter on farm typology, there is diversity of household in the three studied areas that can be categorized into 10 farm types. Though household in the same farm type are supposed to share similar characteristic, however, there are also diversity within the group. In this section will examine the key different between youth and adult household in each farm type and their economic activities. After that their economic capacity to add one more additional person into the system will be examined.

4.2.3.1 Tram Kak youth and adult

Usually, youth household have smaller farm size than adult household. Except youth household in TK-3 where they have average farm size 1.63ha which is bigger than adult household 1.10ha, youth in TK-1 and TK-2 have average farm size 0.35ha and 0.78ha which smaller than 0.39h and 0.90ha of adult household in TK-1 and TK-2 respectively.

Adult and youth households in TK-1 have more labor migration than household in other farm type accounted for an average 29% and 18% of percentage of labor migration total labor respectively. Due to degree of diversification of farming, youth household in TK-2 and TK-3 have no percentage of labor migration while adult and youth household in TK-1 have 29% and 18% of labor migration respectively. Adult household in TK-3 have average active labor migration 22% while youth household do not have any migrant.

Beside land and labor migration, youth and adult in Tram Kak is remarkable different in term of agricultural asset and household asset. Adult household tend to have more home and agricultural asset than youth in TK-1 and TK-2 while it is opposite for youth TK-3 where youth have similar household asset and higher agricultural assets (see Table 69 below).

Table 69 Tram Kak: youth and adult household farm characteristics

	TK-1			TK-2			TK-3			Grand Total		
	Adult HH	Youth HH	Total	Adult HH	Youth HH	Total	Adult HH	Youth HH	Total	Adult HH	Youth HH	Grand Total
Number of HH	29	15	**44**	18	5	**23**	24	5	**29**	71	25	**96**
Human resources												
Total Active Worker	3.13	2.08	2.82	3.26	2.00	3.04	3.24	2.00	3.07	3.20	2.05	2.95
Active Farm Worker	2.03	1.54	1.89	2.84	2.00	2.70	2.28	1.75	2.21	2.32	1.67	2.18
% labor migration	29.46	17.95	26.06	7.37	0.00	6.09	21.55	0.00	18.58	21.23	11.11	19.02
Age of Household Head	49.35	29.69	43.55	49.26	30.25	45.96	48.92	31.50	46.52	49.19	30.14	45.02
HH size	4.90	3.92	4.61	4.95	3.75	4.74	5.36	4.25	5.21	5.07	3.95	4.82
Land resources												
Farm size	0.39	0.34	0.37	0.90	0.78	0.88	1.10	1.63	1.17	0.76	0.67	0.74
Land Labor Ratio	0.22	0.24	0.22	0.34	0.39	0.35	0.49	1.17	0.58	0.34	0.44	0.36
% Rice land	98.91	92.05	96.88	52.30	56.61	53.05	85.22	88.16	85.63	82.54	84.55	82.98
% AC land	0.36	0.00	0.25	36.89	30.03	35.69	4.59	6.33	4.83	11.02	6.93	10.13
% VG land	0.73	0.26	0.59	10.81	13.36	11.25	10.19	5.51	9.54	6.44	3.76	5.85
Financial resources												
Agricultural Asset	582	482	553	768	705	757	866	1355	933	724	691	717
Total household assets	1828	1556	1748	3216	2761	3137	3430	3445	3432	2713	2145	2589
HH expenditure	769	962	826	1017	928	1001	1439	959	1373	1055	955	1033
Agricultural Expense (IC+PL)	98	93	97	254	149	236	351	366	353	222	156	207
Agricultural PL	16	2	12	12	8	11	73	14	65	34	5	28
Rice IC+PL	67	60	65	89	95	90	221	110	206	124	76	114
AC IC+PL	0	0	0	53	25	48	5	16	7	15	8	14
Cattle stock value ($)	661	731	682	1526	1500	1522	1260	1250	1259	1080	976	1057
HH income sources												
Agricultural income	404	402	404	1069	856	1032	1804	1006	1693	1039	604	944
Rice income	152	160	154	277	398	298	683	269	626	360	226	331
AC income	1	0	1	133	63	121	31	52	34	45	22	40
VG income	7	4	7	73	100	78	125	32	112	63	28	55
CAT income	75	55	69	306	149	279	594	333	558	306	126	267
AN (exclu. CAT) income	142	126	137	125	122	125	326	196	308	199	139	186
Total non-farm income	605	638	615	336	475	360	452	474	455	486	576	506
Non-farm income	362	376	366	215	475	260	187	474	227	266	413	299
Migration income	244	263	249	121	0	100	264	0	228	219	163	207
Total HH income	1010	1041	1019	1405	1331	1392	2255	1480	2148	1525	1180	1449

In terms of economic performance, Figure 36 shows that adult and youth household in TK-1 have identical economic capacity of annual household income 1010USD and 1041USD respectively. The composition to total average household income is also share the similarity. In TK-2 adult household have economic capacity generate income 1405USD while youth generate 1331USD per year. The annual income of youth and adult household in this farm type is about the same, however, the key different is the contribution of animal income (exclude cattle) and annual crop income the make adult household have higher agricultural income. In addition, the labor migration of household active work in the adult household and non-farm activities provide additional income to adult household to generate annual income slightly higher than youth household. Thanks to the contribution of non-farm activities approximately 36% to total income that contribute the youth household economic is identical to adult household income. Adult household in TK-3 has the highest annual income of 2255USD while youth has only 1480USD. The high income of adult household is due to high

income from rice and animal raising (exclude cattle). Although youth household seem to have higher farm size than adult household but the high contribution of rice income of adult household is due to the capacity to grow early rainy season rice in combination with late rainy season rice. In addition, the adult household have 22% of active labor migration which provide remittance addition to existing non-farm income resulting adult household in this farm type have the highest economic capacity compare to youth within farm type and other farm types.

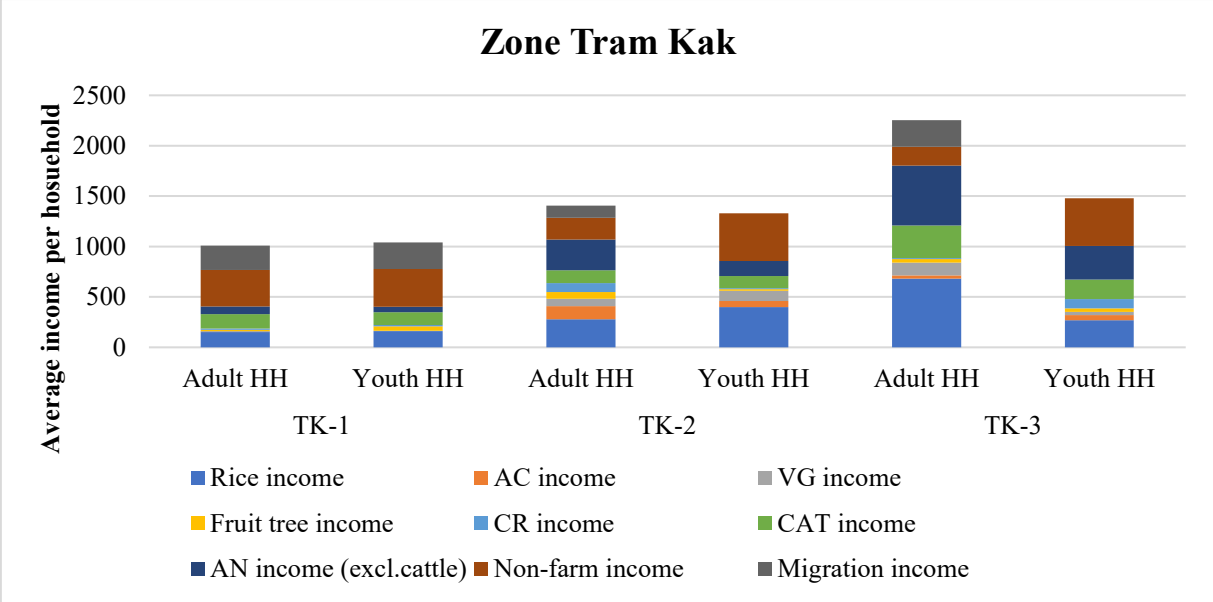


Figure 36 Tram Kak: youth and adult household economic performance

In Tram Kak, youth is different from adult household in term of land holding, agricultural asset, household asset and income generation. Youth and adult household in the poor resource farm type (TK-1) tend to have high percentage of migration, while youth household in diversified farm type have no labor migration. However, adult household in diversified farm type (TK-2 and especially TK-3) have high percentage of labor migration apparently due to high dropout youth in the household.

4.2.3.2 Prey Kabas youth and adult

Farm size, household assets and percentage of labor migration are the main characteristics that highlight the key different between youth and adult household in Prey Kabas. Youth and adult household have similar amount of both agricultural assets and household assets except youth in PB-1 and PB-3 have higher agricultural assets and household asset than adult household. However, this is apparently due to the small youth sample size this distributed in these two farm types. For PB-2 where majority of youth are in this farm type, result shows that adult and youth household have identical value of both

agricultural (1640$ vs.1533$) and household asset (3477$ vs.3152$). Adult household in all farm type have larger farm size than adult household. Given the area is purely based on intensified rice, higher farm size determines the higher rice income. In PB-1 average farm side of adult household is 0.78ha while youth household possess only 0.36ha. Adult and youth household have average farm size 1.78ha and 1.66ha respectively in PB-2, and 1.68ha and 1.2ha respectively in PB-3. In general, youth household tend not to have active labor migration but adult household have 13.53% in PB-1, 1.45% in PB-2 and 14.58% in PB-3, while youth in PB-1 and PB-2 have no active labor migration except youth household in PB-3 having 40% of active labor migration. But there is only one youth household in this farm type big household size which is apparently old age parent residing with youth couple and contribute to farm work that permit youth active labor to go on migration (See Table 70).

Table 70 Prey Kabas: youth and adult household farm characteristics

	PB-1			PB-2			PB-3			Grand Total		
	Adult HH	Youth HH	Total	Adult HH	Youth HH	Total	Adult HH	Youth HH	Total	Adult HH	Youth HH	Grand Total
Number HH	25	2	**27**	22	29	**51**	16	1	**17**	63	32	**95**
Human resources												
Total Active Worker	3.36	2.00	3.26	2.22	2.00	2.10	3.63	5.00	3.71	3.02	2.10	2.72
Active Farm Worker	2.76	2.00	2.70	2.13	1.93	2.02	2.88	3.00	2.88	2.56	1.97	2.37
% labor migration	13.53	0.00	12.53	1.45	0.00	0.65	14.58	40.00	16.08	9.45	1.29	6.79
Age of Household Head	59	32	57	47	30	38	57	34	55	54	31	46
HH size	5.12	3.50	5.00	5.09	4.50	4.76	5.38	6.00	5.41	5.17	4.48	4.95
Land resources												
Farm size	0.78	0.36	0.74	1.78	1.66	1.71	1.68	1.20	1.65	1.36	1.56	1.43
Land Labor Ratio	0.31	0.18	0.30	0.85	0.89	0.87	0.61	0.40	0.59	0.57	0.83	0.66
% Rice land	100	100	100	100	100	100	100	100	100	100	100	100
% AC land	0	0	0	0	0	0	0	0	0	0	0	0
% VG land	0	0	0	0	0	0	0	0	0	0	0	0
Financial resources												
Agricultural Asset	804	1765	875	1640	1533	1582	2759	2800	2761	1593	1589	1592
Total household assets	2603	3087	2639	3477	3152	3299	5209	6320	5275	3568	3250	3465
HH expenditure	1243	1023	1226	1462	1341	1396	2148	1510	2110	1548	1326	1475
Agricultural Expense (IC+PL)	759	300	725	1533	1592	1565	1691	672	1631	1270	1479	1338
Agricultural PL	195	76	186	396	333	361	435	210	421	327	313	322
Rice IC+PL	716	299	685	1460	1446	1452	1376	586	1330	1148	1344	1212
AC IC+PL	0	0	0	0	0	0	0	0	0	0	0	0
Cattle stock value ($)	980	750	963	891	804	843	969	2500	1059	945	855	916
HH income sources												
Agricultural income	997	512	961	2026	1803	1904	2726	3007	2742	1799	1759	1786
Rice income	599	326	579	1404	1198	1291	1722	2119	1746	1169	1171	1170
AC income	0	0	0	0	0	0	0	0	0	0	0	0
VG income	0	0	0	0	0	0	0	0	0	0	0	0
CAT income	285	187	278	418	343	377	386	589	398	358	341	352
AN (exclude CAT) income	98	0	90	145	224	189	509	141	487	217	207	214
Total non-farm income	603	1199	647	132	372	264	877	405	849	502	426	477
Non-farm income	461	1199	515	132	372	264	792	45	748	425	414	422
Migration income	142	0	131	0	0	0	85	360	101	77	12	56
Total HH income	1600	1711	1608	2158	2175	2167	3603	3412	3591	2301	2185	2263

Result shows that youth and adult household share almost identical total annual income household in each farm type. On average, in PB-1, adult household earn 1600$/year while youth household earn 1711$/year. However, due to small land, youth household in PB-1 have to combine 70% of total income from non-farm activities while adult household combine 29% of non-farm activities and 9% from migration activities. In PB-2, adult household earn 2158$ per year youth 2175$ per year. Adult household have higher agricultural income than youth household due to the contribution of rice income (big farm size) accounted for 65% compare 55%. In addition, 19% of income of adult household comes from animal production while youth household has only 16% of income from animal production. It is non-farm income that annual total income of youth household higher than adult household (17.10% vs.6.12%). In PB-3, adult household generate 3603$ per year where major contribution is from rice (49%), cattle (14%), non-farm income (22%), migration (2.36%). Youth household annual income earning is 34012$ where major contribution is from rice (62%), cattle (4%), animal production (17.27%), and migration (11%). The key different between adult and youth household in PB-3 is adult household have high percentage of non-farm income added to farm income that make adult household earn identical income to youth household (See Figure 37).

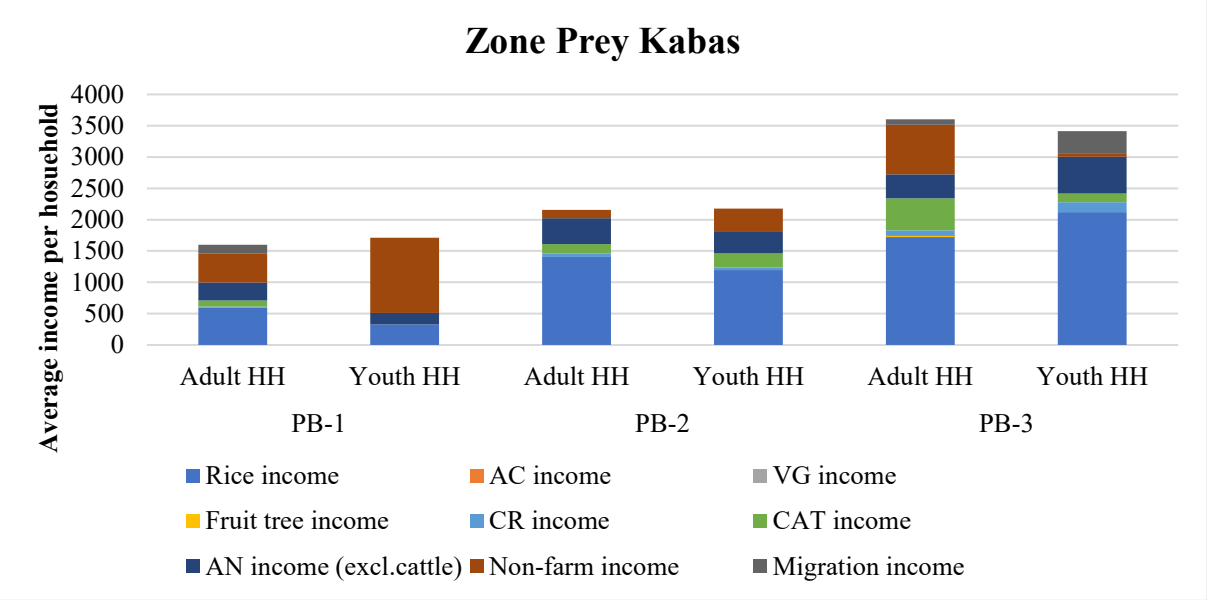


Figure 37 Prey Kabas: youth and adult household economic performance

4.2.3.3 Otdar Meanchey youth and adult

In general, result shows that youth household tends to have smaller land, smaller agricultural asset and smaller household assets than adult household. However, adult household tend to have higher percentage of labor migration than youth household due to high farm active worker and smaller land per active labor than youth household.

Youth in rice based small land poor resource farm type OMC-1 has smaller and asset than adult household. It is opposite for youth in rice based big land and rich resource farm type OMC-2. While adult household in OMC-1 has average agricultural assets 1501$, youth has only 754$. Youth in OMC-2 has better situation in term of land and assets compare to adult household for both agricultural assets and household assets. The average agricultural assets for adult household is 2546$ and for youth household is 2793$. The average total household assets for adult household is 2230$ and for youth household is 4252$.

OMC-3 and OMC-4 whose household combine rice and annual crops, youth has average land bigger than adult household but then to have smaller agricultural assets and household assets compare to adult household. Thank to this, youth in OMC-3 and OMC-4 tend to spend more paid labor in both rice and annual crops cultivation than adult household having more agricultural assets (see Table 71). Labor exchange is found common in Otdar Meanchey in both rice and annual crops cultivation.

Table 71 Otdar Meanchey: youth and adult household farm characteristics

	OMC-1			OMC-2			OMC-3			OMC-4			Grand Total		
	Adult HH	Youth HH	**Total**	Adult HH	Youth HH	**Total**	Adult HH	Youth HH	**Total**	Adult HH	Youth HH	**Total**	Adult HH	Youth HH	**Grand Total**
Number HH	81	30	**111**	33	16	**49**	12	4	**16**	2	3	**5**	128	53	**181**
Human resources															
Total Active Worker	4.12	2.13	3.59	4.06	2.06	3.41	3.33	2.00	3.00	2.00	2.00	2.00	4.00	2.09	3.44
Active Farm Worker	3.42	1.97	3.03	3.36	1.81	2.86	2.42	1.75	2.25	2.00	2.00	2.00	3.29	1.91	2.88
% labor migration	12.06	8.89	11.20	8.89	2.08	6.67	19.58	0.00	14.69	0.00	0.00	0.00	11.76	5.66	9.97
Age of Household Head	54	31	48	51	33	45	53	29	47	50	29	37	53	31	47
HH size	5.95	4.17	5.47	6.61	4.69	5.98	5.67	4	5.25	5.5	3.33	4.2	6.09	4.26	5.55
Land resources															
Farm size	3.02	2.22	2.81	6.75	5.72	6.42	2.31	3.67	2.65	3.85	4.17	4.04	3.93	3.50	3.80
Land Labor Ratio	1.00	1.18	1.05	2.15	3.53	2.60	0.98	2.33	1.32	1.93	2.08	2.02	1.31	2.03	1.52
% Rice land	98.28	99.26	98.55	97.34	99.15	97.93	43.34	71.05	50.26	38.52	58.33	50.41	91.95	94.78	92.78
% AC land	1.53	0.64	1.29	1.61	0.21	1.15	21.94	26.66	23.12	61.48	29.63	42.37	4.40	4.12	4.32
% VG land	0.19	0.09	0.17	1.05	0.64	0.92	1.39	2.29	1.61	0.00	12.04	7.22	0.52	1.10	0.69
Financial resources															
Agricultural Asset	1501	754	1299	2546	2793	2627	1315	0	986	1565	0	626	1754	1270	1612
Total household assets	2292	1366	2042	4230	4252	4237	2290	595	1866	2762	398	1344	2799	2124	2601
HH expenditure	1115	1025	1090	1506	1200	1406	968	773	919	1544	1796	1695	1209	1102	1178
Agricultural Expense (IC+PL)	357	299	341	802	959	853	381	570	429	461	970	766	476	556	499
Agricultural PL	190	161	182	392	588	456	192	304	220	33	545	340	240	323	264
Rice IC+PL	299	226	279	632	796	685	278	266	275	90	428	293	380	413	389
AC IC+PL	9	1	7	26	2	18	61	144	81	371	260	305	24	27	25
Cattle stock value ($)	358	217	320	879	219	663	500	0	375	500	167	300	508	198	417
HH income sources															
Agricultural income	770	678	745	1824	1239	1633	930	1162	988	1753	1587	1653	1072	935	1032
Rice income	423	367	408	1141	703	998	276	431	315	360	442	409	594	477	560
AC income	14	6	12	32	10	24	187	219	195	1121	490	742	52	50	52
VG income	6	3	6	24	111	52	14	164	52	0	258	155	11	62	26
CAT income	109	23	86	229	82	181	150	0	113	0	53	32	142	41	113
AN (exclu. CAT) income	156	135	151	284	235	268	139	299	179	114	105	109	187	176	184
Total non-farm income	776	494	700	577	495	550	536	260	467	50	1377	846	691	527	643
Non-farm income	453	371	431	417	495	442	434	260	390	50	1377	846	436	457	442
Migration income	323	123	269	160	0	108	102	0	77	0	0	0	255	70	201
Total HH income	1546	1172	1445	2401	1734	2183	1466	1423	1455	1803	2964	2500	1763	1462	1675

In OMC-1 adult household earn average 1546$ per year, youth household earn 1172$ per year. Though adult household has average farm size 3 ha which is 1 ha higher than youth having only 2ha but rice income of adult household is just slightly higher than youth household (423$ vs.367$). While the investment on farm is not significant different, the different of rice income is apparently due to quality of production such yield or quality of land. However, it is non-farm income and migration income that contribute to adult household income higher than youth household. Non-farm income and migration income contribute 29.3% and 20.89% respectively to total adult household income, while these two income source 31.67% and 10.5% to total youth household income.

In OMC-2 adult household has average income 2401$ per year while youth household has 1734$ per year. Thank to bigger land size, rice is the key contribution to adult household income which account for 47% of total income while adult is only 40.55%. Animal production contributes 9.56% in adult household compare to 4.71% in youth household. Adult household combine migration (6.66%) and non-farm income (17.36%) while youth have only non-farm income (28.53%).

In OMC-3 youth and adult household have identical income 1466$ and 1423$ respectively. What makes youth and adult household different is contribution of income of adult household is non-farm income (29.58%), migration income (6.97%), while youth household is rice (30.32% vs.18.83%), animal income (21.05% vs.9.49%), and non-farm income (18.3%).

In OMC-4, adult household has average annual income 1803$ while youth has average income 2964$. Youth have higher income than adult thank to the non-farm activities which contribute 46.46% of total non-farm income while non-farm income contributes 2.77% to adult household income. Adult household have higher agricultural income due to the higher proportion of land is growing annual crops which have higher land productivity compare to rice. Annual contribute 60.19% to adult household while it is only 16.52% for youth household.

In general, in rice based small land, poor resource, youth tend to have smaller income compare to adult household due to small land. However, either youth or adult household in this farm type have high percentage of migration compare to the rest of the group. Usually, adult household have high percentage of labor migration compare to youth household thank to availability of total active worker and in all most all farm type (except OMC-4, apparently due to small sample size) adult household have labor migration. Youth household has big land

size tend to have no or less migration. However, in all case youth and adult household have to engage in non-farm activities as complementary to farm income (See Figure 38).

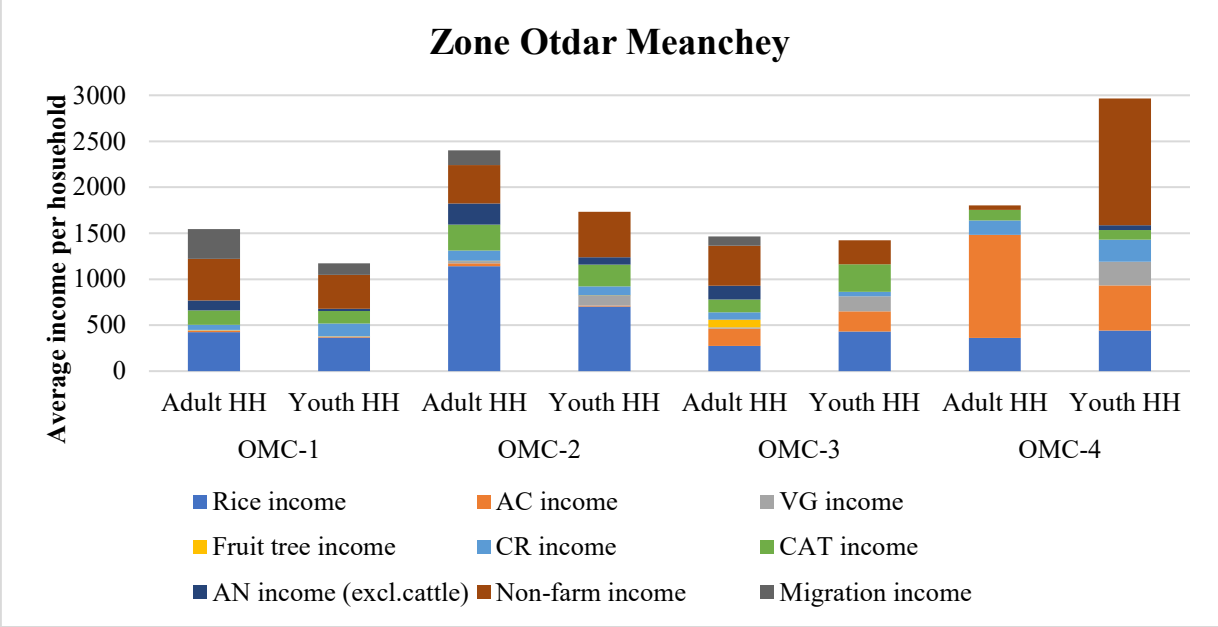


Figure 38 Otdar Meanchey: youth and adult household economic performance

4.3 Analysis youth integration capacity

Youth and adult characteristics and its farm economic have been described. This section is going to examine at what extend each farm type can accommodate future youth and the current situation of youth in each farm type.

4.3.1 Defining youth integration capacity

Taking the total household income minus the minimum threshold for living, we get the surplus amount of income of each family. Capacity for youth integration is, then, defined as a surplus of income above minimum threshold of living of family that is greater or equal to a poverty line of one additional one person into the farm household. This condition, three situations arise. The first is the farm household that is not able to add one more youth where the value of capacity youth integration is less than 0. The second is the farm household that is subsistent with the current family member where the value of capacity youth integration is between 0 and 0.99. The third is the farm household that is able to integrate at least one or more youth where the value of youth capacity integration is more than 1.

4.3.2 Youth integration capacity in each zone by farm type

4.3.2.1 Capacity youth integration in Tram Kak

Table 72 is the result explaining the farm capacity in Tram Kak by youth and adult household in each farm type and it capacity denoted as “Unable” referring to household who is unable to add at least one additional member, “Subsistence” referring to household whose farm has capacity to maintain subsistent, and “Able” referring to household who are above the subsistent level and able to add at least one additional member into the current family farming. Number of person to be added is the sum of number of person each household within the same farm capacity “Unable”, “Subsistence” and “Able”. In figure, “UH”, “SH” and “AH” are the abbreviation using to denote “unable household”, “subsistent household” and “able household” respectively.

In TK-1 majority of youth and adult household 87% and 83% respectively are in the situation that is not able to accommodate more people. There are two youth household and two adult household that farm economic capacity is able to add at least one more people while 3 adult household are subsistence. In TK-2, 60% of youth household and 67% of adult are below subsistence level which is not able to add more people. In TK-3, 40% of youth household and 63% of adult household are in the better situation that can add more people.

By looking at household unable household, result shows that in each farm type especially adult household, they are in fact being accommodating youth in family farming. For example, in 24 unable adult households in TK-1, number of people to be added is supposed to be -53 persons (minus 53), but in fact 11 youth are working on parents ‘ farm, 29 youth are on migration, 18 youth are currently studying, and 20 persons is under youth. By reading the same way in other adult household in the rest of the farm type, we can see the same pattern that those unable household are currently accommodating youth in the system.

Based on the land share pattern to youth couple at marriage in the area is 0.18ha to 0.2ha, it is likely that though those household in TK-1 with average land size of 0.36ha even they have capacity to add more youth but land situation does not permit to sub-divided. The capacity to add is due to the present of non-farm and migration income of parents or household member migration. But household in TK-2 or TK-3 under moral obligation to share the survival apparently household may be able to share to land to youth couple even though it is very small and far below the minimum threshold of living. The situation in Tram Kak is that the youth integration must combine non-farm activities.

In general, in Tram Kak 60% of households is in the situation that economic capacity below subsistence which is not favorable for to accommodate more people in the farm system. However, these below subsistence farm far in fact being accommodated many rural youths in Tram Kak. 13% of household are in situation of subsistence. There is only 27% of household that are above subsistence level which is able to accommodate more youth into the farm system. In all case, youth in a household are involving in migration and non-farm activities which contribute to the economic capacity to accommodate more people.

Table 72 Tram Kak youth integration capacity

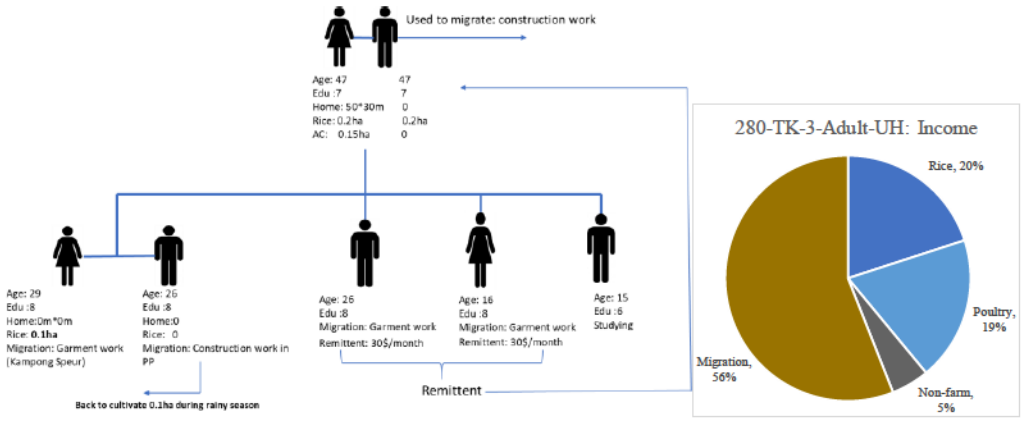
Farm type	HH	Capacity	Capacity to add			Actual youth currently in farming system					
			Number of household	%	Number of person to be added	Youth Farming	Youth Migration	Youth Non-farming	Youth Studying	Youth total	Under youth
TK-1	Youth HH	Unable	13	87%	-32	20	2	2	0	24	25
		Able	2	13%	7	1	0	3	0	4	2
		Total	15	100%	-26	21	2	5	0	28	27
	Adult HH	Not able	24	83%	-53	11	29	0	18	58	20
		Subsistence	3	10%	1	2	3	0	2	7	3
		Able	2	7%	11	0	2	0	1	3	2
		Total	29	100%	-40	13	34	0	21	68	25
	Total	Unable	37	84%	-85	31	31	2	18	82	45
		Subsistence	3	7%	1	2	3	0	2	7	3
		Able	4	9%	17	1	2	3	1	7	4
		Total	44	100%	-66	34	36	5	21	96	52
TK-2	Youth HH	Unable	3	60%	-5	6	0	0	0	6	4
		Subsistence	1	20%	0	1	0	1	0	2	3
		Able	1	20%	3	2	0	0	0	2	3
		Total	5	100%	-2	9	0	1	0	10	10
	Adult HH	Unable	12	67%	-21	13	4	0	6	23	10
		Subsistence	2	11%	1	2	1	2	0	5	1
		Able	4	22%	15	6	0	0	6	12	1
		Total	18	100%	-5	21	5	2	12	40	12
	Total	Unable	15	65%	-26	19	4	0	6	29	14
		Subsistence	3	13%	2	3	1	3	0	7	4
		Able	5	22%	18	8	0	0	6	14	4
		Total	23	100%	-7	30	5	3	12	50	22
TK-3	Youth HH	Unable	2	40%	-2	4	0	0	0	4	4
		Subsistence	1	20%	0	2	0	0	0	2	1
		Able	2	40%	4	3	0	1	0	4	5
		Total	5	100%	2	9	0	1	0	10	10
	Adult HH	Unable	4	17%	-6	1	1	0	5	7	2
		Subsistence	5	21%	2	3	5	1	4	13	5
		Able	15	63%	64	5	16	1	18	40	9
		Total	24	100%	60	9	22	2	27	60	16
	Total	Unable	6	21%	-8	5	1	0	5	11	6
		Subsistence	6	21%	2	5	5	1	4	15	6
		Able	17	59%	68	8	16	2	18	44	14
		Total	29	100%	62	18	22	3	27	70	26
Tam Kak	Youth HH	No	18	72%	-39.46	30	2	2	0	34	33
		Subsistence	2	8%	0.47	3	0	1	0	4	4
		Yes	5	20%	13.27	6	0	4	0	10	10
		Total	25	100%	-25.72	39	2	7	0	48	47
	Adult HH	No	40	56%	-79.91	25	34	0	29	88	32
		Subsistence	10	14%	4.36	7	9	3	6	25	9
		Yes	21	30%	89.59	11	18	1	25	55	12
		Total	71	100%	14.04	43	61	4	60	168	53
	Total	No	58	60%	-119.37	55	36	2	29	122	65
		Subsistence	12	13%	4.83	10	9	4	6	29	13
		Yes	26	27%	102.86	17	18	5	25	65	22
		Total	96	100%	-11.68	82	63	11	60	216	100

Case 280-TK-3-Adult-UH

Mr. B, 47 years old, is living in Ang Roneab village. He studied grad 7. His wife is 47 years old and studied grade 7. He got married in 1992 and came to settle in the village. His couple got land share at their marriage of 0.35 ha from bride side and 0.3 ha from groom side. The household has total 0.55 ha and 0.15 ha of 0.4 ha rice land is allocating to grow early season rice. 0.15 ha of annual crop land is reserved growing annual crop-watermelon. He raises 4 cows for selling and 5 chickens for home consumption. This year he sold 1 cow with an income of 400$. Tit Pros used to migrate to Phnom Penh to do construction work. However, he recently returned home due to health problem.

This household has 4 children. The 29 years old eldest daughter dropped out at grade 9 of secondary school and just got marriage to 28-years old man who dropped out at grad 8. He sub-divided his land 0.1 ha to the young couple. The wife of this young couple migrated to Kampong Speur province to do garment work and husband does construction work in Phnom Penh. They come back to cultivate this 0.1 ha of rice during the cultivation season.

View on farming: Mr. A shared his view that his family wanted to hand over farm job to children when he is getting old. Agriculture is good option because he can survive by growing vegetable, raising cattle, poultry etc. For them, it is difficult to find non-farm job in the urban area. Even we go to garment work, we cannot abandon rice farming. Farm work helps supporting family consumption. He added that some households need to send rice to migrant workers in order to minimize the cost of living. Even my children engaged in garment work, they cannot leave out our farming work as it is vital pillar for our livelihood. It provides staple food for our daily survival. In his view, starting up farm work is not difficult. Because children are engaged in farming since they were young. Even small young child can carry plough ploughing rice field. So, doing farming is not difficult to start. But if working at garment factory, one has to stand all along the day.



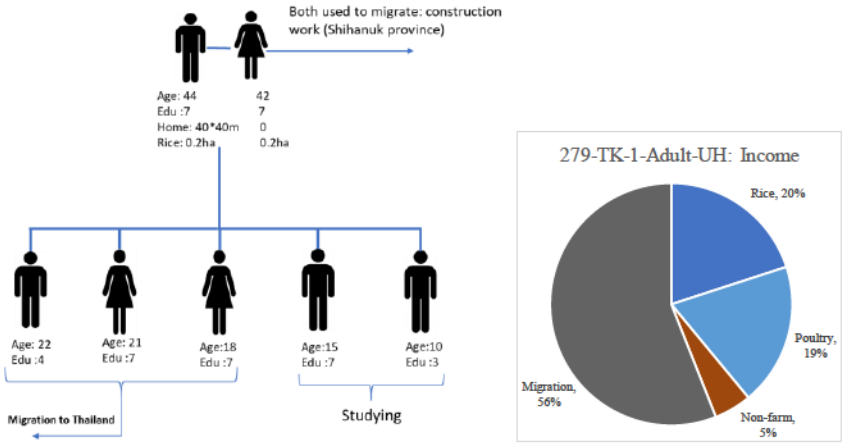
Box 2 Case 280-TK-3-Adult-UH Household

Case 279: TK-1: UH-adult household

Mrs. C, 42 years old woman, respondent. Her husband is 44 years old. Both husband and wife used to migrate to Kampong Som province and Phnom Penh for construction work. The work took place during the dry season for 6 months.

In 1983, land was distributed 20 a per person. She and her husband got total 40 a of rice land. She has 5 children. All are single. 3 children dropped out and migrated to Lem district of Battambang province before 2011. There, they work as agricultural wage laborers there. And perhaps having experience in the province proximity to Thailand, those three children are currently migrating to Thailand working as construction worker and factory worker. Remittance from children is 1500(Thai) Bath/month which approximately 45$/month. Thank to this remittance, the household head currently no longer migrates to work as construction worker but doing farming in the home village.

All though the land is already small, Mrs C is willing to share farming to children because to her it is the share for the survival. There is no alternative of occupation. The only occupation is farming. It is extremely difficult to find non-farm work. The land in her village is not available for sale and if there is, it is very expensive and a household like her is not able to manage to buy and expand the land.



Box 3 Case 279-TK-1-Adult-UH household

4.3.2.2 Capacity youth integration in Prey Kabas

Table 73 shows the economic capacity of farm household in youth and adult household in each farm type in zone Prey Kabas whether they are able to accommodate more people into the farm system. Result shows the same pattern as zone Tram Kak that household whose have small land and poor resource i.e. PB-1 and PB-2 tend to have less capacity to add more young people. Empirically, though small sample size of youth household in PB-1, 100% of youth household in this farm type are in situation of below subsistence which is not able to

accommodate more young people into the system. The same way for adult household, 80% of adult household in PB-1 is not able to add more youth, while 8% of household are subsistence and 12% are able to add more youth. Although the majority of the unable households are not supposed to add more people, they are in fact hosting many youths in farming. Result show that total number of people to be added into this farm type is -43. In contrary, among 57 total youth in adult household of PB-1, there are 26 youth working on farming, 11 youth on migration, 1 youth doing non-farm activities and 19 youth studying. Reading the same way for the rest of youth and adult household in PB-2 and PB-3, we can see the same pattern that majority of household in each farm type are in situation of not able to accommodate additional people (See Table 73).

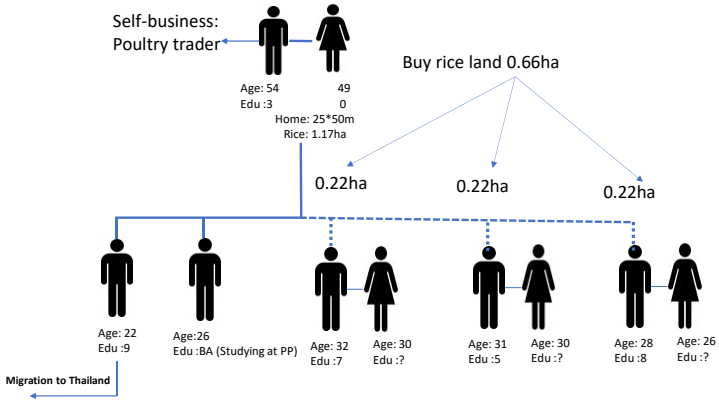
In general, in zone Prey Kabas, among total 32 youth household, there are 59% of youth household are not able to accommodate additional people, while 13% are subsistence, and 28% are able to add at least one additional person into the farm system. Among total 63 adult household, there are 60% of adult household are not able to accommodate additional people, while 14% are subsistent, and 25% are able are able to add at least one additional person into the farm system. Considering both youth and adult household, among total 95 farm household din Prey Kabas, there are 60% are below subsistence and not able to add more people, 14% are subsistence with the current farming system, and 26% are above subsistence and able to add at least one additional youth into the current farming system. For general summary of result by zone, by youth and adult and all studied area, please see Appendix – 09 Youth integration capacity by zone by youth adult household.

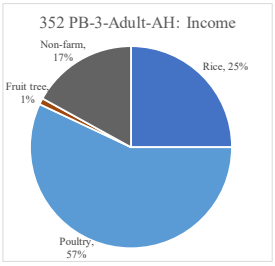
Table 73 Prey Kabas youth integration capacity

Farm type	HH	Capacity	Capacity to add			Actual youth current in farming system					
			Number of household	%	Number of person to be added	Youth Farming	Youth Migration	Youth Non-farming	Youth Studying	Youth total	Under youth
PB-1	Youth HH	Unable	2	100%	-3	4	0	0	0	4	3
		Total	2	100%	-3	4	0	0	0	4	3
	Adult HH	Unable	20	80%	-43	26	11	1	19	57	14
		Subsistence	2	8%	1	4	0	1	1	6	2
		Able	3	12%	4	4	2	0	2	8	1
		Total	25	100%	-38	34	13	2	22	71	17
	Total	Unable	22	81%	-46	30	11	1	19	61	17
		Subsistence	2	7%	1	4	0	1	1	6	2
		Able	3	11%	4	4	2	0	2	8	1
		Total	27	100%	-40	38	13	2	22	75	20
PB-2	Youth HH	Unable	17	59%	-33	32	0	1	4	37	31
		Subsistence	4	14%	2	8	0	0	1	9	7
		Able	8	28%	23	15	0	1	1	17	19
		Total	29	100%	-8	55	0	2	6	63	57
	Adult HH	Unable	15	68%	-20	8	1	0	19	28	13
		Subsistence	3	14%	1	2	0	0	5	7	1
		Able	4	18%	9	3	0	1	10	14	7
		Total	22	100%	-10	13	1	1	34	49	21
	Total	Unable	32	63%	-52	40	1	1	23	65	44
		Subsistence	7	14%	4	10	0	0	6	16	8
		Able	12	24%	31	18	0	2	11	31	26
		Total	51	100%	-17	68	1	3	40	112	78
PB-3	Youth HH	Able	1	100%	2	2	2	0	1	5	0
		Total	1	100%	2	2	2	0	1	5	0
	Adult HH	Unable	3	19%	-4	6	2	0	2	10	2
		Subsistence	4	25%	1	2	1	3	4	10	0
		Able	9	56%	42	10	6	0	10	26	7
		Total	16	100%	40	18	9	3	16	46	9
	Total	Unable	3	18%	-4	6	2	0	2	10	2
		Subsistence	4	24%	1	2	1	3	4	10	0
		Able	10	59%	44	12	8	0	11	31	7
		Total	17	100%	42	20	11	3	17	51	9
Prey Kabas	Youth HH	No	19	59%	-35.22	36	0	1	4	41	34
		Subsistence	4	13%	2.43	8	0	0	1	9	7
		Yes	9	28%	24.96	17	2	1	2	22	19
		Total	32	100%	-7.83	61	2	2	7	72	60
	Adult HH	No	38	60%	-66.73	40	14	1	40	95	29
		Subsistence	9	14%	4.16	8	1	4	10	23	3
		Yes	16	25%	54.67	17	8	1	22	48	15
		Total	63	100%	-7.90	65	23	6	72	166	47
	Total	No	57	60%	-101.95	76	14	2	44	136	63
		Subsistence	13	14%	6.59	16	1	4	11	32	10
		Yes	25	26%	79.63	34	10	2	24	70	34
		Total	95	100%	-15.74	126	25	8	79	238	107

Case 352: PB-3: AH-adult household

Mr. D, 54 years old and his wife 49 year sold are living in Ou village, Prey Kabas commune. This household is better off. They got married during Pol Pot regime. After the liberation from the regime, the state distributes 0.18 ha to each of them (0.36 ha all together). However, since land was cheap, they managed to buy additional 0.81 ha more. Beside rice farming, his wife raises pig and poultry. The husband is poultry trader. The main household income is from trading poultry. He has 5 sons. 3 sons already got married and live separately. He manages to buy rice land for each of them 0.22 ha. His last son dropped out from school at grad 9 and he has migrated to Thailand. Currently he borrows from MFI 3000$ for constructing household for last married couple. Another 26 years old son are currently studying at university in Phnom Penh and expect to work in non-farm sectors. His youngest son who migrates to Thailand is expected to come back and settle down in farming after return from migration, and he would be the last person who takes up farm work from parents when they are getting old. This household has capacity to accommodate two more people.





Box 4 Case 352-PB-3-Adult-AH household

4.3.2.3 Capacity youth integration in Otdar Meanchey

Result shows the same pattern that both youth and adult household in the small land and poor resource farm type tend to have less percentage of households that are able to accommodate additional people in to the farm system and more percentage of household below subsistence level.

80% of youth household in OMC-1, 69% of youth household in OMC-2, 75% in OMC-3, and 50% of adult household in OMC-4 are not able to add more people in to the current farming. While 10% in OMC-1, 13% in OMC-2, 14% in OMC-3 and 33% in OMC-4 (of youth household) are subsistence, there are 7% in OMC-1, 19% in OMC-2, 25% in OMC-3 and 33% in OMC-4 are subsistent. 7% in OMC-1, 19% in OMC-2, 0% in OMC-3, and 33% in OMC-4 are able to accommodate at least one more people.

68% of adult household in OMC-1, 42% of adult household in OMC-2, 75% in OMC-3, and 33% of adult household in OMC-4 are not able to add more people in to the current farming. While 9% in OMC-1, 15% in OMC-2, 8% in OMC-3 and 33% in OMC-4 (of adult household) are subsistence, there are 7% in OMC-1, 19% in OMC-2, 25% in OMC-3 and 33% in OMC-4 are subsistent. 23% in OMC-1, 42% in OMC-2, 25% in OMC-3, and 50% in OMC-4 are able to accommodate at least one more people.

In general, in zone Otdar Meanchey, among total 53 youth household, there are 75% of youth household are not able to accommodate additional people, while 13% are subsistence, and 11% are able to add at least one additional person into the farm system. Among total 128 adult household, there are 61% of adult household are not able to accommodate additional people, while 10% are subsistent, and 29% are able are able to add at least one additional person into the farm system.

Considering both youth and adult household, among total 181 farm household in Otdar Meanchey, there are 65% are below subsistence and not able to add more people, 11% are subsistence with the current farming system, and 24% are above subsistence and able to add at least one additional youth into the current farming system (See Table 74).

Table 74 Otdar Meanchey youth integration capacity

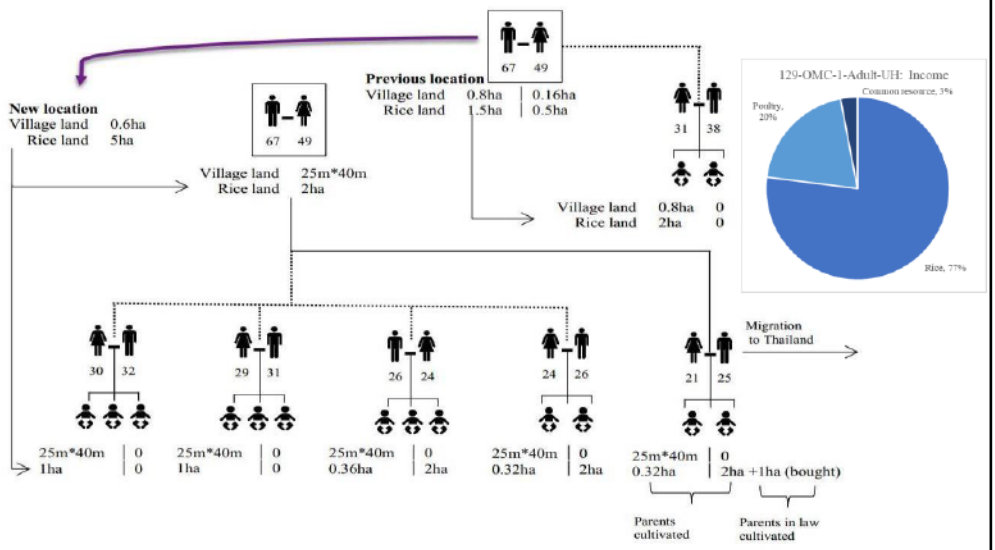
Farm type	HH	Capacity	Capacity to add			Actual youth current in farming system					
			Number of household	%	Number of person to be added	Youth Farming	Youth Migration	Youth Non-farming	Youth Studying	Youth total	Under youth
OMC-1	Youth HH	Unable	25	83%	-71	49	4	0	2	55	42
		Subsistence	3	10%	2	6	0	0	0	6	6
		Able	2	7%	9	3	0	1	2	6	1
		Total	30	100%	-61	58	4	1	4	67	49
	Adult HH	Unable	55	68%	-140	106	25	4	14	149	67
		Subsistence	7	9%	4	11	5	1	2	19	6
		Able	19	23%	58	23	13	9	17	62	25
		Total	81	100%	-78	140	43	14	33	230	98
	Total	Unable	80	72%	-211	155	29	4	16	204	109
		Subsistence	10	9%	5	17	5	1	2	25	12
		Able	21	19%	66	26	13	10	19	68	26
		Total	111	100%	-139	198	47	15	37	297	147
OMC-2	Youth HH	Unable	11	69%	-16	21	1	1	3	26	25
		Subsistence	2	13%	1	3	0	1	0	4	3
		Able	3	19%	8	5	0	1	0	6	7
		Total	16	100%	-7	29	1	3	3	36	35
	Adult HH	Unable	14	42%	-18	18	7	1	10	36	23
		Subsistence	5	15%	2	10	2	2	2	16	11
		Able	14	42%	65	21	7	4	17	49	15
		Total	33	100%	49	49	16	7	29	101	49
	Total	Unable	25	51%	-34	39	8	2	13	62	48
		Subsistence	7	14%	3	13	2	3	2	20	14
		Able	17	35%	73	26	7	5	17	55	22
		Total	49	100%	43	78	17	10	32	137	84
OMC-3	Youth HH	Unable	3	75%	-6	5	0	1	0	6	4
		Subsistence	1	25%	0	2	0	0	0	2	3
		Total	4	100%	-5	7	0	1	0	8	7
	Adult HH	Unable	8	67%	-25	6	8	0	2	16	14
		Subsistence	1	8%	1	0	0	0	0	0	3
		Able	3	25%	10	3	1	2	0	6	8
		Total	12	100%	-14	9	9	2	2	22	25
	Total	Unable	11	69%	-30	11	8	1	2	22	18
		Subsistence	2	13%	1	2	0	0	0	2	6
		Able	3	19%	10	3	1	2	0	6	8
		Total	16	100%	-20	16	9	3	2	30	32
OMC-4	Youth HH	Unable	1	33%	-3	2	0	0	0	2	2
		Subsistence	1	33%	0	2	0	0	0	2	1
		Able	1	33%	12	2	0	0	0	2	1
		Total	3	100%	9	6	0	0	0	6	4
	Adult HH	Unable	1	50%	-3	1	0	0	0	1	3
		Able	1	50%	2	0	0	0	2	2	2
		Total	2	100%	0	1	0	0	2	3	5
	Total	Unable	2	40%	-6	3	0	0	0	3	5
		Subsistence	1	20%	0	2	0	0	0	2	1
		Able	2	40%	14	2	0	0	2	4	3
		Total	5	100%	9	7	0	0	2	9	9
Otdar Meanchey	Youth HH	No	40	75%	-95.51	77	5	2	5	89	73
		Subsistence	7	13%	3.48	13	0	1	0	14	13
		Yes	6	11%	28.30	10	0	2	2	14	9
		Total	53	100%	-63.73	100	5	5	7	117	95
	Adult HH	No	78	61%	-185.27	131	40	5	26	202	107
		Subsistence	13	10%	7.02	21	7	3	4	35	20
		Yes	37	29%	134.91	47	21	15	36	119	50
		Total	128	100%	-43.34	199	68	23	66	356	177
	Total	No	118	65%	-280.78	208	45	7	31	291	180
		Subsistence	20	11%	10.49	34	7	4	4	49	33
		Yes	43	24%	163.21	57	21	17	38	133	59
		Total	181	100%	-107.07	299	73	28	73	473	272

OMC case 129-OMC-1-Adult-UH

Mr. E, 67 years old, wife 49 years old. The analysis of household economic shows that this household are in the situation that is no able to add more additional youth into the farm system. The family has no non-farm activities but last married daughter migrated to Thailand. The family did not borrow money from any lender.

He came to settle in this village in 1997. Before he came here, he used to live in Preah Net Preah district of Banteay Meanchey province. He lived there for one year then he moved to Kok Svay village of Phum Thmeny commune, Thmar Pouk district, Banteay Meanchey province. In 1997, he moved to Kantouy Choun village, Beng commune, Banteay Ampil district, Otdar Meanchey province where he tried to get more new land. In the previous location, Kok Svay village, he has 2 ha of rice land and 5 Ria of village land. Ria is a local scale measurement using in northwest province of Cambodia. 1 Ria is equal to 0.16 ha (40m*40m). These lands are given to elder daughter. The family moved to Kantouy Choun village and occupied land there 5 ha and 0.6 ha of residential land. This land is for sharing to children at their marriage. The family land share is illustrated in the diagram below. The dot line refers to children who already get married and live separately from parents. The dark line is the married family that has connected with parents. Land below the family indicates the land share from the bride and the groom side at their marriage. The last daughter's family migrated to Thailand by leaving their two children with parents in law. Therefore, their rice land of 2 ha is kept for parents to cultivate and 1 ha is for parents in law to cultivate. Currently, parents cultivate on 4.32 ha. Some of the yield is share to parent in law given that their grandchildren are living with parents in law. Purpose of migration is to save money to buy two-wheel tractors. The parents shared the impression that with the 3 ha of cultivated land that the young migrate couple has plus the saving from migration to Thailand, it may be enough for them to save to buy the tractor. The tractor will be used to serve not only the last couple family but also the parents, parents in law and other four couples residing in the same village.

He shares the view on farming that "farming is very hard because if it is good we have everything, but if it is not good, we borrow to buy everything. Farming is difficult but if our children fail in studying, then, what else we can do besides farming? That is why if we abandon rice farming, life will be difficult. That is why having rice farming is always good. I move to new area to get more land to secure the future work for my children. If we don't farm, we will be very poor and starved!

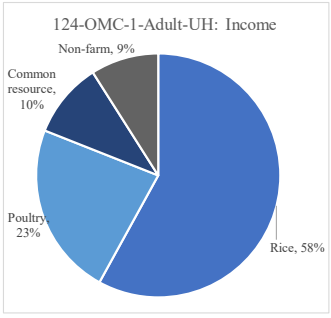


Box 5 Case 129-OMC-1-Adult-UH story of household settle in zone poineer

OMC case 124: OMC-1-Adul-UH

Mrs. F, 54 years old woman and her husband 53 years old are living in Kantouy Choun village. Her ancestor used to live in this village since 1962-63. During the Khmer Rouge regime, her family migrate to live in Beng village. After liberation, the family moved to Prasat Bey village. At her marriage, she got 1ha of rice land from the groom side and 0.32ha of village land from bride side in Thmar Pouk district, Kok Svay village. The family has 5 children. However, both 1ha of rice land and 0.32ha village land were distributed two eldest sons. The family, then, decided to bring the rest of the 3 children to settle in Kantouy Choun village in 2001. There, the family occupied 4ha land for rice cultivation. About the same time, the family also bought 1 ha of forest land for doing Chamkar, cassava. And she still has one more ha of forest land which was distribute last year (in 2011) to the villager arrange by local authorities (village and commune arrangement). The remained 1ha of land was just cleared this year by hiring tractor cost 5500Bath (155USD/ha) but not cultivated. Among 3 children, none of them have access to education. 27 years old daughter got married to 33 years old man but do not have children. They got 1ha of rice land from parents and small village land about 0.1ha nearby parent's land. 24 years old daughter got married to 23 years old man and having baby girl of 2 months old. They also got 1ha of land from parents with 0.1ha village land near by parents. However, both families have been migrated to Thailand last years and just come back to village this year. The objective is the earn money to pay back debt that the parents borrowed to buy new two-wheel tractor for serving agricultural purpose. The last 19 years old daughter who is single is also get 1ha of rice land. Right now, the family has one old two wheel-tractor and new two wheel-tractors, which have to be used and share among five families (2 son families, 2 young married families and parent family). To get new two-wheel tractor parent's family have to sell 1 cow, using money getting from dowry, sell rice product and borrow 30000 Bath (847UDS) from micro finance in order to buy new two wheel-tractor cost 106000Bath (2990USD). The family said that the reason that family did not use all land for cultivation because the family does not have enough capital to clear the land as well as to invest. In order to get 1ha of forest-cleared land ready for cultivation, it is very, very hard and time consuming, Mrs. F stressed.

The family also harvest common resources such as wild fruit, wild vegetable, mush room, wild rhizome and frog for both income and household consumption but the family said that those common resources are dramatically decline because the expansion of land clearance for growing rice and annual crops particularly cassava. During April and May, the 3 family members buy fresh cassava from nearby villages to dry out and sell for profit. In June, two family members spend total 7 days working as agricultural wage labor with local rate of 14000Riel/person/day approximately 3.5USD/person/day. When asking is it easy to find non-farm or off-farm job, Mrs. F reported that it is not that easy because the opportunity is not available all the time but seasonal like her case, the family member can work only 7 days per year. If one has to rely on this kind of job, one will be starved because one will not get enough to eat. That is why the family view agriculture is good option. However, Mrs. F added that it is not easy to start agricultural work drawing from her and others' experience of how hard it is to get 1 ha of cultivated land clear from the forest.

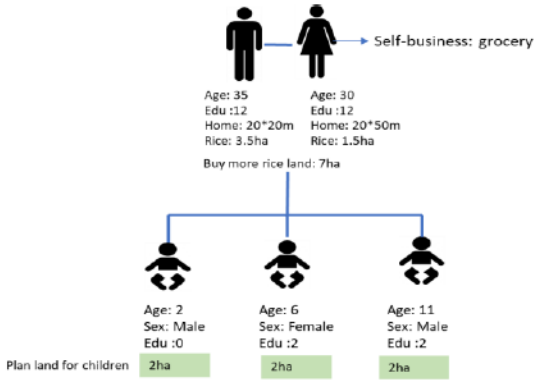


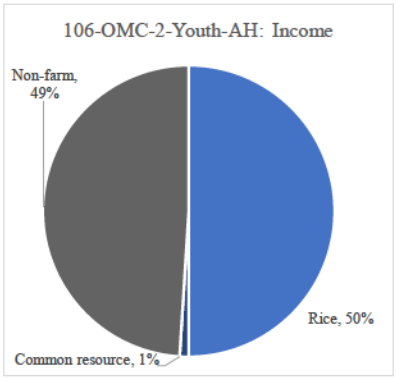
Box 6 Case 124-OMC-1-Adult-UH: Youth integration in Otdar Meanchey

Case 106-OMC-2-Youth HH-AH

This is the case of youth household having capacity to add more family member in Otdar Meanchey.

Mr. G is 35 years old now. His wife is 30 years old selling grocery in front of house. This couple got married in year 2000. At marriage, the couple got land share amount 3.5ha of rice land from groom side and 1.5ha of rice land from bride side (see figure household composition below). Mr. graduate high school. Thanks to his knowledge, he used to work for NGO and current he is deputy chief of community forestry in his village. He managed to buy additional agricultural land 7ha. Currently he owns 12ha of rice land. He has three children. The eldest is 11 years old. He does not want his children to do farm work because it is hard job. He wants his children to study and get job in non-farm activities. However, he plans to share land 2ha to each child for securing their future in case they do not do well in study and drop out.





Box 7 Case 106-OMC-2-Youth HH-AH

In all three zones, result shows that among the total 372 households, there are 232 households account for 63 percent of farm household are not able to accommodate one more youth while the other 45 households accounts for 12 percent are subsistence with the current family. 25% of household that is able to add at least one addition al youth. Among those 63 percent unable household, they are actually accommodating 62% of total youth with the same category while 17% of youth migration, 2% of youth engaging in non-farm activities and 19% of youth studying. While total capacity of those unable household is -502 persons, the current total youth is 549 persons in which 339 youth are working on farming, 95 persons on migration 11 persons doing non-farm activities and 104 persons currently studying plus 308 under youth whom these households need to take care. This suggests that majority of rural household are currently facing the challenge in accommodating youth and the growth family member while their farm capacity is in critical situation of below the average poverty

threshold per household (See Table 75). For detail capacity in all zone by youth and adult household, please see Appendix – 09 Youth integration capacity by zone by youth adult household *(page 328).*

Table 75 Summary youth integration capacity in the three study areas

Capacity	Number of household	%	Number of person to be added	Youth Farming	Youth Migration	Youth Non-farming	Youth Studying	Youth total	Under youth
No	233	63%	-502.10	339	95	11	104	549	308
				62%	17%	2%	19%	100%	
Subsistence	45	12%	21.91	60	17	12	21	110	56
				55%	15%	11%	19%	100%	
Yes	94	25%	345.70	108	49	24	87	268	115
				40%	18%	9%	32%	100%	
Total	372	100%	-134.49	507	161	47	212	927	479
				55%	17%	5%	23%	100%	

4.3.3 Economic capacity of youth integration in each farm type

4.3.3.1 Zone Tram Kak

Having seen the different capacity of each farm type by youth and adult household, the economic capacity of each both household in each farm type have been further examined.

Result shows that youth and adult household who is in the situation of not able to accommodate more youth are in fact those below the poverty threshold with the earning capacity from both farm and non-farm income below 1150$/year/household. Youth unable households have average annual income of 714$ in TK-1, 968$ in TK-2, and 1150$ in TK-3. Adult unable households have the average annual income 805$ in TK-1, 938$ in TK-2 and 1114$ in TK-3.

The subsistence households have the annual income from 1550$ to 1700$. Youth subsistent household have average income 1550$ in TK-2 and 1570$ in TK-3, while there is no subsistent youth household din TK-1. Adult subsistent household has average income 1637$ in TK-1, 1700$ in TK-2 and 1584$ in TK-3.

The able household has the annual income above 2073$. Youth able household have average income 2500$ in TK-1, 2420$ in TK-2 and 2073$ in TK-3. Adult able household have average income 3160$ in TK-1, 2622$ in TK-2 and 2820$ in TK-3 (Figure 39).

In all cases, non-farm income and migration income contribute to total household income and determine the capacity of each household to accommodate additional people. Usually household having high non-farm and migration has high capacity to add more people except adult able household in TK-2 and TK-3 whose farm income alone is able to add more people thank to the degree of diversification animal (pig, poultry, fish, cattle), vegetable, annual crop.

Adult able household in TK-1 has 59% of non-farm income, and 7% of migration income to total household income. Farming contributes only 34% to household income where major source is from cattle and animal production. By looking at the source of non-farm income (Figure 40), those 66% of non-farm income (59%+7%) are coming from self-business high income 58%, 31% from salary high income and 10% from migration (consider of 100% of non-farm income). Youth able household in the same TK-1 has 32% of income from non-farm activities and 54% of income from migration contributed to total non-farm income. Considering this 56% (32% plus 54%) as 100%, we can see that 63% of income from migration, 32% from self-business high income and 5% from labor based work.

Adult able household in TK-2 is remarkable due to the contribution of farm income alone is enough to add more people. Farming contribute 86% of total income where 17% come from rice, 8% from annual crops, 6% from vegetable, 5% from fruit tree, 12% from common resource, 7% from cattle, 31% from animal production. Non-farm income contributes only 14% where 91% from self-business low income and salaried high income. Youth able household in the same farm type has 16% income from rice, 8% from cattle and 75% from non-farm income in which 100% of this non-farm income is coming from self-business high income.

Adult able household in TK-3 has the same pattern to adult able household in TK-2. 75% of income is coming from farming where 31% is from rice 1% from AC, 4% from VG, 2% from fruit free, 14% from cattle and 23% from animal production. Total non-farm income contributes 25% in which 10% from nonfarm activities and 15% from migration. Youth household in the same farm type have 75% of income from farming where 27% from rice, 11% from AC, 1% from VG, 6% from CR, 10% from cattle, 20% from animal production and 25% from non-farm income (86% from salary high and 14% self-business low).

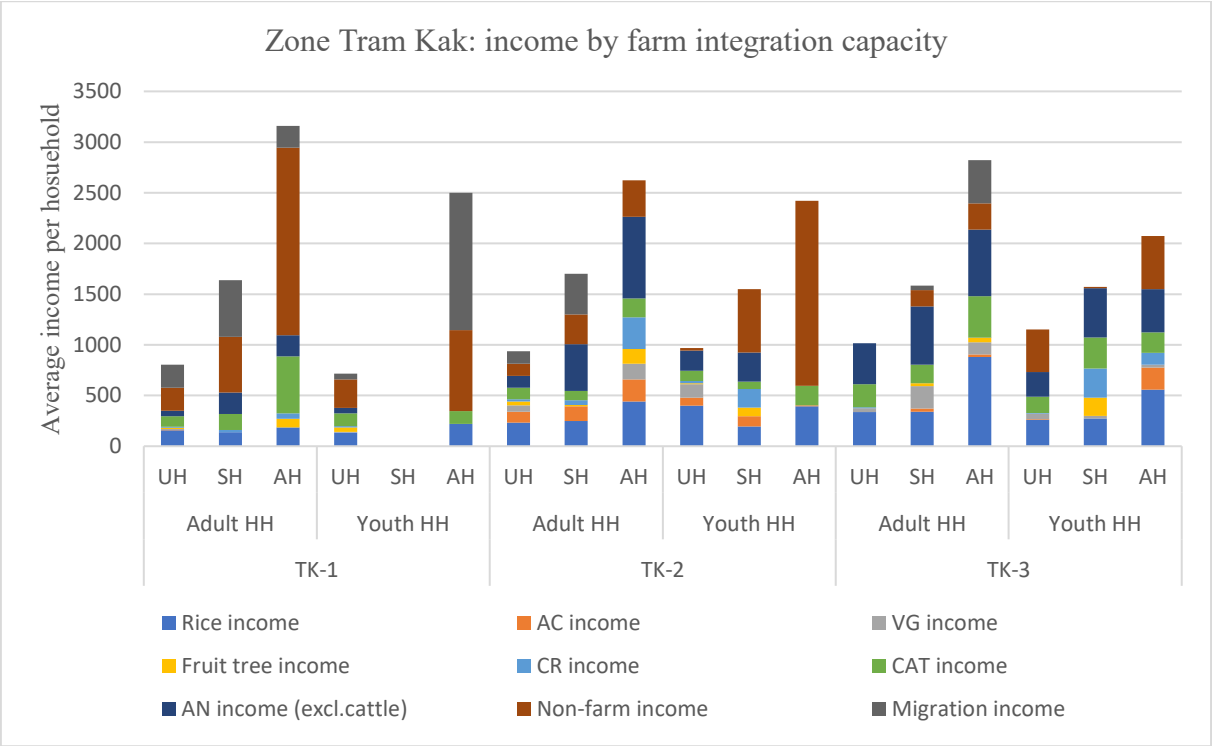


Figure 39 TK-Income of youth and adult household by farm type and by integration capacity

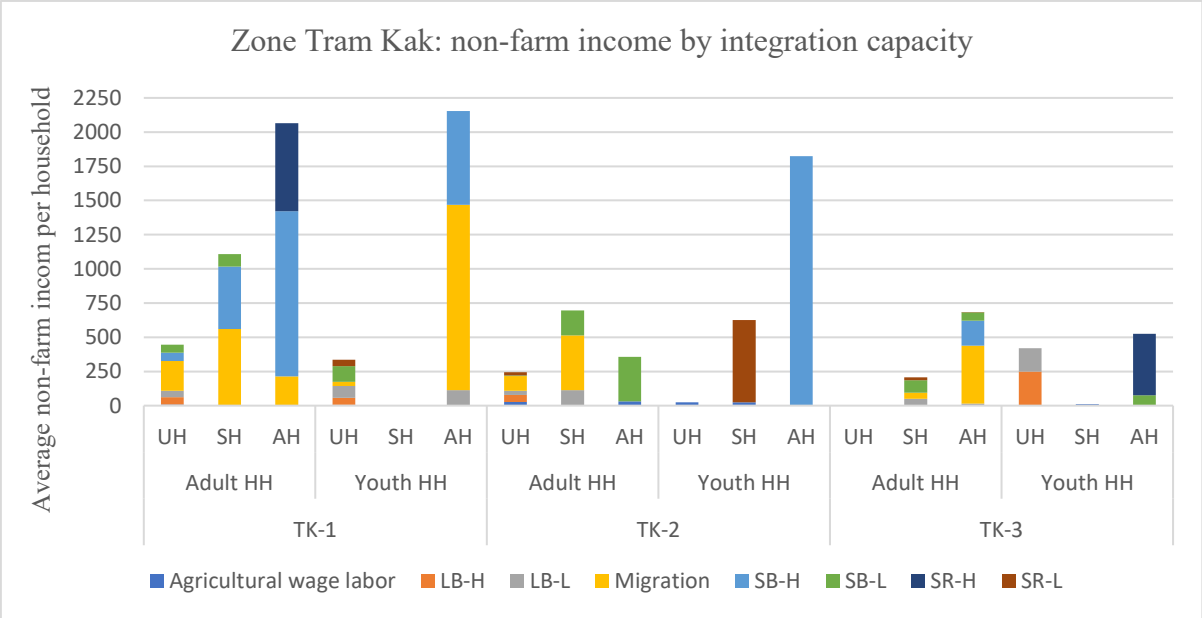


Figure 40 TK Non-farm incomes of youth and adult household by farm type and by integration capacity

We can see that both able youth and adult household combine self-business and migration for making additional income to farm family in poor resource farm type (TK-1). However, there is tendency that adult household tend to have more percentage of contribution from non-farm activities while youth tend to have more percentage of contribution from migration. In the medium resource household and rich resource household (TK-2 and TK-3), able youth and adult household tend to make additional income from self-business.

4.3.3.2 Zone Prey Kabas

Household who is in the situation of not able to add one additional person into farming system has an average income below 1711$, while subsistent household have an average income between 2502$ to 2663$. The able households have average income from 2951$.

In PB-1, adult able household have annual average income of 2951$ where 16% of income from non-farm activities, 24% from migration, 30% from rice, 2% from common resources, 7% from cattle and 23% from animal production.

Youth and adult able household in PB-2 and PB-3 have farm capacity to add one additional people even without additional non-farm activities given that it agricultural income alone is above the subsistence level. It is remarkable that this agricultural income beside rice, the major contribution to this capacity is cattle income and the animal production (pig and poultry).

Adult able household in PB-2 have average income of 3386$ where 55% of income is from rice, 9% from cattle, 30% from animal production and 6% from non-farm income. Youth able household in the same farm type have average income of 3706$ where 68% from rice, 5% from cattle, 16% from animal production, and 11% from non-farm activities. This 11% of non-farm activities, are mainly come from self-business high (57%), self-business low (19%) labor based low income (15%) and 10% from agricultural wage labor.

Adult able household in PB-3 have average income of 4728$ where 43% from rice, 1% from fruit tree, 18% from cattle 12% from animal production, 21% from non-farm income and 1% from migration. The 22% of total non-farm income (21% plus 1%) is coming from 11% agricultural wage labor, 1% from labor base low income, 6% from migration, 11% from self-business low income, 11% from self-business high income and 2% from salary low income. Youth able household have average income of 3412$ where 62% come from rice, 5% from common resource, 4% from cattle income, 17% from animal income, 1% from non-farm activities and 11%from migration. The 12% of total non-farm income 4% from agricultural wage labor, 89% from migration and 7% from self-business low income.

In term of land or farm size, there is not significant different between the subsistent and able household. Farm size does not provide clear cut answer what which amount of land that contributes to the capacity to add one additional people into the system. The farm capacity to add one additional people is thank to the combination of farm size, cattle, animal and non-farm activities (including migration) (See Figure 41 and Figure 42).

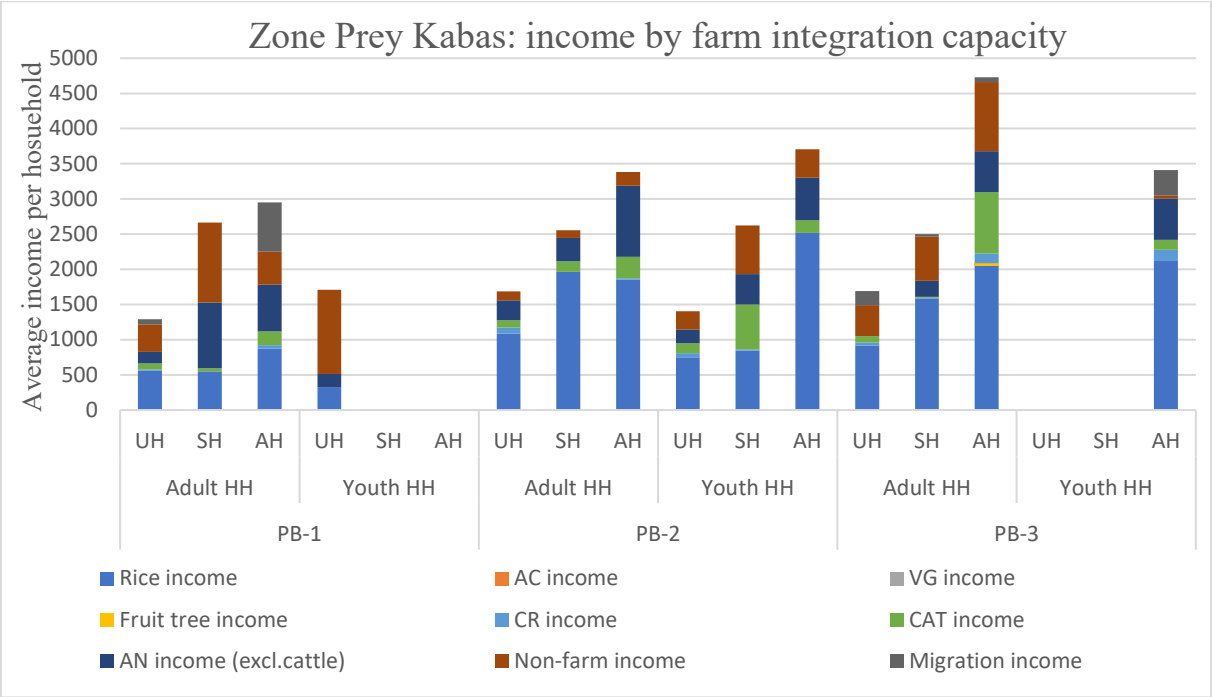


Figure 41 PB-Income of youth and adult household by farm type and by integration capacity

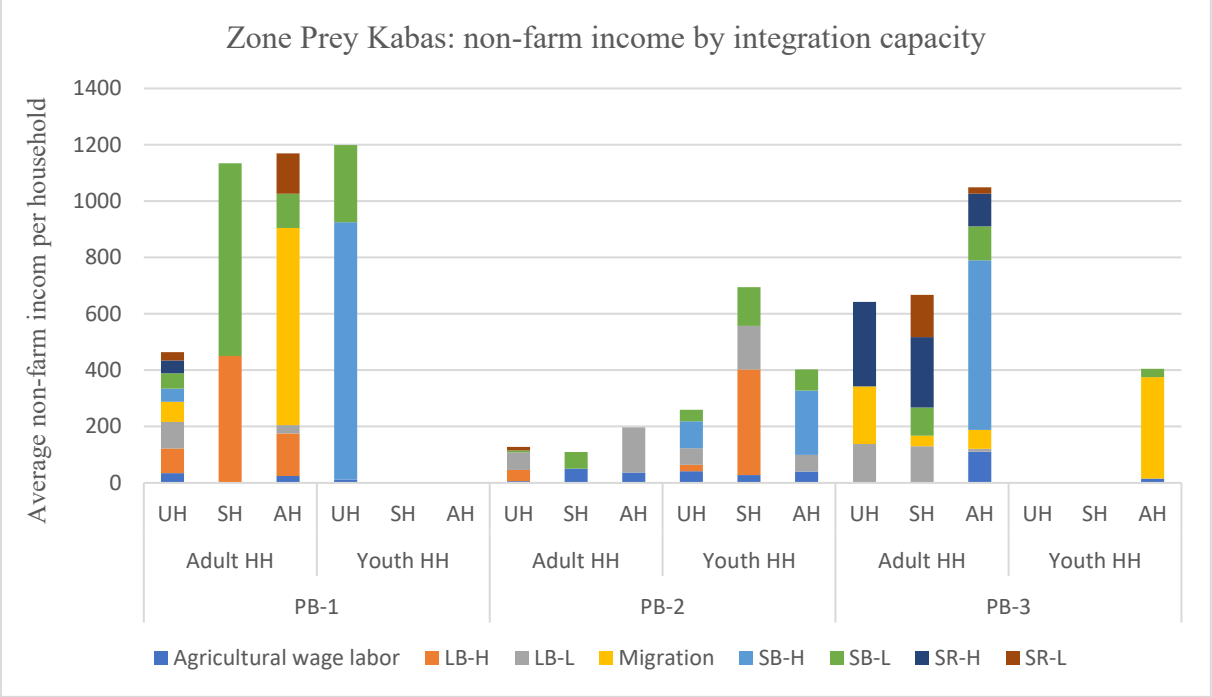


Figure 42 PB Non-farm incomes of youth and adult household by farm type and by integration capacity

4.3.3.3 Zone Otdar Meanchey

In Otdar Meanchey, result shows that household that are in the situation of not able to add one additional member in to the family farming are those with average annual income below 1428$. The subsistent household are those with average annual income between 1998$ and 2217$. The households having capacity to accommodate one additional people are those having average annual income more than 2666$ (Figure 43 and Figure 44).

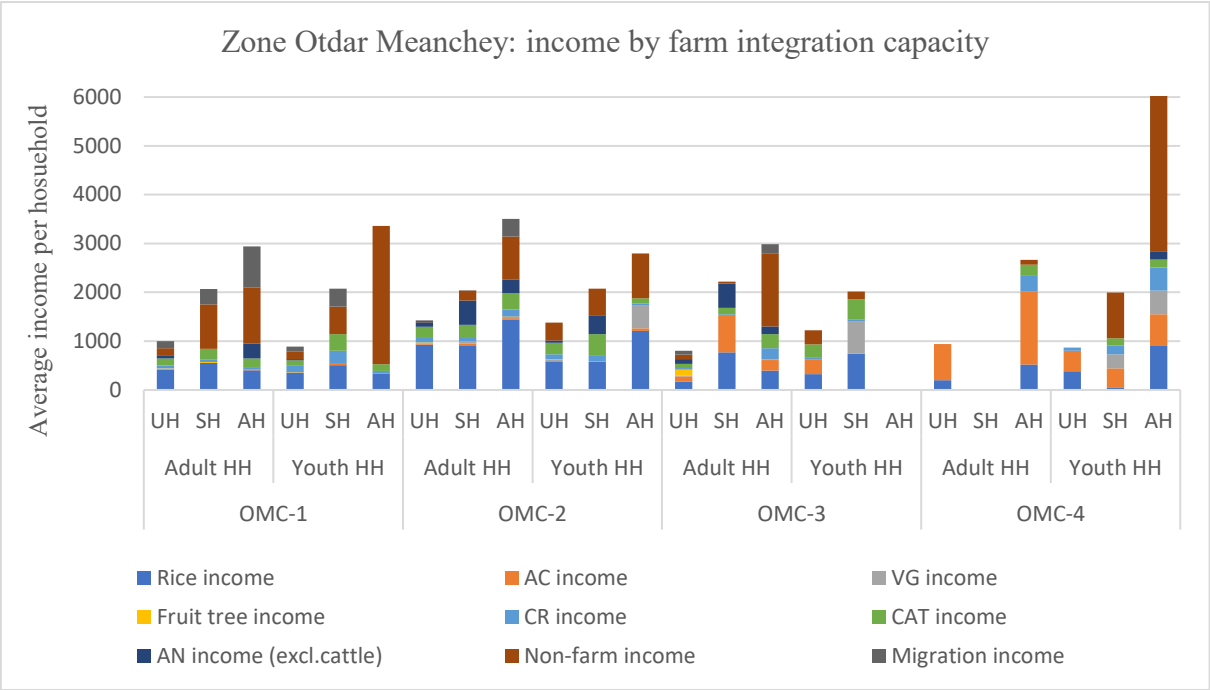


Figure 43 OMC-Income of youth and adult household by farm type and by integration capacity

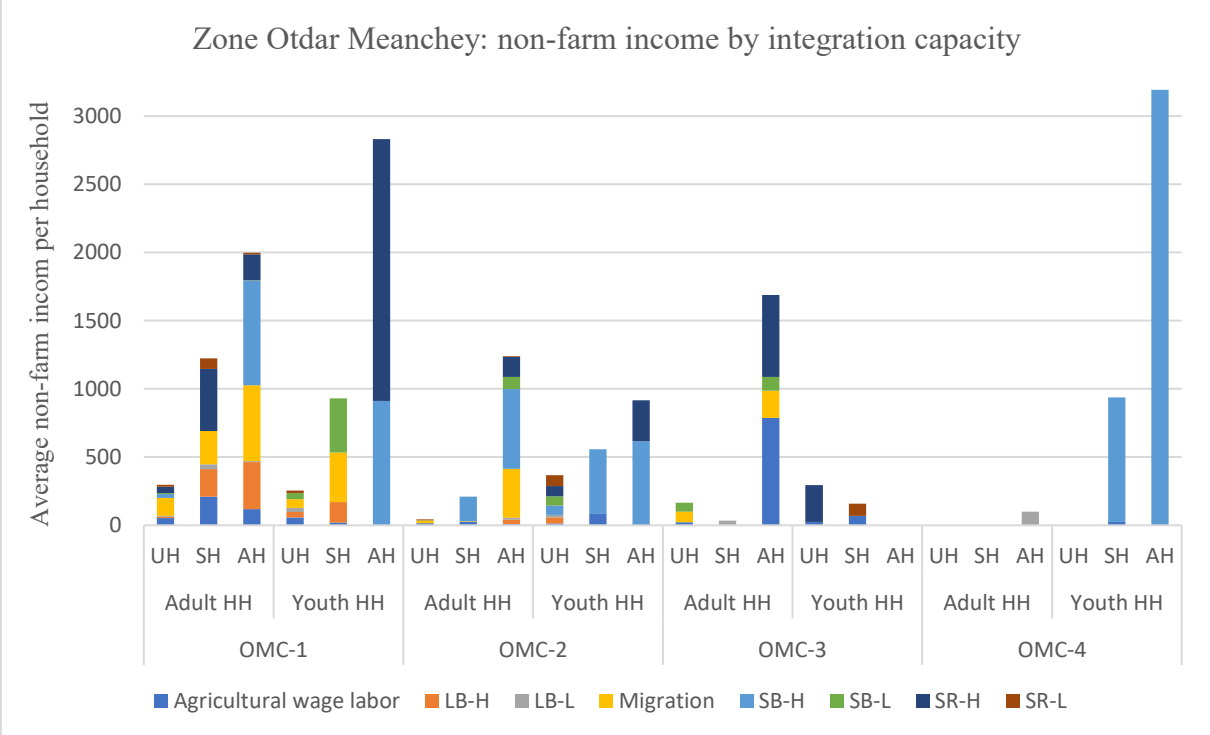


Figure 44 OMC Non-farm incomes of youth and adult household by farm type and by integration capacity

Adult able household in OMC-1 has annual average income of 2942$ where 14% coming from rice, 1% from annual crops, 2% from common resources, 6% from cattle, 10% from animal production, 39% from non-farm activities and 29% from migration activities. Consider both non-farm and migration as total non-farm income; this 68% of non-farm income is coming from agricultural wage labor (6%), Labor based high income (17%),

migration (28%), self-business high income (38%), and salary high income (10%). Youth able household in the same farm type have average annual earning 3363$ where 14% from rice, 1% from common resource, 4% from cattle and 84% from non-farm income. This 84% of total non-farm income is coming from self-business high income 32% and salary high income 68%.

Adult able household in OMC-2 has annual average income of 3503$ where 41% of income come from rice, 1% from annual crops, 1% from vegetable, 4% from common resources, 10% from cattle, 8% from animal production, 25% from non-farm activities and 10% from migration activities. Consider both non-farm and migration as total non-farm activities, this 25% total non-farm income is coming from agricultural wage labor (1%), labor-based work 4% (LB-H: 3%, LB-L:1%), migration (29%), self-business high income (47%), labor base low income (7%) and salary high income (12%). Youth able household in the same farm type have average annual income 2797$ where 43% of total income is from rice, 2% from annual crops, 17% from vegetable, 2% from common resources, 4% from cattle income and 33% from non-farm income. This 33% non-farm income is contributed from agricultural wage labor 1%, self-business high income 66% and salary high income 33%.

Adult able household in OMC-3 has annual average income of 2989$ where 13% come from rice, 7% from annual crops, 8% from common resource, 10% from cattle 5% from animal production, 50% from non-farm income and 7% from migration income. Both non-farm and migration income contribute total non-farm income 57% where 47% come from agricultural wage labor, 12% from migration, 6% from self-business low income and 36% from salary high. There is not youth able household in this farm type.

Adult able household in OMC-4 has annual average income of 2666$ where 20% of income come from rice, 56% come from annual crops, 12% come from common resources, 9% from cattle, and 4% come from non-farm income. This 4% of non-farm income is contributed by labor based work low income accounted 100% of total non-farm income. Youth able household in the same farm type have average annual income of 6025$ where 15% of income is from rice, 11% from annual crops, 8% from vegetable, 8% from common resources, 3% from cattle, 3% animal production, and 53% from non-farm income. This non-farm income (53%), 100% is coming from self-business high income.

In general, household in poor resource and small land like OMC-1, the subsistence and capacity to add more people is strongly depend on the degree of generation of income from non-farm activities. Self-business high income, migration, and salary high income are the main contribution to total non-farm income where both youth and adult household access

to. From the farming activities, rice alone is not the key activities determine capacity. It is obvious that cattle and animal production play role in adding value to farm capacity to accommodate additional people. Therefore, like the previous two zones, the degree of diversification of income from both farm and no-farm income determine the capacity of youth and adult household to accommodate future people to be added into the farming system.

4.4 Household strategy for future youth

4.4.1 Investment in children education

Due to the situation of land size, linking to the land distribution in early 1980s, people in Tram Kak and Prey Kabas share the same understanding that children born in late 1980s have no land quota distribute by the state designed by actually family member at the point of time land distributed. Parents often motivate children to do well in education so that they can mobility resource particularly borrowing from micro finance institution to support children education. If children do not perform well in education, i.e. fail to pass high school exam, hence the last resort is only farming with parent on the existing small land and wait for opportunity to out migration for non-farm activities. Children education is expensive and cost almost the gross value added earn from both farm and non-farm income of the farm household. That is why borrowing is the only mean to support children studying higher education. The field observation, zone Prey Kabas where rice is intensified, this zone has the highest number of youth perusing university in Phnom Penh. Selling agricultural land to support children perusing education at university level, even not many households, but is typically found in zone Prey Kabas (6 households) and minor in zone Otdar Meanchey (1 household) while it is not the case in Tram Kak.

There is some form of sacrifice of family member to drop out in order to seek non-farm work or to migrate among family member in order to help lifting family situation and thereby investing on education of some particular family member. There is no discrimination among male and female who sacrificed. It is very much depending on who is doing well and not in education. Even the distribution of family member who drop out and go on migration shown that they are both man and woman, my impression from the qualitative interview suggest that women tend to sacrifice to drop out to take up farm work, or to migrate to do non-farm work such as garment factory worker to support man family member who still studying high school or continuing higher education.

The investment in children education also take the form of borrowing from micro finance institution especially when children need to pursue higher education at university such as paying school fee (in case that children did not get scholarship), living costs and other cost and sending rice and agricultural product from home village.

However, the cost investment is expensive to rural that not many of them could afford. Based on the cost for education per children at university, it is cost more than the average annual household income in of household in TK-1 115% of 1031USD/year, 85% of annual income of TK-2 (1403USD/year), 54% of annual income of TK-3 (2213USD/year). In the Prey Kabas, the cost for investment compare to annual average household income would 72% of annual income of household in PB-1, 52% of PB-2 and 33% of PB-3. In Otdar Meanchey, the cost of investment on children higher education will be 63% of annual income of OMC-1, 39% of OMC-2, 61% of OMC-3 and 37% of OMC-4.

Table 76 The average cost of expense on education per child at different level by household

Zone	University cost			High school per person	Secondary school per person	Primary school per person
	University living allowance/year/person	University fee/year/person	University per person			
Otdar Meanchey	502	480	982	170	128	33
Prey Kabas	851	437	1288	168	168	51
Tam Kak	840	350	1190	224	138	41
Grand Total	781	425	1206	187	147	37

If this amount of expense on education can be lower if children do well in education and get the scholarship for university fee. Hence households need to expense on living allowance for children. The cost will be reduced if there is social network such as relative or previous migrant who live and work in the capital that can accommodate and support children studying university.

Across comparison between the zone, among household having youth attending school, only zone Prey Kabas having high percentage of household that have children studying at university level. Among 69% of household having youth studying, 26% having youth studying at university, 18% studying high school, 23% studying secondary school and 3% of youth studying primary school. In Tram Kak, among 36% household having youth at school, there are only 4% having children studying university. In Otdar Meanchey among, 57% of household having children at school there is only 7% of household having children studying at university. These household is distributing divers across farm type which provide no clear-cut answer that which farm type have more children studying university.

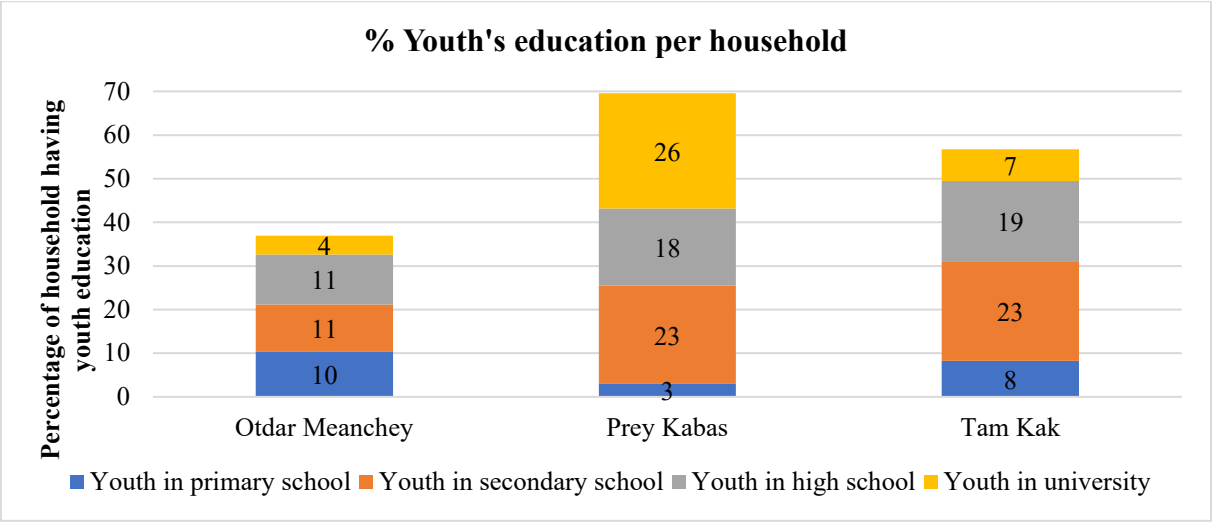


Figure 45 Percentage of household having youth access to education by level of education

4.4.2 Integration into farming under the MSI

There will be more youth have to install in farming. It is very unlikely for household in the poor farm type whose land is small particularly in TK-1, PB-1 and OMC-1. However, given the pattern of land share is 0.18ha or 0.20 ha in Tram Kak and Prey Kabas, it is likely that household in TK-2, TK-3, PB-2 and PB-3 whose land is more than 1 ha is going to sub-divide for children who fail education under to moral obligation of *"sharing the survival"*.

In Otdar Meanchey many youths did not access to school or drop out at mainly primary and secondary school. Parents are motivated to secure the future of their children by preparing agricultural land for sub-division.

In many cases highlighted in the box as well as the observation from the qualitative interview reveal that thought household currently have single youth, but some households already facilitated integrating youth into farming already and the land is become smaller and smaller. In Tram Kak, family give land to children between 0.1ha and 0.2 ha while in Prey Kabas between 0.18 to 0.22 ha, while in Otdar Meanchey, youth settle farming between 1 and 5 ha dependent on the combination of bride and groom, notably 1 to 2 ha from each side. This amount of land is far below the minimum surface for sustainable integration in farming. Therefore, youths who start farming with this amount of land will have to strongly rely one interaction between the parents support and the migration or combination of non-farm activities. Given educational level of rural youth is low, it will be difficult for them to integrate into high labor productivities non-farm sector but labor based work and low labor productivities work such as garment factory, construction work and other urban services for

those living in Tram Kak and Prey Kabas. And those living in Otdar Meanchey will likely migrate to Thailand.

Table 77 reveals how parents of a household prepare land for sub-dividing to secure future youth to start up farming in Otdar Meanchey. This is the case of subsistent adult household who already support three youths starting farming. The rest of the children are single and all dropped from school. Drop out youths have migrated to Thailand. One drops out youth is working on farm and last child has not yet attended school. Land has been planned 1 ha for each of them given parents anticipate that children will not access high education and, hence, they have no alternative beside settling in farming and therefore and has been prepare for them.

Therefore, there will be many more youth have to settle in farming and there will be a need for more land for future youth.

Table 77 Land plan for sub-divided by household in Otdar Meanchey (case 103)

HH ID	Name	Age	Sex	Relation	Education (grad)	Migration before year interview	Migration the time interview	Village land	Agricultural land
1	Deng	48	F	Housewife	Illiterate	No	No	20m*20m	5ha
2	Vorn	50	M	HH Head	Can read	No	No		
3	Kdey	20	M	Son	4 (drop)	Yes(Thailand)	No (work on farm)	0	1ha (plan)
4	Otdam	18	M	Son	0	Yes(Thailand)	Yes (Thailand, construction work)	0	1ha (plan)
5	Kdeak	16	M	Son	4 (drop)	No	No (work on farm)	0	1ha (plan)
6	Bok	7	M	Son	0 (not yet attend school)	No	No	0	1ha (plan)
3 kids already settle in farming and live separate from parent already.									
7	X1 (has 2 kids)	28	F	Daughter	No school	No	No	20m*20m	2ha
8	X2 (has 2 kids)	25	F	Daughter	2	No	No	20m*20m	2ha
9	X2 (has 2 kids)	30	M	Son	3	Yes	No	20m*20m	2ha

Case-103: OMC-1-Adult-SH

4.4.3 Integration under the form of generation transfer

In Prey Kabas where rice is intensified, the integration of youth is seen to be generation transfer from the old age parents whose working labor are no longer enough to do farming. Therefore, any of children who drop out and fail in seeking non-farm activities take up farming. Among the youth families I interviewed, 5 families meet this kind of farm transfer. Youths take up farming with the support from parents while the other member of the household engages in non-farm activities and share economic responsibility to contribute to household economic of parents.

4.4.4 Migration to zone pioneer to seek for agricultural land

Selling land in high density area to move to zone pioneer in Otdar Meanchey is common strategy of household either by nearby district of the province and from other provinces. For example, during the survey 2 households in Ou Krouch villages of Trapaing Prasat district of Otdar Meanchey is found to come from Tak Keo province. They sold their land in Takeo province and come to buy land in Ou Krouch village. As already mentioned in historical setting of the study area in chapter 3, the story can be represented in the Illustration 4 below. After the peace settlement in 1991, refugee in several camps of liberation forces along the Cambodia-Thailand border were repatriated to Samrong district center where only village land was distributed to repatriated refugees. To survive, those new comers began clear the forest land nearby village. Due to landmine and insecurity, land was clear only small plot between 0.02 and 0.04 ha for just growing rice for survival.

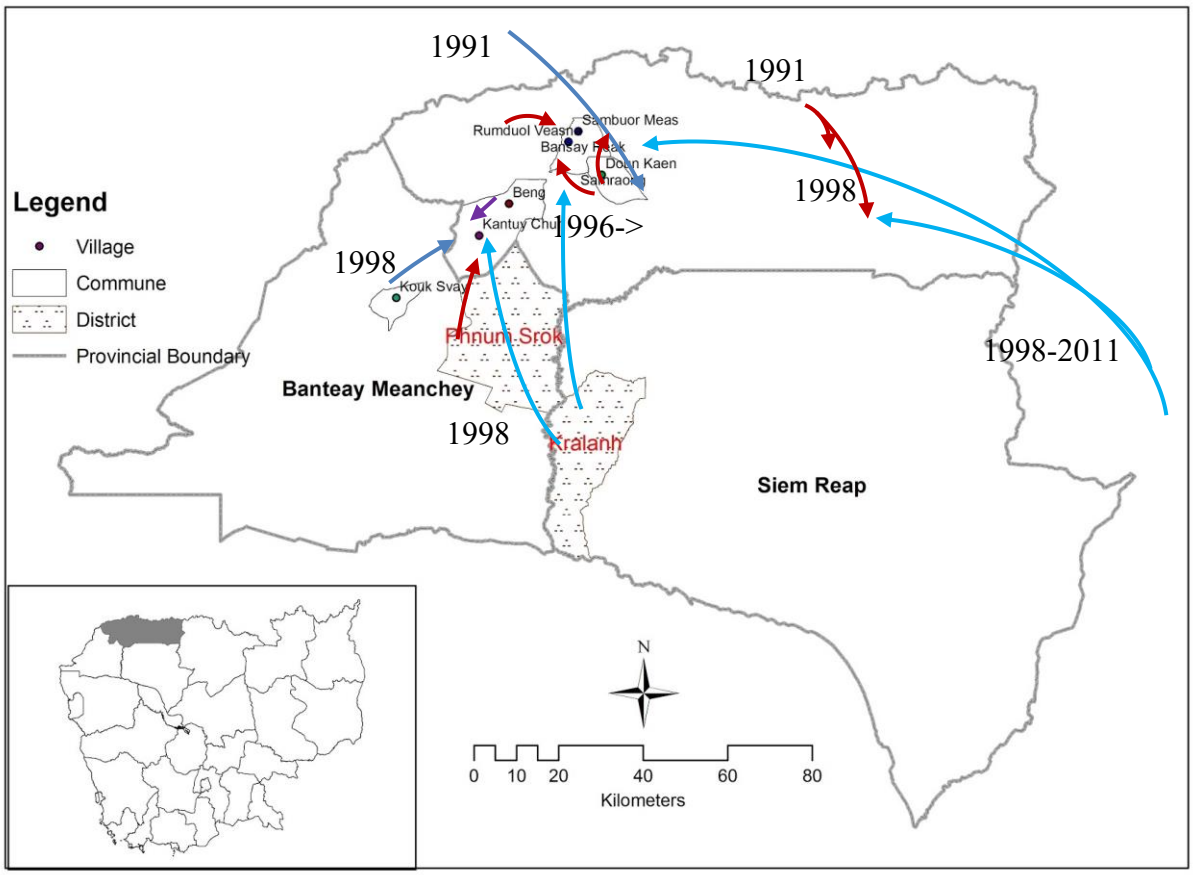


Illustration 4 The movement of settlement in Otdar Meanchey province

Source: drawing based on story told by elders, village chiefs, and key informants in study area of Otdar Meanchey (*cf.* French (2002, p. 332)

Meanwhile, the refugee under the control Khmer rouge come to settle down in Anlong Veng district land were clear based on the available active labor of the family because the

area is full controlled by the Khmer Rouge force. In 1996, the situation is little bit improved and the growing population in Samrong district drive villager to begin clearing land and expand village. For example, Ou Ruessei village were separated into two villages, and villagers in Don Ken and Kam Nop village began to move to Bansay Reak commune which later on Sambour Meas, Romdoul Veasna, Ou Tong village were created. In 1998, the last force of Khmer Rouge in Anlong Veng were surrender and submit to the government, villager in Along Veng began expand land to Trapaing Prasat district. The province was then separated from Sieam Reap province. New city center and municipality were newly constructed displacement and resettlement take place in Somrong district. The movement of people to occupy land began rapidly. People from Kralanh district of Siem Reap province, from Phnom Srok and Kok Svay of Banteay Meanchey moved to occupy land in Katuy Choun village, Beng commune, Banteay Ampil district of Otdar Meanchey. Beng village which is an old populated village began to expand village too. People here also move to Kantuy Chun area under local initiative.

Settlement in new area requires a lot of effort especially forest land clearance *"Hék Dey"*, the common expression in Khmer language. Thank the historical and institutional setting to this area, usually, children did not have access to school due to poverty and, thereby, engage in farming and migration to Thailand. Children migration in this area is expected to accumulate the financial capital to invest in farming such as clearing the remained forest land, buy two-wheel tractor, to buy land. People views that currently land is no longer available for free occupy but land is only available on purchase. The qualitative interview with key informants reveal that the motivation to move to new area is to seek agricultural land in zone pioneer of Otdar Meanchey is for securing the future for the family and for children.

4.4.5 Farm trajectory Tram Kak, Prey Kabas and Otdar Meanchey

The triangulation of farm household economic situation, land situation, migration , education and household story on youth integration, a farm household trajectory in Tram Kak, Prey Kabas and Otdar Meanchey can be summarized and represented in Illustration 5, Illustration 6 and Illustration 7.

In Tram Kak, given the land is very scare, investment on children education is a must for household in this area. If youth fail in education, the only option is migration to garment work or other sectors. Once youth get married, in this case, under the motto of sharing for the survival, parents may manage to share land 0.1 to 0.2 ha to young couple or do not share but

let couple to share household economic with parents but youth have to engage in non-farm or migration activities. However, given the limited access to water and limited capacity to diversify, youth couple with migration experience tend to abandon this mall land for parents and more rely on non-farming or migration activities. Given the situation of poverty, single youth may be forced to drop out and migrate in order to earn additional income to support family. In return, remittance from migration become an investment for future youth's education and as well as for keeping the continuity of rural livelihood. If youth perform well in education and family is able to afford after high school investment, youth may attend university and integrate themselves into salary high income in formal sectors. If youth perform well but household has no financial capacity to support youth to continue higher education, youth may follow the path of previous migrant and migrate for garment work or other non-farm activities. Even though settlement in farming usually take place at point of marriage, however, migrant may have high chance to integrate into non-farm sector and least chance to return to farming. However, this also depend on the couple strategy and land availability of each side of couple. Integration in farming could take place when the parents are too old to farm. In this case, daughter or son who is going to live with parents they are getting old likely to inherit land from parents. Illustration 5 shows the representation of farm household trajectory in Tram Kak.

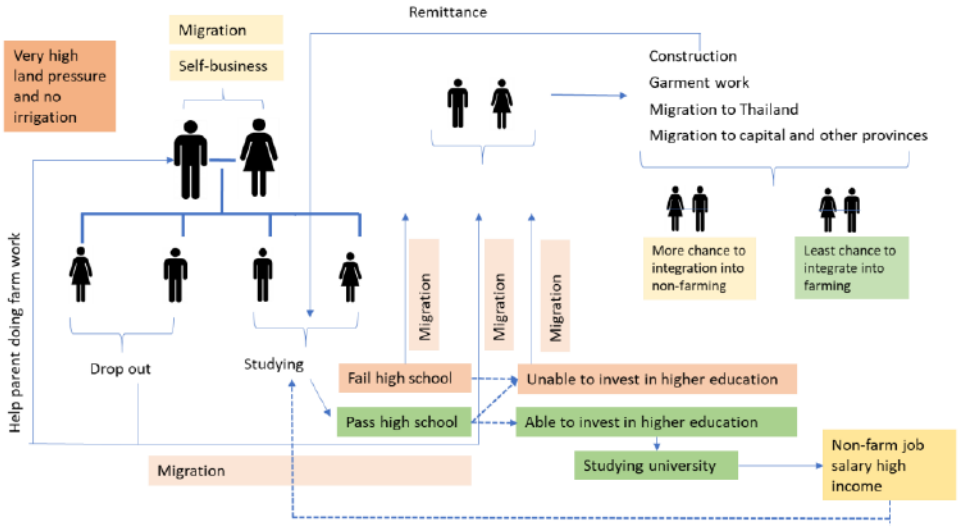


Illustration 5 Representation of farm trajectory in Tram Kak

In Prey Kabas, farm household share the same pattern of trajectory as Tram Kak. However, the present of irrigation and the availability of water receding rice land, some farm families manage to settle children who do not perform well and drop out from school into in farming. Drop out youths help parent working on farming. After working for parent for a while, single youth is likely to married with youth in the same situation in the same village or

the same commune. Both side of parents mobilize resource to support this new couple such as land or lending cultivated land for capital accumulation to buy land. Thank to parent's socio-economic situation which are mainly better off household, migrant youth will have moderate chance to return home and settle in farming and combine farm and non-farm activities. The better off situation of adult household also has high chance for investment on children to pursue university study. Illustration 6 is a representation of farm trajectory in Prey Kabas.

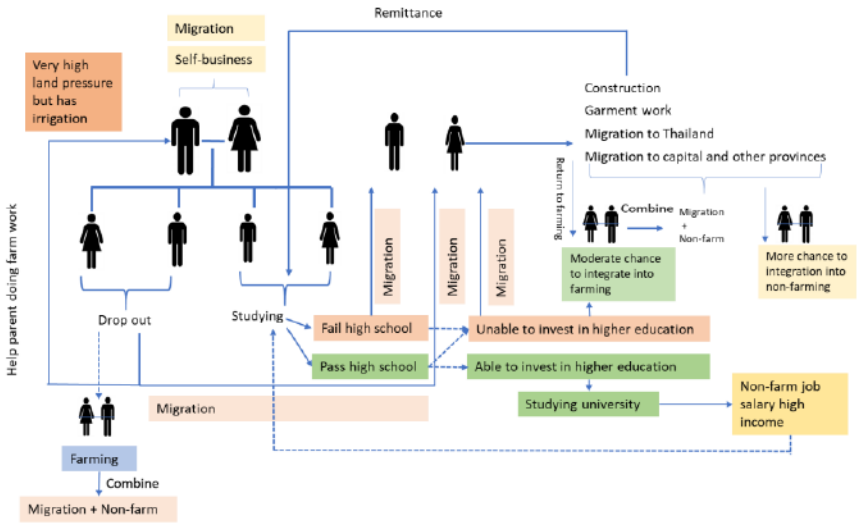


Illustration 6 Representation of farm trajectory in Prey Kabas

In Otdar Meanchey, more youth are going to settle in farming even under the minimum surface for sustainable living given adult household settle in new zone pioneer and occupied more agricultural land. Youth majorly dropped out from school and did not attend school due to generation born in in secure area between 1980s and 1990s. In addition, the remoteness and distance from school also hinder children access to school. This situation drives many youth and rural household member in Otdar Meanchey migrated to Thailand in order to accumulate financial capital to expand land and buy two-wheel tractor which is necessary for farming. The return from migration and getting married is the turning point of rural youth in the area to settle in farming. The current generation of youth settle is going to settle in farming on average between 1 to 2 ha. However, land share is depending on parents' land availability and the combination between the share from bride and groom 's family. Next generation of youth will have to face challenge on land. Illustration 7 is a representation of farm trajectory in Otdar Meanchey.

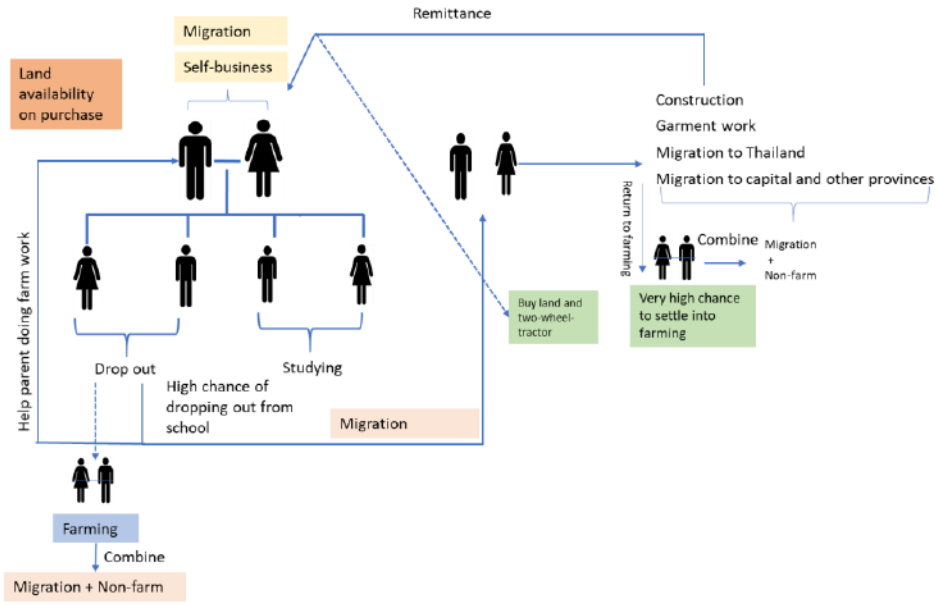


Illustration 7 Representation of farm trajectory in Otdar Meanchey

4.5 Discussion

4.5.1 Factor of enable and unable

Theoretically, land, labor, capital, knowledge and skill and access market are generally considered as the main factors of productions contributed to farm household economic which determine capacity of farm household to be able or not be able to accommodate one additional people in to the farming system. In this study, we are able to test correlation between five variables including total active workers, total farm size, total land index (value of land converted from land productivities utilized on each plot of land) and total agricultural investment (IC and PL) and the capacity of farm (number of person to be added by each household farming system). Result show that there is positive correlation between capacity and total active worker which is statistically significant $r\ (372) = 0.122,\ p < 0.05,\ two\text{-}tailed$. There is also positive correlation between capacity and total farm size which is statistically significant $r\ (372) = 0.139,\ p < 0.01,\ two\text{-}tailed$. Total agricultural investment also has positive correlation with the capacity $r\ (372) = 0.228,\ p < 0.01,\ two\text{-}tailed$. Finally, there is a positive correlation between capacity and total land value index which is statistically significant $r\ (372) = 0.152,\ p < 0.01,\ two\text{-}tailed$. The study is not able to perform test if the capacity is impacted by knowledge, skill or agricultural training that the respondent acquired as well as the access to market given that the survey did not include those variables in the survey design (the correlation results and the projection of capacity with total active worker,

farm size, agricultural investment and land index, see Appendix – 10 Factors of production correlation *page 329).*

Although the household situation is unable to add more people, many rural households will have to subdivide land for children at their marriage for sharing the survival. In cases where land is too small to be sub-divided, young couple tend to live and share the living with the current farming and thereby any member of couple have to get engaged in non-farm activities or migration or both couple migrate. In Tram Kak, it is obvious that youth couple in this situation have no choice but to seek garment work or construction work. The same tendency is found in Prey Kabas for the poor resource households and small land holders. However, in Otdar Meanchey, the migration to Thailand is obvious due to its proximity and ease legal border crossing. Migrants are able to make higher income earning than local. Thank to high income earning, migration to Thailand is become a mean for accumulation of capital to buy land and two-wheel tractors which is necessarily needed for farming in the area. Though local villagers admitted that the situation of land is increasingly scarce and expensive with financial capital of 500 to 1000 USD, people can manage to buy one or two hectares of land. The land sale and transfer are still available. Some owners own big land and some parts are not cleared yet. They are likely to make smaller plots for sales. In contrast, land in Tram Kak and Prey Kabas, is very scarce and expensive due to increase of population. Most importantly is that there is no one is willing to sell its own land in these two areas.

4.5.2 Land amortization of land/sub division of land

There is a very strong tendency that youth is going to startup more on farming even in small land with the size far below the MSI even in low density area such as Otdar Meanchey. Even though the economic capacity of farming generating from land is far below the living threshold, my study found that youths have to startup with farm work even in very tiny of land and combine migration and non-farm work. Under to motto *"Chek Khnea Ros"* in Khmer which is mean *"share each other for the survival"* drive parents more or less to manage to share the land. Case 280-TK-3-UH in Box 2 is an example in zone Tram Kak and OMC-1-Adult-SH in Table 77 is example of land amortization among family member in Otdar Meanchey.

The institutional environment and arrangement explain that the open up new area in Otdar Meanchey is driven by the national political integration becomes a driving force/access for local people to solve the population pressure especially helping the integration of young people into farming in the low-density area Otdar Meanchey. Due to the limitation of rural

non-farm activities and growing family member who mostly drop out, many more family members are going to settle more on farming on the small plot of land between 1 and 2 ha. However, due to degradation of farm household economic and small land, future youth integration in Otdar Meanchey will rely on farming and migration to Thailand.

While in high density area such as Tram Kak and Prey Kabas, there will be no land to share with future youth integration. Parents have small land and there is no land quota for sharing to children born later than 1982 or 1983. Therefore, the handover of land is possible when parents get old or among parents who have accumulated land over the years. But future youth will be largely relying on non-farm work and parents will mobilize resource to invest on children education. If they fail schooling, the only last resort is to stay with parents and take on the same land for a while, until they have the possibility to make migration for non-farm job.

Even the many families and youth have to settle in land below the MSI, people will have to settle in farming due to lack of better alternatives. Therefore, farming is a basic safety need to family. The future migration is anticipated to complement the family's source of income from farming. This is often the case for families with children whose access to education is long enough for them to build skills needed by non-farm sectors. Future youth integration has to combine both farm and non-farm activities including migration of the family member.

Like in Tram Kak, youth still have to work on farming even if they have small land and combine with non-farm activity. So, do Prey Kabas. In Otdar Meanchey, people migrate to Thailand in particular to see financial capital to clear more land, expand the land, to buy two wheel-tractor and to compensate the degradation of farming economic that might occur during the bad year period such as drought and crop failure.

All though farm economic demonstrated in the survey shows that only few families that can make profit from farming and majority can profit only if they combine with non-farm activity, still farming is consider as vital role in ensuring family safety and food security.

4.5.3 Land is main challenge for future youth integration

The farm household from the survey shows that even with the people trying to seek non-farm activities and developing non-farm activities, still majority of family do not meet the need of the family in a sustainable manner. For some families, farming can integrate youth. Still, parents encourage children to seek the alternate job on non-farm in order to improve their

livelihood. However, this will be challenge, as the current system could not allocate MIS to one more youth who married in the family or to live separately from parents. In many cases that I encounter the family where the young married couple aged between 23 and 26 years old, their parents are able to share not more than 1 ha of land. With such a small land, both husband and wife are forced to migrate to Thailand leaving behind the children at grandparents to look after. When asking what purpose of migration, they said to seek capital to expand the land and to buy two-wheel tractor.

Case of Otdar Meanchey (case 124) reveals how family structure allocates land to youth. Although few families have MIS to allocate to youth and the MIS should be met, the study found that youth are already working on the small plot of land. In reality, in many cases that I have encounter during the interview, rural youth in Otdar Meanchey have to startup in agriculture on one ha of agricultural land. Case 124 is an example of how parents prepare and distribute land to children and how they mobilize family member to expand the important assets for agricultural purpose. We can see that in this family, the two eldest sons are already making their living in farming. The two younger married daughters also installed in farming though previously migrated. In addition, the last single daughter already has the land quota of 1ha land for future settlement. This family is not an isolated case but it is typical case that I see it is the pattern of the people in Otdar Meanchey. The pattern is that people with limited access to education is left with no other better alternative than farming. In this area, the school was just built under the initiative of new settlement when the village was established and it was available mainly at the primary school. Therefore, those children who were growing up during the family settlement were very unlikely to have access to school beyond primary level. This is the situation of the villagers in this area. Therefore, I can draw the main strategy for youth integration in the area based on historical linking to settlement and political integration, the socioeconomic condition of the family there. Pressure of big household size over small plot of land and limitation of children accesses to education drive families in Otdar Meanchey to find all means to expand agricultural land for the securing the future of their children. Migration to Thailand that was revealed by some families during the interview is just temporary. It is just to find the financial capital to buy land or two-wheel tractor for serving agricultural purpose.

Small land and poor resource household such as TK-1, PB-1 and OMC-1 despite economic capacity shows that some households have capacity to add one additional youth, but qualitatively, these households are in the situation of no longer possibility of further subdivision land. Hence, youth migration out is obvious in those farm types. The contribution

remittance from migrant or non-farm income to the household is adding to the farm capacity and that capacity will be translated to investment on education of remaining child or children or expand agricultural asset to secure the future return of migrant or when migrant getting married. However, without capital from migration, it is very unlikely that current farming will be able to accommodate grown up family members. Therefore, those migrants will likely to have integrated into non-farm sectors rather than return home for farming. The takeover of the land from parents could possibly happen under the form of generation transfer when parents are getting old and not able to work on the land, then any migrants of the households may return home and take care of parents and work on the land and combine activities with non-farm or resume migration since they have experience already.

4.5.4 Small holder farming is safety-net

As there is not so many alternatives and limited capacity, knowledge and skill to get non-farm job, this suggests more youth particularly those who dropped out or fail in education rely on family farming and expect for future migration as a complement to existing parents' farm. Although the situations of some farm households are under the minimum threshold of living, still these farm households are currently accommodating youth more than any other type of farming. This is strongly corresponded to the qualitative explanation by farm household that farming is their safety net and the positive perception of youth and adult household on farming (This will be elaborate later in chapter 5).

Non-farm activity plays significant role in increasing farm capacity to accommodate youth. Hence, future integration will not purely rely on farming when the land is below the MIS. Integration will take place under the forms of combination of farm and off-farm/non-farm activities. This can be seen in the survey that either husband or wife tries to diversify income source on non-farm activities notably motor-taxi, construction and agricultural wage laborer by husband and handcrafting, shopkeeper, small business (family rice mill, sell grocery in front of house) mainly by wife. Any households whose family members are successfully integrated into non-farm activities or have non-farm activities such as salaried employees (teachers, soldiers, civil servants) have higher capacity added to farm household to sustain the living as well as to accommodate more young people on the small land.

Farm type TK-1, PB-1, OMC-1 and OMC-3 (poor resource group) has many household are below the MSI. The capacity for youth integration strongly relies on non-farm activities. Those who are in the position to accommodate youth are those who have higher non-farm income from both migration and non-farm activities. Although this group is in the

position not to accommodate more youth and many youths are going to move out, the survey result shows that in fact many youths are currently living and relying on this farm. The future of youth in this farm type will have to invest on education. However, as investment in education is expensive, this group of family will likely not able to invest in their children education. The household in this type will have to accommodate more youth and wait for opportunity to migrate out of the farm in order to maintain the sustainability of the household. That is why household view farming as good option for them given that it plays a role ensuring safety-net, without any alternative, they, at least, have food to consume. In rural area, having enough rice to consume all along the year together with *"Pra Hok"* or *"fermented fish"* is considered by rural household as food secure. The additional non-farm activities are added to complement what farm cannot generate and thereby, the migration family member or seasonal migration of household head will offer additional opportunity or capacity to invest on children education in the future where farming has no place for them.

4.5.5 Sustainable integration in farming need a complementary from non-farm

Jiao, Pouliot, and Walelign (2017) found that over 70% of rural household has been shifted their livelihood strategy to more remunerative strategy. Rahut and Micevska Scharf (2012) found that non-farm income contributes more 60 per cent of total household income and emphasis that education plays a major role in accessing to more remunerative non-farm employment. The poor and the less well-educated of people, the less their participation in the non-farm sectors. This study shares similar finding that non-farm activities which include local self-business, salary employment, and migration plays important roles in complementary income to rural household and the less land the farm household has, the more non-farm activities the household has to rely on farming. This is clearly seen in small land and poor resource household TK-1, PB-1, OMC-1 and OMC-3. However, this study found that it is not enumerative employment is found to be very rare for rural household such as military, local authority, civil servant and teacher. The employment in private sectors such as garment worker, construction worker is contributing to low income earning. Other urban services which is high income earning is very rare except some household whose children finished university high enumerative employment. Investment in education is expensive and not rural household can afford this. Hence, it is not coincident that rural non-farm employment particularly self-business initiated by rural household and migration play important role in complementary income to farm household income particularly small land and land poor household in this study.

Like many agrarian studies who find that small holder family farming still offers big source of employment for youth, this study shares similar finding that majority of youth are working on family farming but majority of youth are working on the small-land and poor resource household and even below poverty threshold. Such a situation is not healthy for future youth occupation. This situation requires the complementary income from non-farm activities. The smaller land tends to rely more on non-farm activities and migration work and therefore, farming on small plot of land will become source for food instead of buying rice.

4.6 Conclusion

This chapter examined the situation of youth and adult household in accommodating youth integration in family farming, its strategy for future youth, and its economic capacity to add one additional member in to the current farming system. The study found that youth household accounted for 30% of the survey sample and they are mainly settling in the small land and poor resource farm type TK-1, PB-1, OMC-1 and OMC-3, except PB-2 where majority of youth settle in PB-2 thank to the strong support from parents who is mainly better off household. Even though the pattern of settlement suggested youth normally settle in farming at their marriage, however, not all youth couple get land share at marriage thank to land situation of the parents' household. Youth can reside and depend on parents' household for several years to accumulate capital to buy mean of productions such as land and equipment in order to live independently from parents. The combination of land share of both side of parents-groom and bride side could increase the amount of land and thereby facilitate youth settlement in farming especially if youth get married within same village or nearby village. The analysis economic capacity of farm household show that though majority of farm household are in situation of below subsistent, they are in fact accommodating youth especially within the adult household. Hence, beside food security, smallholder farming in the study area is the safety-net in the absent of no alternative or less alternatives.

The study also found that rural youth often have poor access to school and many drop out below secondary and high school. Situation is worse in low density area-Otdar Meanchey where remoteness and the previous insecurity of province impacted the access to school of many children in the area. While access to higher education require high capital for investment, it is very unlikely that those small land and poor resource is able to invest in such higher education. Thus, there will be more youth going settle in farming even small land.

Given the poverty situation linking to low level of education and the limited availability of non-farm job, rural youth have few alternatives besides farming. In return, the

hardship in rural household economic becomes a pushing factor for rural household to combine farm and non-farm activities such developing self-business and migration. The area where land situation is highly pressure such as Tram Kak and Prey Kabas, household also engage on non-farm activities but strong motivation to invest in children given there is no more land to secure for their future. Unlike Otdar Meanchey where land is still available for purchase, drop out youth still have more chance to get land share from parent to start up farm work. In the future, smallholder farming will have to face more challenge in accommodating the new growing family member. Therefore, combining non-farm activities, seasonal migration of household head or family member long term migration to urban such as the capital city or to Thailand become necessary to ensure keeping continuity and sustainability of the current family farming.

The next following chapter will examine the institutional dimensions in supporting youth settlement in farming by looking at the individual youth and household perception on farming, role of local based community organization, the role of NGOs and policy impacted on youth integration in farming in the study area.

CHAPTER 5: INSTITUTIONAL DIMENSION FOR SUSTAINABLE YOUTH INTEGRATION IN CAMBODIAN FAMILY FARMING

5.1 Introduction

The situation of Cambodian rural youth regarding the settlement in farming is absent but some indications from various studies in Southeast Asia state that youth is no longer interested in farming (Hall et al., 2012). The finding is quite contradictory to the current situation of Cambodia where majority of rural youth residing in rural area engage and depend on their parents' family farming. However, the recent migration study indicates remarkable migration from rural to rural and rural to urban area. Agricultural land seeking likely drives these rural-rural migrations (Diepart, 2010; Pilgrim et al., 2012). We are not clear whether the migrant population is the outcome of youth who is not interested in farming or other factors. In addition, we do not know what is in youths' and their parents' minds about farming activities.

The way of which they think about the possible employment in farming is totally absent in this country. This chapter aims at exploring individual youth and their family perspectives on farming activities and factors determining their choice of occupation.

As shown in the previous chapter, the economics and profitability of farming alone are small and not enough to sustain the current family members of majority of household in the survey. Majority of them have to earn the complementary incomes from non-farm activities including local non-farm, off-farm and migration activities. In addition, the land holding per family is far beyond MSI that drive majority of the family not able to allocate one MIS to one additional youth.

In chapters 3 and 4, I have indicated that the economic result of farming and the family and thereby draw the conclusion that such condition is likely not favorable for future sustainable youth integration in farming within the current farming system due to the land availability. However, I was wondering in such condition, how people perceive farming and why. Last section of the survey questionnaire is dedicated perception questions in order to get respondents' views on farming. This is not the general public view on farming but rather how farmers themselves view on farming. As indicate in the framework of sustainable youth integration, one of the factors for successful youth integration is firstly come from the motivation of individual and family farm to improve the farming (Wampfer & Bergès, 2017;

Wampfler, 2014). Therefore, view on farming in this case indicates how they give value to what they are doing.

This chapter is drawn from the socio-economic survey of 372 rural households in two provinces of Cambodia, focus group discussion with 12 youth in Tram Kak, 13 youth individual interview in Prey Kabas, 1 youth group leader in Otdar Meanchey and case of study of YAE project of CEDAC to see

(1) The individual's and family's views on farming,

(2) Role of local based community in supporting youth

(3) Lesson learnt from youth integration program YAE done by CEDAC and

(4) Existing policies that may have been impacted on youth integration in family farming.

Part 7 of the questionnaire dedicates to the perception of the youth from parents' perspectives asking how respondents give opinions about youth's perceptions on agriculture and parents' own perceptions on agriculture and youth family's perceptions. Respondent in group discussion, individual interview and the survey, has been asked to response yes/no to the questions and thereby explain the reasons to support his/her argument in the open-ended question. There are four main questions: first do they think that agriculture or farm work is good option for their family? Is it easy to start farm work? Do they intend to hand over the farm work to their children? Is it easy to find non-farm job? Focus group discussion and individual interview with single youth are used to discuss their views on farming both youth dropping out and currently studying. Survey data of youth and adult couple household is used to discuss family's perceptions and role of community-based organization. After that study examines the NGOs-case study of CEDAC-YAE, and policy framework impacted on youth integration in farming.

This chapter discusses 1. What are youth, youth family, and adult family view about farming? 2. What factors explain the choice of integration in farming? 3. What roles of community-based organizations, NGOs and existing policy framework play roles in supporting youth integration in farming?

5.2 Perception on farming

5.2.1 Theory explaining perception

When it comes to explain youth decision to move out-off the farm, many empirical explanation are mainly derived from economic incentives (Rhoda, 1983). For example economic migration theory explains rural out-migration based on the expected "profitability of the employment" at the destination; that is, a personal cost-benefit analysis taking place in the prospective migrant's mind (Todaro, 1969). Due to the fact that human economic rational is incomplete and imperfect, ways in which people make decisions are not totally based on economic reason but also based on other form of non-economic behavior such as norms, self-imposed standard of conducts, altruism etc. which were shaped by the social structure of the society (North, 1990). In addition, people may make decisions based on personal experience or from what they have learnt from their social environment. Decision, in another word, is an outcome of changing one or more agents' perceptions if his or their interests are better served under the new institutional arrangement comparing to the previous one (Mantzavinos, 2001). In the later sense, way in which people making decision is not totally dependent on economic rational but they also rely on existing social institutions and social structures either family, community or society (Bourdieu, 2005; Mantzavinos, 2001; North, 1990; Polyani, 1944). Hence, youth decision to move out or stay working on the farm is based on economic rationales embeded in social institutions.

5.2.2 Single youth perception and aspiration toward farming

One group discussion has been done with 12 single youth in Tram Kak commune. 1 youth drops out and works on the farm. The rest are students currently studying at secondary and high schools. In Prey Kabas, no group discussion is done but youth has been identified through the survey with family and individual discussion is done with youth who are available. 13 single youths have been interviewed aged between 16 and 23 years old. Among them, 3 youths are female. 6 youths drop out. 7 youths are currently studying. Beside the qualitative information, I manage to encode the responses from both group discussion and individual discussion into small database comprise of 25 cases to see what we can learn from youths' perspectives on their aspirations toward farming.

Both group discussion and individual interview with youth show that in all cases, youth used to help parents do the farm work.

Youth focus group discussion reveals that youths are proud of what their parents have especially when they have learnt that those who migrated do not do well comparing to what

their parents do i.e. farming. They also learnt that those who migrated return home and rely on farm job. All the participants share the same views that farming is one of the good options. They share the same views that they see those who migrated to seek non-farm job do not do well and do not save much. They finally come back home and rely on the farms of their parents. A drop out male youth who is currently working on their parents' farms reveals that farming is not difficult job because he used to help and do it with their parents since he was young. Other participants also share the same views; therefore, all participants think that they can do farm work. However, when asking about what they want to be in the future, it appears that only 2 youths (who currently study) said that they want to be farmers whereas the rest they aspire to non-farm job. My impression during the group discussion suggests that female youths tend to show their interests in farm work than male youths and give more positive views on agriculture when they were asked this question: "Do you have any intention to take over farm work from your parents?". 10 participants out of 12 share positive views on farming, whereas 2 participants said that their parents want them to peruse higher education and work on non-farm activities.

Female participants:

"I have no problem with farm work. Some tasks are easy and some tasks are difficult."

"Farming is important for family. When we need money, we can sell the products."

"Farming is very important. If we do not do farm work, farmers like us will have nothing to eat."

"It is the job for daily livelihood. We grow vegetables. We have to grow more in order to get enough for supporting our study."

"Parents do not want children to do farm work. They want children peruse higher education."

Male participants:

"Agriculture just only brings income for daily subsistence in the family. If we cannot find others non-farm work, we can still work on the farm and we can feed ourselves. Working on the farm is the work for our own boss, can get food and income for daily consumption. However, we need to find other non-farm job to supplement the farming

because we have small land. This is the reason why I partly love agricultural job only 50%."

"I think farming is difficult job because it is just a subsistence job. It is good only if we know how to develop the farming to be more than subsistence. But in the future, I think that 80% of my feeling, I want to work on farm whenever I am free from non-farm work."

"It is good as it is a kind of job that can sustain the living."

"Farming provides food and supports children's education"

"My parents want me to work outside the farm as mechanic in repairing motorbike. I finished the training already but do not have the initial capital to start this job. That is why I want to start my work with agriculture to earn more income in order to achieve my parents' goal. I think that agriculture is good because I saw those who cultivate with modern technique gain good yield and much easier than those practicing traditional technique. So, I want to study agricultural technique but I am not sure if I can peruse or not."

When asking the question: "Is it easy to start farm work?", 7 out 12 participants demonstrate that it is not that easy. All of them pointed out to the question of technical know-how in doing farming. One participant shares the view that *"at the beginning, it is difficult as we are not well aware of all farming techniques. So, my parents have to accompany me to do the farm work."* Another participant agreed and added that *"it is very difficult at the beginning but later on it becomes easy"*. Another participant shares the same view that *"Because we do not know how to do it. We can do it only if parents help us to do a long with us". "We do not have much technical knowledge. Moreover, working on the farm needs to spend more time."*, another participant added. The last participants raise their concern about the constraints of agriculture that *"It is difficult due to natural factor, livelihood factor such as lack of capital to buy fertilizer, sometimes lack of labor as it demands many labor inputs such as labor to transport rice, seedling, watering and etc. Agricultural work also impacted on health such as backache, and other consequences derive from applying agricultural chemical inputs."* The last two participants positively indicate that it is easy to start farm work and also raise the following concern that they are unsure about the outcome of the crops on one hand and on the other hand, this farm work requires a lot of labor inputs and of course it is a very tired and exhausted job.

When asking the question: “Is it easy to find non-farm job?” 4 participants said that it is difficult to find by providing the reason that first there is a few jobs available and second, the availability is hard job with low income such as garment factory job. 2 participants said they have no ideas about this question. The other 6 participants share positive views that there is possibility to find job beside farming but all of them stress on the same point that only if they have true skill and knowledge plus foreign languages. The quotation below is the view expressed by each participant.

> *“Only if we have true skill, then we can earn money besides rice farming.”*
>
> *“It is easy only if we have higher education but my case, I drop out low grade. So, cannot do any other job beside garment worker, construction worker. If I compare between those jobs and farming job, I think that working on the farm at home is better. Although it is difficult but we can meet our daily need and support our family and help them every day.”*
>
> *“It is easy to find like garment work but it is difficult job. This is because people are not knowledgeable to get better job than garment work.*
>
> *“Non-farm work generates more income than farm work and use less labor than rice farming but only if we have knowledge such foreign language.”*

When asking “do you have any intention to take over farm work from your parents?”, 1 participant said he did not know, 2 said they are not interested in farm work, and 9 participants said they are willing to take farm work from their parents. Among them two participants said they are willing to work on the farm only if their parents have land for them to farm. The other four participants are willing to work on the farm but regard farm work as a complementary work from non-farm activities such as school teacher.

> *“If parents keep the land for us, want or do not want we have to do it.”*
>
> *“If we have opportunity to do other non-farm work, we rent our agricultural land to others.”*

"Because I want to be a teacher. Being a teacher, I can partly teach at school and partly work on agriculture." "Besides being a teacher, I can do farm work." "I want to do farming 50% of my time, whenever, I am free from other jobs."

Two participants are willing to take over farm work from parents because their parents are too old to do farm work. So, it is a kind of generation transfer from parents to children.

"Because my parents are too old to work, to prepare land, to irrigate the vegetable."

"Because my parents are getting old and they want me to take over their farm."

Another participant is willing to do farm work because he/she enjoys freedom of being working for his/her own boss.

"It is the job that can generate income, doing work for other is not as easy as doing our own work."

However, the last comment from the female participants is very interesting. It is almost the same to the generation transfer from old age parents to children. She emphasized on the role of woman that in Cambodia, man is traditionally going to live with bride side. Therefore, old age parents are going to live with the last daughter and hand over their last asset such as land and house to the last couple when they pass away.

"I am willing to take over the farm work because I am a girl who will continue this work and who will live with parents. Boy can leave after marriage.", said a girl participant.

We can see that youths share positive views and they are willing to take over the farm if their parents keep land for them. Although there is an availability non-farm activity, youth still would prefer to do farm work. Male and female share the same views on farming work. Non-farm activities are perceived to be limited available and it require knowledge and skill. This is the reason that youths show their intention to be school teachers (primary and secondary schools) because they can partly do farm work beside the teaching. However, the impression from the interview suggests that females give more positive views on farming than males. Females tend to accept to stay with parents as moral obligation and accept farm work once their parents are getting old. The group discussion, hence, tells that from individual youth's perspective, there is no discrimination on farm work. Although acknowledging that it

is hard job, still youth view farming is also a good option given that it ensures the family safety net. Drop out youth give their views that seeking low skill non-farm activities is even more difficult and the earning is not far less than farming. Therefore, for them, there is limited option besides farming. That is why drop out youth tend to give more positive views on farming.

Individual interviews with 13 youths in Prey Kabas show that farming is not a good option by referring to the fact that the family has small land and thereby aspire to non-farm activities which are perceived to be easier.

> "Because my parents have very small land size, and income from rice cultivation is irregular. If I work in non-farm activity, I will have regular earning than farming."

> "Doing business or working in non-farm sector is easier than farming. If I go to find job in Phnom Penh, I have my relatives, they can help me find job."

> "I have friend who can find job, so I think it is easy to find non-farm job."

Agriculture is a good option referring to the fact that it is an existing job and provides foundation for family to invest in children education and sustain the living and safety net in case of failure in job seeking after graduation.

> "I am not interested in working in agriculture because we have small land. So, I want to be a banker in the future."

> "Agriculture is a good option because we cannot afford to get the job beside agriculture. I want to start farm work but I share my feeling that 50 percent I want to work on the farm given that the earning from farming allows us to peruse further education."

> "Farming is good. If I graduate and I cannot find job, I have farm which can support my living."

> "Farming is a good option because we depend on farming"

> "For peasant, it is the good choice because there is no any other thing for them to do."

> "Farming is a good option because it is an existing job."

"I think farming is a good option because if I don't work on the farm, I don't know any other job that I can do."

"We cannot afford to find other job besides farming, so it is only rice cultivation that can sustain our live."

"Farming is a good option because what I can live so far is because of the farming."

Again, drop out youths tend to view that farming is a good option given the fact that it is difficult to seek job besides farming and that they have existing experience in farming and farming is their only choice for sustaining livelihood. Even though they are now currently working on farming, youths are aspired to develop small business of non-farm activities as a complementary work to farming. The mean to achieve this was explained that it is solely rely on family support. 4 out of 7 youths who are studying share their views that it is easy to start farm work because they get experience from helping parents to do the farm work. The other 3 youth view farming is hard job given that farming is hard and exhausted job. 7 out of 25 youths who drop out or stop studying are expected to take over farming from parents. However, all youths who are currently studying aspire to do non-farm job. Table 78 below shows the frequency and percentage of youth aspiration.

Table 78 Youth aspirations: those who currently studying

What are your aspirations? *	Frequency	Percent	Valid Percent	Cumulative Percent
Teacher	4	22.20	23.50	23.50
Doctor	5	27.80	29.40	52.90
Lawyer	2	11.10	11.80	64.70
Accountant	2	11.10	11.80	76.50
Private company	1	5.60	5.90	82.40
Banking	1	5.60	5.90	88.20
Other non-farm jobs (tourism)	2	11.10	11.80	100.00
Total	17	94.40	100.00	
Missing System	1	5.60		
Total	18	100.00		

*** Only youth currently studying**

The cross-tabulation youth aspiration with whether or not they are willing to take over the farm work from parents shows that all youths whose aspirations to become teacher are willing to take over farming. This result supports my observation and qualitative interview that given non-farm opportunity is few available for rural youth, therefore, youths wish to come civil servants as primary and secondary school teachers because this job permits them to combine with the existing farm activities of their parents.

Association test has been done on 16 valid cases out of 18 youth to see if youth willingness to take over farm from their parents is associated with gender. Result shows that there is no statistically association between gender and their willingness to take over farming, even though the percentage shows that man has higher percentage than woman among those who have no willing to take up farming, while this percentage is almost the same between male and female who have intension to take up farming (Pearson Chi-Square = 0.149, however, 2 cells (50.0%) have expected count less than 5 with the minimum expected count is 2.35. This violated the assumption rule. Hence, Fisher's Exact Test has been used = 0.294 (2-sided), 0.183 (1-sided)).

Table 79 Association between gender and willing to take over farm work

Willingness to take over farming	Male		Female		Total	
	N	Percent	N	Percent	N	Percent
No	7	88%	1	13%	8	100%
Yes	5	56%	4	44%	9	100%
Total	12		5		17	

Among 18 youth, only 4 (22%) youth show their feeling that they are pretty sure that their aspirations could be achieved because they have family and relative support for perusing higher education. 12 (67%) youths are unsure if they could achieve their aspirations because it very much depends on the capacity of family to support them to study. 2 (11%) youths said they do not know. All of them share the same views that in order to achieve this aspiration, they have to do best in education. If they fail in education, meaning if they fail high school exam, their family cannot help even if they have ability to support them to pursue university.

Both group discussion and individual youth interview suggested that youths share positive views about farming. Since most rural youths have engaged to help parents farming, this becomes pre-requisite for youth to family with farming if they decided to settle farming in the future. But many cases, single youths share lack of confidence due to lack of experience in doing farming and require parents' help doing a long. View that was given to farming very much depends on the experience that the family has faced in farming. Those whose farming did not provide better earning tend to view farming as hard job and earn less comparing to other activities. Those youth who learn from migrant's experience that did not do well and finally come back to settle in farming tend to view that farming is a better option. Even though general view said that farming is a good option, only drop out youths aspire to work on farming, whereas, youth currently studying aspire to do non-farm job. Perhaps many youths are unsure if their aspirations can be achieved, majority (53%) of them said that they are willing to take farm work if their parents hand over to them. In addition, working on non-

farm job also requires experience of migration such as being used to live far away from home, have social network such as friends or relatives in the city to facilitate and accommodate the migration.

Unlike many study which found that youths are growing disinterested in farming (Hall et al., 2012), My individual discussion with single youth either they are currently studying or dropping out show the opposite view that single youths in the study share positive views on farming and have no discrimination between male and female youths. Female youth tends to share more positive view on farming and willing to take over farming than male as indicated in the group discussion.

5.2.3 Family perception on agriculture

5.2.3.1 General opinion on agriculture

General opinion on farming expressed by respondents in the survey have been categorized into 6 main response based on their qualitative expression of their felling. The projection of the responses to by farm type and by youth and adult household does not help much to explain the difference in this general opinion. Hence, the result is presented in zone.

In general, 41.40% of respondents did not have ideas to comment on the question while the rest 59.60% shared their opinions. Majority of household accounted for 34.5% share general impression on agriculture that it is good (32.3% stated that it is good, 2.2% stated that it is very good). The cross tabulation between farm type, farm capacity (below poverty threshold, subsistence and above poverty threshold) show no clear cut or strong tendency that those who are in hard situation or poor farm type tend to view farming is a good option or not. But there is mixture of view among them. The point is that even household in the poor farm type also gives positive view on farming and some households in the better farm type give view that farming is hard work. Please see appendix for detail view presented by farm type and farm capacity.

Households who view farming as not good because it is hard work and earn less profit. They do not have alternative and the fact that they have small land. Those who view farming as hard work share almost the same reason to the previous one but adding the fact that they lack equipment, capital, and it is rain dependent work. There are households giving natural view that farm is normal because it is culture and tradition and they do not have alternative besides farming. For those who view farming is good, their major reason is refer to the fact

that they do not have to buy food. It is their safety net. They do not have alternatives. It is the source for income that they can support children for education.

> *"Farming is better than migration to Thailand. Migration to Thailand can earn money but it is very hard job. Farming more relaxes and provides food for home consumption and income generation.", 30 years old married woman with 3 kids in Kouk Kpos commune, Otdar Meanchey province, whose farm house hold is subsitence (Case 82, OMC, OMC-3-Youth HH-Subsistence).*
>
> *"Non-farm migration is even more difficult than farming because I don't have migration and working experience" (Case 209-TK-3-Adult HH-Able)*
>
> *"Farming demands less knowledge and skill, without farming we must be very poor", "No farm, no food.", "Farming is only good only if we have the supplementary income*", *"Farming is good for the poor" Said the household in poor farm type.*

Table 80 General opinion on farming and reasons explained

Zone	General opinion on farming	Frequency	Percent
Tram Kak	No idea	37	36.6
	Not good	7	6.9
	Hard work	10	9.9
	Normal	3	3.0
	Good	42	41.6
	Very good	2	2.0
	Total	101	100.0
Prey Kabas	No idea	29	32.2
	Not good	10	11.1
	Hard work	25	27.8
	Normal	5	5.6
	Good	21	23.3
	Total	90	100.0
Otdar Meanchey	No idea	88	48.6
	Not good	4	2.2
	Hard work	21	11.6
	Normal	5	2.8
	Good	57	31.5
	Very good	6	3.3
	Total	181	100.0
Total	No idea	154	41.4
	Not good	21	5.6
	Hard work	56	15.1

General opinion on farming	Mean reasons explain the opinion	Frequency	Percent
No idea		159	100.0
Not good	Hard work, less profit	12	50.0
	No alternatives, no knowledge and skill to do other job	6	25.0
	Small land	6	25.0
	Total	24	100.0
Hard work	Hard work, less profit	24	42.9
	Lack of mean production (land, equipment, cow)	2	3.6
	No alternatives, no knowledge and skill to do other job	18	32.1
	Rain dependent work	7	12.5
	Small land	2	3.6
	Work under sun no social status	3	5.4
	Total	56	100.0
Normal	It is culture and tradition	6	46.2
	No alternatives, no knowledge and skill to do other job	7	53.8
	Total	13	100.0
Good	Better than migration	1	0.8
	Demand less knowledge and skill	1	0.8
	Don't need to buy food	32	26.2
	Enjoy being own boss	10	8.2
	Farming can support children education	10	8.2
	Income generation	3	2.5
	It is culture and tradition	14	11.5
	Like farming	2	1.6

	Normal	13	3.5
	Good	120	32.3
	Total	372	100.0

	Safety net for living	26	21.3
	No alternatives, no knowledge and skill to do other job	23	18.9
	Total	122	100.0
Very good	Income generation	3	33.3
	Mean of living	5	55.6
	No alternatives, no knowledge and skill to do other job	1	11.1
	Total	9	100.0

5.2.3.2 Is it easy to start farm work?

Though many rural youths used to help parents to do the farm work when they were young, majority of youth households accounted for 60% reveal that it is not that easy to start farm work while adult households 52% share the same views. Lack of equipment (referring to lack of two-wheel tractors and link to the response to lack of labor), lack of capital, lack of technical knowledge, small land, difficult to clear land (in Otdar Meanchey), rain dependent work, hard work are the main reasons for youth and adult households to view that it is difficult to start farm work.

Table 81 Is it easy to start farm work?

Is it easy to start farm work?				
Zone	**Household**	**Response**	**Frequency**	**Percent**
Tram Kak	Youth HH	No	17	58.62
		Yes	12	41.38
		Total	29	100.00
	Adult HH	No	36	50.00
		Yes	34	47.22
		No idea	2	2.78
		Total	72	100.00
Prey Kabas	Youth HH	No	19	67.86
		Yes	9	32.14
		Total	28	100.00
	Adult HH	No	30	48.39
		Yes	32	51.61
		Total	62	100.00
Otdar Meanchey	Youth HH	No	30	56.60
		Yes	20	37.74
		No idea	3	5.66
		Total	53	100.00
	Adult HH	No	70	54.69
		Yes	45	35.16
		No idea	13	10.16
		Total	128	100.00
Total	Youth HH	No	66	60.00
		Yes	41	37.27
		No idea	3	2.73
		Total	110	100.00

Is it easy to start farm work?			
Response	**Reasons**	**Frequency**	**Percent**
No	Difficult to clear land	14	6.90
	Hard work	34	16.75
	Lack of capital	28	13.79
	Lack of drought power	10	4.93
	Lack of equipment	57	28.08
	Lack of everything	3	1.48
	Lack of experience	4	1.97
	Lack of labor	9	4.43
	Lack of technical knowledge	9	4.43
	Rain dependent work	18	8.87
	Small land	17	8.37
	Total	203	100.00
Yes	Availability of farm machinery services	4	2.65
	Better than migration	1	0.66
	Have enough equipment	11	7.28
	Have enough labor	2	1.32
	Have experience	70	46.36
	Have free time to work on other activities	4	2.65
	Have land	2	1.32
	Have parents' help	1	0.66
	Have two-wheel tractor	1	0.66
	Independent work	2	1.32
	Lack of market	1	0.66
	Need small capital to start	1	0.66
	No alternative	3	1.99

Adult HH	No	136	51.91
	Yes	111	42.37
	No idea	15	5.73
	Total	262	100.0

	No require much technical knowledge	1	0.66
	Only if we have land	1	0.66
	Parent support	1	0.66
	Personal preference	4	2.65
	Require less technical knowledge	2	1.32
	Tradition	39	25.83
	Total	151	100.00
No idea		18	100.00

"Having experience" is linking to the reason of "tradition" or "habit of being farmer" are main reasons that respondents view that it is not difficult to start farm work. In addition, farming is view that easy to start is because respondents "having enough equipment". While categorizing the qualitative answer, this response is usually link to the answer of "having enough labor", "need small capital to start", "require less technical knowledge". However, based the qualitative interview and field observation of the three-studied areas suggested that in zone pioneer like Otdar Meanchey farming is difficult to start because it is difficult to get the land clear given the land is former forest land. In irrigated area like Prey Kabas where rice is intensified, experience and technical knowledge are required. Traditional knowledge is no longer applied in this area which many youth households complain that is not easy when they start farm work.

4.2.3.1 It is not easy to get land clear in zone pioneer like Otdar Meanchey

The view is given by the adult family who experience and involve in settlement in new village and organize the land distribution such as those living in Kan Touy Choun village, Ban Say Reak village and Som Rong village. Usually people who seek for land are those who lack financial capital and rely solely on family active labor for land clearing slash and burn. Therefore, people clear land step by step and piece by piece. That is the main reason why some households still remain uncultivated land because it is not yet been cleared.

> *"To get land clear for one 1 ha requires a lot of labor and capital. It is very hard because the base of the tree that have just fell down and burn remain very difficult to get the land clear for cultivation" (Case 124-OMC-Adult-UH).*

In addition, the process of getting land involved serious land conflict resulting some households lost their land that have been cultivated several years. Due to land conflict, some households got agricultural below their expectation. For example, to get land in Kan Touy Choun village, people expect to get 5 ha unclear land for each family. However, due to

ongoing land dispute between concession company, military and villagers, only 5 household get 5 ha of land and the rest get only 3 ha. The conflict takes place from nearly 10 years from 2000 until 2009. Those who come to settle latter receive only village land. That is why some households migrate to Thailand with the expectations that they can manage to save some money to buy land and two-wheel tractor which is the necessary mean for land clearance and preparation.

4.2.3.2 Traditional knowledge is no longer applicable when rice is more intensified

Settlement in Otdar Meanchey is view to be usual as it follows the rational practice slash and burn and apply no fertilizer for the first two or three years in the zone pointier new area and receive low yields. The land clearance and rice cultivation are at the stage of claiming land possession and secure tenure. Migration is also a mean to seek financial capital to buy mean of production such as two-wheel tractor to facilitate rice cultivation, land clearance and transport agricultural production from the far farm field. In new area like this, people follow traditional practice slash and burn and sow rice. Labor exchange is commonly practice in this area in both rice cultivation (land preparation, harvest, thresh, and transport agricultural product) and annual crops cultivation. This is also applied for annual crop cultivation. In one less intensified like Tram Kak where people grow mainly rice on small plot of land, farming does not require much knowledge. Knowing only how to prepare seedling, transplant and application fertilizer is considered as enough. However, in zone high intensified rice cropping, youths who just settle in farming share view that it is not that easy to start farm work. Traditional knowledge where youth used to learn from his parent is not applicable to rice cultivation now in Prey Kabas. Either doing 2 or 3 cycle rice or dry season rice, require more technical knowledge on choosing the right fertilizer at different stages of cultivation. This is the same for application of pesticides that require different identification to the cause on rice disease and insect. High application of pesticide also drives family to view that farming is hard job due to the impact on health especially on those who spray pesticides by themselves. To avoid the risk, farmers tend to hire someone else to do instead and this raises the cost productions and thereby low value added and profit from farming.

> *27 years old male in Deoum Pou village, Prey Kabas commune tells the story that: since the year 2000, the farming practice in Prey Kabas is completely transformed from transplanting rice to sowing rice. The rice variety of IR66 requires high technical knowledge to handle. We have learnt from Vietnamese farmers who farm at the Cambodia-Vietnam*

border and spread across Prey Kabas. In my parents' generation, they just use transplant rice and apply fertilizer. This knowledge is not applicable anymore in my generation because rice now is become more intensified for the current moment." (Case 383-Youth-PB-2-UH).

" growing rice is hard job because high input use and earn very few. Sometimes the return is just equal to the investment which means we make no profit. If the price is above 900 Riel, we could make profit but otherwise, we will lose," said by several households in Prey Kabas commune.

4.2.3.3 Experience determines the view on the easiness of starting up farm work

Youth who first start up farm work said that it is not that easy to start up farming linking to previous experience in farming. This view was expressed by the youth married couple who have just settle in farming in Prey Kabas and single youth in Tram Kak. Those who have experience view that it is easy since they used to help parents to do the farm work since they were young. However, those who never engage in farming before view farming as very hard job to start and require parents to work along with them at least one to two years.

> "A 26 years old male youth in Prey Kabas "Kha" village, studied at a Buddhist high school. He got married 2 months after he left the monkhood in 2009. At his marriage, he got 40a of "Sré Leur", which can cultivate up to 3 times per year, from his parents (groom's side) and 38a for "Sré Krom-water receding rice" from bride's side. At the first starting up the farm work, it was physically and mentally hard because he does not have previous experience in farming. Mentally, he was so worry about his crops whether it yields good result or not. He is afraid of crop failure and profit loss. Luckily, his parent in-law helps him to work on the farm and give advice. Without help from parents, his settlement in farming would be even more difficult. He shares opinion that he would need capital of 250 USD to start farm work in each crop season. To live better life, he would need 5 ha. He would need parents to support them both to work on the farm and give advice for at least 2 years to get accustom as today. Besides farming, he is also a cow trader. He is the main farm active labor force in the family." Case 305-PB)

From the qualitative interview, several youths also share similar experience like the above case. Therefore, having previous experience on farming such as helping parents to do farm work when they were young does impact on how hard that youths have to face when starting up the farm work. Besides experience, lack of access to irrigation, insufficient rain, lack of capital, lack of labor in peak season, high input cost resulting low profitability are mentioned in the reasons for how hard is it to start farm work. Youth who took over farming from parents revealed they have difficulty in starting up farming due to lacking experience and technical know-how.

5.2.3.3 Do you think agriculture is a good option for employment?

The main reasons that drive rural households to view that farming is a good option are because the majority of rural households accounted 72% perceive that it is not easy to find job besides farming thereby 87% of households tend to view that farming is a good option for them. In addition, the qualitative interview shares the same perspective that they are farmers who have low level of education, and they have no alternatives besides farming. The cross-tabulation between the response of how easy it is to find job beside farming and is agriculture a good option, the chi-square test shows that there is significant association between the response.

Table 82 Do you think that agriculture is a good option?

Do you think that agriculture is a good option?			
Zone	Response	Frequency	Percent
Tram Kak	No	3	3.13
	Yes	91	94.79
	No idea	2	2.08
	Total	96	100.00
Prey Kabas	No	10	10.53
	Yes	83	87.37
	No idea	2	2.11
	Total	95	100.00
Otdar Meanchey	No	12	6.63
	Yes	149	82.32
	No idea	20	11.05
	Total	181	100.00
Total	No	25	6.72
	Yes	323	86.83
	No idea	24	6.45
	Total	372	100.0

5.2.3.4 Do you intend to hand over your farm to children?

The survey shows that in general, majority of both youth and adult household said they are willing to hand over their farms to their children. However, the response of youth household has less percentage comparing to adult household in zone Tram Kak. That is

because the land is small; therefore, they do not want children to work on the farm but to work on non-farm sectors. There are two main reasons explaining the choice of majority of adult household to hand over farm work to children. First, majority of their children fail in education. This is no alternative beside farm work. As explain in the previous chapter, land is going to sub-divided to share to youth at their marriage even it is going to be smaller and smaller because it is moral obligation to share the survival (*Chék Khnea Ros*). Second, because some parents' household heads are too old to work (generation transfer). Qualitative interview and the impression from the survey suggest that all most all households wish their children to do well in education in order to seek an alternative on non-farm sectors. However, this is very much dependent on children performance in education. If they fail, the only last resort is farming with their parents. Table 83 shows the percentage on willingness of youth and adult household to hand over farm work to their children in the three zones. For detail response by farm type and by farm capacity, see Appendix – 11 Perception on agriculture by type by youth adult by capacity *page 331.*

Table 83 Intention to hand over farm work to children

Do you have any intention to hand over your farm work to you children?					
Zone	Household	Response	Frequency	Percent	Valid Percent
Tram Kak	Youth HH	No	13	52	52
		Yes	12	48	48
		Total	25	100	100
	Adult HH	No	15	21	21
		Yes	55	77	79
		Total	70	99	100
		Missing System	1	1	
	Total		71	100	
Prey Kabas	Youth HH	No	11	34	35
		Yes	20	63	65
		Total	31	97	100
		Missing System	1	3	
	Total		32	100	
	Adult HH	No	14	22	23
		Yes	48	76	77
		Total	62	98	100
		Missing System	1	2	
	Total		63	100	
Otdar Meanchey	Youth HH	No	18	34	35
		Yes	33	62	65
		Total	51	96	100
		Missing System	2	4	
	Total		53	100	
	Adult HH	No	24	19	20
		Yes	97	76	80
		Total	121	95	100
		Missing System	7	5	
	Total		128	100	
All zone	Youth HH	No	42	38	39
		Yes	65	59	61
		Total	107	97	100
		Missing System	3	3	
	Total		110	100	
	Adult HH	No	53	20	21
		Yes	200	76	79
		Total	253	97	100
		Missing System	9	3	
	Total		262	100.0	

5.3 Institution al dimension in support youth integration in farming

5.3.1 Role of existing CBOs in the survey

Both survey and qualitative interview found that the existing traditional community based organizations are mainly for religious purpose. Absence of institutional supports drives young farmers to rely very strongly on family supports (subdivide land, know-how, motivation, capital, equipment etc.). The livelihood condition of youth or young couple such as their capacity in accumulating wealth is very much dependent on their parent's socio-economic background. The better off of youth parents, the more assets are shared to youth at their marriage for example land availability for sub-divide to youth, equipment such as two-wheel tractors for utilizing in farming and especially financial support for youth starting farm work. Youth integration in farming is purely done by family support both land and financial capital to start up. As explained previously, youth settlement takes place at the point of marriage where both side of parents make an effort to contribute asset to both couple such as land and money. Looking at the distribution of list of CBOs in the survey and its nature together with the impression from the qualitative interview, the study found that those community-based organizations are mainly for religious and development purpose which play no role in supporting youth to install in farming. Those CBOs are saving, self-help group that all contribute to livelihood improvement under the development project of NGGs program.

In OMC, there are NGOs that people report to have activities in the province such as Children's Development Association (CDA) who mainly work on livelihood improvement and community forestry, Community-based Integrated Development Organization (CIDO), and Investing in Children and their Societies (ICS) working education program to children. There are other NGOs program reported by villagers that I could not trace the correct name but reported by villager as SAKVAM, WC, SVAM, CHHR and MARISOR. They run multiple programs ranking from livelihood improvement via increase productivities in rice, vegetable, and animal raising to health care, education, saving group, village rice bank, and cow bank. Beside livelihood program that encourages people to improve and diversify agricultural activities raising animal and vegetable growing, there is community forestry. However, this creation of community forestry resulting some land conflict over land occupation previously by some villagers. Some villagers have been asked to move out of the protected forest. That is why some few villagers give some negative views about community forestry as nepotism and partism. It should be noted that community forestries in the Otdar Meanchey are potentially accepting under the REDD Project. Recently people attempt to raise fish on the plastic pond.

While inTram Kak, Takeo province, there is Sokapeak Krousa Yeurng (SKY) which means our family health. It is health insurance scheme for the poor. CEDAC is also available in the area working on saving group and agricultural development. There are nun association, Old people association, Association of the poor, Saving Group, and majority is Sangkahak Group. Sangkaha is partly linked to Buddhism religion where people contribute the small amount of money. For example, 0.5 USD/month to secure if any member of group, primarily the old one, get sick or die. The association would share a certain fund to help back or help organize funeral ceremony. It is like a solidary association.

People share view that those institutional supports are not sufficient to what they need for starting up the farm. Hence, the existing CBOs in Tram Kak, Prey Kabas and Otdar Meanchey are mainly religion purpose, self-help group or development program-oriented production improvement to motivate existing farmers to diversify agricultural activities purposively for income generation. But none of them directly involve in integrating youth in farming. Therefore, youth integration in farming is purely done with family support.

5.3.2 NGOs Intervention: Case study of CEDAC's YAE program

5.3.2.1 Very few attempts to test youth integration program in farming

The opportunity of rural youth to find decent work besides farming is limited in developing countries. When youth employment emerges at international policy agenda, the policy intervention that focuses on the employment opportunity in the agriculture and agribusiness sectors remain at low level of attention (Proctor & Lucchesi, 2012; White, 2012). Only very recent studies have highlighted the critical role of youth in the informal labor force in their family farm (SPC, 2010). Traditional farming with low profitability and less evolve in agri-food chain may not be enough to match youth expectation. So, development practitioners try their intervention programs which encourage young people to develop themselves as agricultural entrepreneurs and to stay working in agriculture such as in some Pacific countries (SPC, 2010) and some African countries (CEPIA, 2007). Given the issue is relatively new for developing countries, there are not so many existing knowledges available regarding to issue on youth installation in agriculture. However, literatures suggest that major challenges are high level of youth education, young age (remarkably less than 30 years old), small land side, proximity to the city and stress in livelihood which drive youth to have tendency to shift from agriculture (Leavy & Smith, 2010; Sharma & Bhaduri, 2009).

In Cambodia, the exploration of NGOs working on youth integration in farming is very few and CEDAC is found to be the most leading one in working with youth. Centre d'Etude et de Développement Agricole Cambodgien / Cambodian Center for Study and Development in Agriculture (CEDAC) founded in August 1997, with initial support from the French NGO GRET. CEDAC main activities are to provide training on Development Oriented Research in Agriculture (DORA) and to develop agricultural techniques which are practical for Cambodian farmers by collecting extensive successful experiences from farmers. In addition, CEDAC facilitate organize farmers to create saving group and the latest program is to train Young Community Leader (YCL) and Young Agricultural Entrepreneur (YAE). As stated in its project document to donor, YAE project aims at creating farm job for youths who do not have opportunity to pursue their study and to find other jobs beside farming by accommodating them with technical and financial support to run a profitable farming. It is also to test the approach in respond to employment creation in farming sector while there was global economic crisis in 2008 when some migrant youths returned and being accommodated by smallholder farming. So far, CEDAC has produced 267 YAE. Table below shows the number of youths who have taken part in youth program of CEDAC.

Table 84 Youth Graduated from CEDAC project

Youth Development Program	Number
Young Graduate	212
Young Community Leader	207
Young Agricultural Entrepreneur	267

Source: interview with program direct of Young Agriculture Entrepreneur project

5.3.2.2 CEDAC and young agricultural entrepreneur program

The project criteria are to select youths aged 16- 30 who have at least graduated high school, who have parents as farmers with affordable land for farm development, who has experience in farming and inspire to work in farming, who have capacity to write and basic numeric calculation. He/she has to have willingness to contribute to their community and young generation and does not affiliate with an ongoing study or workplace. Children of the poor, women and those who got married are encourage to take part in the project but there must be an accord from their parents and husband/wife. The project targeted 6 provinces: Svay Rieng, Prey Veng, Kampong Chhnang, Kampong Speur, Kampot and Takeo. The project planned to train 60 YAE from each province in which 20 YAE per promotions.

The project duration is two years. First year is dedicated to theory and technical knowledge in agriculture. The first 6 months, the study focuses on theoretical part includes agroecology, farming system, rice production, fish production, chicken production, pig

production, vegetable production and mushroom production. Research method, personal development, value chain and farm business development are also included. Trainees are obligated to develop their own farms such as chicken, SRI or pig based on their interest as part of their practice with constant support and supervision from Group Learning Facilitators in each province. They are encouraged to set up learning center[39] in the farm to share knowledge and experience gained from the project to share with other youths and villagers in their villages. This is a part of their social responsibility and a part of their learning to facilitate their community work. After that they have to choose their areas of specialization so that they have to do internships with experience and successful farmers for 5 months. The last month of the first year is dedicated to reflection and writing up their business plan for implementation for the second year. They have to present their plans to the committee of the project. The second year is dedicated to the farm practice. YAEs implement their farm business according to their business plans. YAEs are invited to attend follow up meeting which took place every three months to share the working experience.

YAE's experiences from his/her real implementation allow YAE to modify or to adjust his/her business plan. Group Learning Facilitators (GLF) provided "on farm" supervision to each YAE. Experience suggest that female GLF is easier to work with YAE comparing to male GLF because first she understands female YAE situation and second male YAE is encouraged to work harder as they feel embarrassed to female GLF. GLF has extensive experience in agricultural techniques. GLF acted as facilitator, teacher and counselor. They are selected from top graduates from Youth Community Leader (YCL) project.

The announcement was done through radio broadcasting. However, the interview with CEDAC program director reveals that it is difficult to find youth taking part in the project. CEDAC later updates its approach by making loudspeaker announcement at some potential communes and through identification from village chief and commune chief. Upon received applications, candidates are invited to participate in an orientation seminar. There, they are explained about the objectives of project, study program, requirements, assignment and the supports from the program. The candidates who are interested are invited to take part in 4 assignments within one-month period. They have to write a minimum of 5 pages of (1) personal life story and future aspiration, (2) plant inventory in their home village, (3) inventory of village capital such infrastructure, and (4) resource flow in the village including

[39] CEDAC contribute 100 USD to YAE who is willing to set up the learning

value chain. Those who take part in these assignments and submitted all assignments will be reward 10 USD and they passed for the interview round. Those who passed the interview will attend the YAE two years training. Candidates have two more months to decide. If they are confident to take part in training, they are asked to sign a formal contract with the agreement from parents witnessed by local authorities that they are committed to take part in the training. The project would spend for each trainee amount 2000 USD including food, traveling, field apprentice, and learning materials. However, CEDAC asked each participant to contribute 300 USD when they successfully run the business farming in order to keep sustainability of the program and as part of their social responsibility for next generation of youth. The interview with both CEDAC and YAE reveal that CEDAC so far did not ask for this contribution fun.

5.3.2.3 To leave or to stay: Lesson learnt from CEDAC

5.3.2.3.1 A life story: Motivation to start up farming as experience from trial migration

Except those who fresh drop out of high school, fresh passing high school and taking part of the project, the study found that many youths who decided to settle in farming are those who experience migration to city. Experiencing difficulty from migration and the earning from migration do not permit to save much after several months or years. Migration far from home alone, low salary and difficult condition of living at destination of migration are the reasons that motivate youth and parents decided to take part with CEDAC.

As mentioned earlier, youths have gone through various assignments to test their commitment and willingness to work on the farm. Those who are accepted to enroll in the program are those who already pass the commitment test and ready to work on the farm. Some dropped out during the process. Therefore, the remaining youths taking part in the integration project are those who committed to farming.

5.3.2.3.2 Motivation to quit farming after farming trail: A livelihood economy tell

The study was surprised by the fact that the interview with group learning facilitator (GLF) reveals that only very few YAEs remain working on the farm. The question arises: with two years support, why many youths who take part in project quit their business farms and seek alternatives? Through the selection process and the criteria for selection, YAEs have minimum assets such as land, parents' consent and support to start the farm business work. Another question arises: why there are so many youths taking part in the project quit their work and seek non-farm opportunities after the project finished one or several years later?

The on- farm visit and observation with those who are currently taking part in the project show their significant outcome of farm demonstration which gave a good impression of successful youth integration in farming project. However, it turns to interview with YAEs who are no longer supported by project show the opposite result that many of them have migrated to work on non-farm activities and, thereby, it is difficult to access them for an interview. Those who remain in the village for the interview are the most outstanding YAEs.

Question on "how the significant of the project for YAE" has been tested with respondents. All respondents admitted that the project plays a very important role in their successful farm work. Without the project they cannot start farm work because they do not master the agricultural technique. The project helps them overcome all technical matters. Another question has been tested with YAE who is currently stay in farming in order to get their perspective on those YAE who quitted farming: "With such significant support, why do many YAEs in your promotion quit their farm work?". The answer falls into the same pattern is because of the *"livelihood factor "or "Kata Chi Veak Pheap" in Khmer language.* This livelihood factor was revealed by the case of the most successful YAE in Takeo province who decided to quit their farm work last five months to work for private company for monthly salary of 300 USD. Responding to the question why quitting farming, the straight, short and concise answer is that the income earning from farming is not enough to meet their daily consumption. Detail income and expense have been asked the same way in the question of socio-economic survey and result proved that what it means by "*livelihood factor-Kata Chi Veak Pheap*" mentioned by many respondents is valid.

> *Mr. Dara (invented name) 33 years old, is a village veterinary and the most outstanding YAE in Takeo province specialized in chicken and pig raising. He has to commit fulltime work on the farm to get profit from this farm work. His production is far above the average farmer in chicken and pig raiser but still the earning from this is not enough to meet his daily need. He can earn profit 705 USD from chicken, 2707 USD from pig production, 125 USD from his veterinary services in a year. So, in total his net earnings are 3537 USD but this cannot balance his daily consumption of 3679 USD per year. This bases on detail calculation of each farm activities and detail household consumption within his family. Recently there is growing of competition on veterinary services in the village so now he could earn less and less from his service. The company offered him only 5 months' work with monthly*

salary of 300 USD. Now he is staying at home look after his children while his wife has just moved to Phnom Penh to start garment work with monthly salary of 100 USD. I will soon resume my farm activities soon, he added.

Facing the same challenge, some successful YAEs reveal their intention to migrate for high income work including migration to South Korea and Thailand. A respondent in Kampong Chhnang province just got information that his application to South Korea is succeeded. Another successful YEA growing mushroom in Svay Rieng is on the process of applying for job in Thailand. The main reason that he plans to migrate is because his current mushroom farm is very labor intensive and the earning is not much comparing to what he expects from the work in Thailand. Another 23 years old girl YAE in Teuk Pos district, Kampong Chhnang province quitted mushroom farming for garment work in Phnom Penh. Table 85 below is to give an impression on how few it is of successful YAE in operating farm work.

Table 85 Number of YAE who successful settle in farming

Province	Batch	YAE	Female	Success	Year	Project status
Prey Veng	Batch 1	21	?	2	2008-2010	Finished
	Batch 2	13	1	?	2009-2011	Finished
	Batch 3	34	17	On going	2012-2013	On going
Svay Rieng	Batch 1	20	?	1	2008-2010	
	Batch 2	25	?	2	2009-2011	
Takeo	Batch 1	n.a	n.a	n.a		
	Batch 2	n.a	n.a	n.a		
	Batch 3	20	?	3		Finished
Kampong Chhnang	Batch 1	16	5	2	2008-2010	Finished
	Batch 2	20	11	3	2009-2011	Finished
	Batch 3	30	13	5	2011-2013	Finished

This finding which supported by the socio-economic survey indicates that among 372 rural household interviews, there are more than 70 of rural households have positive income which implied that earning would likely be enough to sustain their daily consumption. However, when comparing this figure with the minimum threshold for sustainable living, data show opposite that 47% households in OMC, 56% in PB, and 41% in Tram Kak are above the minimum threshold of living. This means that those positive incomes are living in the minimal expend below the poverty line.

The main reasons that explain by the villagers why youths quit farming are because of "livelihood factor"**,** "they imitate the others who migrate successfully" **in such quotations:** "They saw other youths in village migrate then they follow", "Young girls in the village nowadays drop out at early high school, then go for garment work", "Youths saw the other young people in the village earn good money when migrated to city, the rest of youth in the same village follow the footstep". **However, this imitation has their rational. YAEs who were interviewed about training activities reveal that during training they were asked to do economic calculation exercise on their current family farming and design the business project for ameliorating their farming. They feel very upset when they applied economic principle to analyze their farming they see that their current farming is often profit lose, even they tried with new anticipated project by including their labor cost and opportunity cost, still their business farming do not yield much profitability. The experience that youth encounter in current farm family and the profit lose in their trial business farming have becoming a common knowledge/shared knowledge/shared rule that household and youth poses. Later on, this shared knowledge on become an informal rule or pattern that other youth and family facing the same problem to analog and to act alike (Mantzavinos, 2001).**

The term "farm operational cost" **was locally named** "recycle capital"**. Beside initial investment cost, the case of Mr. Dara (invented name) suggests that he would need at least 1000$ more as an operational cost as well as to secure if any production cycle fails for example chicken or pig died. He would have capital to restore the production. The knowledge from the first field survey reveals that some family members who migrate to city to seek non-farm work are to earn capital in order to invest on their rice farm such as buying fertilizer, hiring labor, enlarging farm size. In this sense they actually try to recover farm operational cost or recycle capital for future farm productions such as rice production, chicken or pig production as this capital was degraded by farm shock or family health shock or by the growing burden of daily consumption such as children schooling.**

5.3.2.3.3 Those who stay combining active labor with family or non-farm activities

Youth who is currently keep on working in farming is considered as successful integration in farming by the GLF and CEDAC staff. However, the study found that those who stay in farming are in fact those single youth who combine their active labor with parent working in farming. For example, youth involves in mushroom production. Mother involves in marketing and feeding animals, and father involves in rice farming or help building chicken fence and cage or mushroom storage house. Farther/mother can engage in non-farm activities such as

small business at home or motor taxi in the city and still manage to come back to help doing farm work. In case youths have children, their parents can help looking after. Many of successful YAE interview mainly fall into this category. The successful case is also found in those marriage couples especially woman whose husband takes part in non-farm activities such as a school teacher.

A single 24 years old woman in Takeo keeps running her fish farm because her farther is a nurse who earns income from consulting medical service to local villagers. Her parents support her to make big fish farm made of concrete. Her mother is responsible for selling fish while she focuses on raising fish and breeding fish. Her parent is a better off family.

In all successful cases, the 2 successful cases in Svay Rieng, 1 successful case raising fish in Takeo and 2 successful cases in Kampong Chnang raising chicken and 1 successful case in Prey Veng are single youth who live with parents. The story of these household reveals that the successful keeping youth in farming are strongly linked with family support such as parents help youth doing farm work. A 31 years old married woman with two children in Svay Rieng province shares the same reasons for her continuity in pig raising because her parents are pig raisers and she wants to raise pig too. Participating in YAE project, she raises pig along with her parents. After she got married to a local secondary school teacher, she separates pig farm from her parents and continues to raise pig on her own but her farm is next to her parents' farm. They still help her some times. She said that she still works on the farm because she has a husband who gets salary from teaching profession which is complementary to her family and he manages to help her in rice farming. Without her husband salary, pig raising alone would not be enough for her family.

A 24 years old single female youth in Kampong Chhnang whose parent socio-economic status is poor quitted her mushroom farm and has gone to Phnom Penh to work as garment worker. A discussion with her parents reveals that the need for income to sustain the whole family requires her to quit her mushroom farm and go for garment work because mushroom farm does not generate enough income to sustain her family.

This suggests that the successful of youth integration in farming beside YAE project support, youth will need strong support from parents and social arrangement within family in order to keep sustain in their farm work especially the combine income from both farming and non-farming by any family member such as husband of youth couple or youth's parents to overcome daily consumption needed.

5.3.2.3.4 Will they return back to farming?

YAE youths share their views that farming is their backup strategy and as safety-net after they get married and have children. Migration is their temporary strategy to earn more capital to enlarge their farm capacity as well as for future investment. The interview with YAEs who have opportunity to work in non-farm activities with NGOs reveals that the earnings from farming are small and discrete unlike non-farm work where the income is liquid. they quit farm job because they want to save and accumulate financial capital. They wish to resume farm work after they save sufficient capital. The study found two cases of successful YAE who decide to invest in higher education in the field of agricultural development. They wish to seek for non-farm job. The rational is that they want to save more capital for future. They share their aspiration to return to farm work in the future as they prefer to work independently. With this earning, they can invest more in their farm work in larger scale and secure the living when they get marriage and have no opportunity to do job in non-farm sectors. In another way, after earning the recover capital, they may return from migration to resume farm work which is their safety net for the future.

> *Miss. Kunthea (invented name), a single 23 years old is an outstanding chicken raiser in Kampong Chhnang province. She was taking part in CEDAC, YAE project in 2008 right after she graduated from high school. She works closely with her father who is curious to learn from her chicken raising technique. Later on, her farther becomes very knowledgeable in chicken raising and raise chicken for remarkable commercial purpose. With knowledge and experience from CEDAC, she has an opportunity to work for a local NGO in the province with monthly salary 260$. She said that if the job is secure, she is going to work for about 10 years, and then she will come to settle back in her farming again. Now she still goes back home every weekend to help her father raise chicken. When asking why she considers coming back, she said that she likes the work for her own boss. It is better than working for others especially when the prospect of her current work is just temporary and not secure. Agricultural job is the job when she gets married and gets old.*

5.3.3.4 Youth's challenge in YAE: Lesson learnt

5.3.3.4.1 Youth's complex social characteristic: Development intervention disappointment?

The impression from some CEDAC staffs who work closely with YAE shows that they feel disappointed with single youth who migrate after joining the project and draw lesson learnt that the project should focus on marriage youth as they might have strong attachment to the farm work. This study found that either single youth or marriage youth at any point of time, they will have to face the same problem. Single youth at their marriage will have to adjust livelihood strategy such as moving farm or previous abandon farm to live at the bride (mostly) or groom side. The marriage couple also has to migrate after the experience undesirable income earning to sustain their family members from their farm work. Single youth also expect to migrate when their earnings from farm work in combination with their parents' resources permit them to fund their higher education and expect to find higher non-farm job. Also, single youth who has more experience in farming and related rural development skills such as facilitation skill, reporting skill and so on, would likely have the opportunity to find job in development work with NGOs or in other non-farm sectors. Thank to agricultural technical knowledge acquired from two years training.

Some youths who aspire for higher education try to work in the informal sector to get resource funding education such as English language and computer skills. But lack of prospects in earning from this meager income job together with pressure from workload drives youth to rethink about their alternatives. One of obvious alternatives is farming work. Youth compare the value earning from informal sectors work with farming opportunities such as being united with family, leisure time with family member; drive youth to decide to settle on farming. For example, five YAE youths in Prey Veng and Svay Rieng provinces used to migrate to work as garment work, security guard, construction and mechanical work in Phnom Penh but they admitted that the income earning is very small and it is very hard job. They feel disappointed with their jobs because the earning is not comparable to the effort they put in. When they heard the announcement via radio and decide to go back home and take part in the CEDAC project. In return, after experiencing in farming for a while, youth will seek alternatives to improve their farming and earning sources such as migration to get non-farm job. For example, among 20 YAEs in the second promotion in Kampong Chhnang province, there are only three successful YAEs of which two of them have successfully got an NGO job as community facilitators with monthly salary of 260$ per month. The 30 YAEs

in the third promotion, 5 of them continue their higher education at university at weekends and they work on their farm on weekdays. 3 among 5 got non-farm job.

Marriage is turning point for youth to reorganize their livelihood activities such as whether to live with bride or groom family. This depends on each side resources. Normally, the groom has to live with the bride family after marriage. This would be the challenge for male youth who take part in the project before marriage. Given that most of the youth take part in CEDAC project when they were single. Their farming equipment was set up at their parents' house. They have to rearrange all this again when they get married especially for male youth. Generally, the groom will have to leave with bride's family. Some youths also have to abandon farm work due to husband's or wife's non-farm job which requires his or her to move to non-farm work place. For example, one female YAE in Svay Rieng abandon her farm to live with her husband who works as security guard in one private company in Phnom Penh.

4.3.3.4.2 There is no showcase that farming is high profitable

The question of how to make farming profitable and become attractive to youth meets a challenge. Given that there is very few or almost no showcase to prove that youth taking part in farming is successful and sustains their living from farming alone. With support from YAE project, youth can overcome technical constraints of farming through increasing farm production and generating higher profit. The increase farm profitability can be seen from technical economic calculation in their business plans. However, household economy is taking into account such an incremental of increase is apparently not enough to sustain household consumption demand. This becomes a real experience and learning process for youth to re-decide whether to move or to stay.

Discussions with YAE project coordinator and relevant staff reveal that since the project has been started, one of the most challenging questions is: "there is no showcase to prove that farming brings high profit". The program has no strong argument to inspire youth to work on farming. In the training, the participants were asked to reflect on their current farming. Youth taking part in the training often disappointed when they share their reflection in the big group discussion on the analysis of their economic calculation of the current farming system. But their motivation to continue is after the comparison with the alternative non-farm work and migration experience of the others. In such situation, youth have been asked to think of the solution to improve their farming. Their proposed ideas would be used

to develop their business plans and to execute the plans with on-going supervision from CEDAC, YAE facilitators.

4.3.3.4.3 No financial support setting up farming: Is CEDAC rational?

At the initial implementation of YAE project, CEDAC did not have budget to finance YAE business plan. Their budget is just enough to run YAE project. Complaints have been raised by many YAEs that there is no financial support such as micro lending for starting up the business farm. For example, one YAE in Kampong Chhnang who wishes to raise fish but did not have enough capital to start. Actually, CEDAC tries to respond to this critique by trying to establish the business plan competition among the best YAE. The champion of the competition would get the micro lending up to 2000 USD from the Federation of Saving. The core value of CEDAC tom motivating farmer is 'to start from what farmer has and to start from what farmer can do". However, when looking at different case of CEDAC and YAE, many of them quit farm work. CEDAC tries to run the training in the form of social business such as students who take part in the project in the form of borrowing. For example, the case of YCL has to pay back their training 1000 USD once successfully get job. The CEDAC farm integration project spends on each YAE amount of 2000 USD per participant. YAE has been required to contribute back 320 USD if they successfully run the farm business. Neither success nor failure, YAE did not contribute back yet because CEDAC did not ask for. They are willing to pay back if demanded. On the point of keeping continuity of the program, a question may be raised: What if the micro lending is given to an anticipated failed business, then who pays back to CEDAC? Will the program be going to sustain? If one knows that taking part in the project one will get financial support, then, many rural youths who do not have options, would participate the projects with or without real motivation. In fact, micro lending is important to start business farm. However, it is not that micro lending that contributes to the success of farming but it is rather the capacity of farm generation of income that contributes to success.

Giving the investment cost on education is expensive; some high school graduates may just want to have opportunity to get access to two years training rather than the desire to settle in farming. The training will be a bridge for them to get access to after-high school education. Two years training is rather costly and they cannot even afford on their own. With such training, they acquire strong technical knowledge to farming, which is quite attractive to NGOs who need development workers.

4.3.3.4.4 Access to market

One of the factors that contributes to success and failure of YAE is access to market. In some rural areas where youth choose to start new crops such as mushroom growing, there is no market because people did not even know how mushroom should be consumed. Distance from market is also a challenge.

In conclusion, CEDAC provides sufficient technical knowledge, self-motivation and advice. However, things that YAE has to overcome are capital to start up, economic profitability from ongoing farming and access to market.

5.3.4 Existing policy in supporting youth integration in farming

There is no direct and specific policy in Cambodia addressing the direct question of youth integration in farming; though, some research indicated that agriculture offers a big source of employment (RGC, WB, & ACI, 2005a). National Employment Policy 2015-2025 is on the process of formulation in 2012 where I had a chance to attend the consultation workshop during the field data collection. The impression is that there is no specific policy idea related to employment creation in farming sectors. The policy is finalized and issued in 2015 (RGC, 2014a, 2015).

However, there are land policies such as land law 2001 and Sub-Degree on social land concession 2003 (RGC, 2003) and economic land concessions 2005 (RGC, 2005) that may indirect impact on rural youth and adult household access to land which is primary source of settlement in farming. Though there is no clear and causal explanation to support this hypothesis but national census 2008 clearly demonstrated that majority approximately nearly 60% of rural households migrated from rural to rural area which is argued by Pilgrim et al. (2012) and agricultural land seeking driven which is apparently a result from existing intervention and legal framework that provide access to land as mentioned in the historical setting of the studied area in the previous chapter 3. This flow of migration is unnoticed and usually goes under the radar of most planners and researchers which is called by Maltoni (2006a) cited by Diepart and Sem (2014) as “the invisible flow”.

Land law was promulgated in August 2001 in respond to turmoil of land tenure management in early 2000s resulted from unclear land tenure, which the first land law (1992) does not cover, and the concession system introduced in 1990s aiming generate state revenue for postwar re-construction (Diepart, 2015a). Put aside the land speculation for an anticipated earning from land market, population pressure is one of the driving forces for settlement and

land occupation in new pioneer area such as Otdar Meanchey. Integration in farming is purely done on family initiated based. Therefore, household has to mobilize its own resource to start up farm work. Since village settlement and land occupation have started in 1998-2000 in Otdar Meanchey, I am not sure under what legal framework that local authority can organize and distribute the land to people in Otdar Meanchey before 2003. Apparently, the measure was taken under specific respond to new created provinces in 1998 when the Khmer Rouge force integrated into the formal administration of the state. Among three specific measure issues by Prime Minister Hun Sen of win-win policy for Khmer Rouge integration, one of the measures is that former Khmer rouge leader can manage the land and distribute land to its people and demobilize military (see also page in historical setting of the study area in chapter 3).

The Sub-Decree No.19 on Social Land Concessions (SLC) provides the ground for local authorities to initiate the social land concession to the landless and land poor at local level and the Ministry of Land Management, Urban Planning and Construction (MLMUPC) to establish residences and/or generate income through agriculture. "Social land concession" is a legal mechanism to transfer private state land for social purposes to the poor who lack land for residential and/or family farming purposes to meet the basic needs. The purpose of SLC are: to provide land for residential purposes to poor homeless families, to provide land to poor families for family farming, to provide land to resettle families who have been displaced resulting from public infrastructure development, to provide land to the families suffering from natural disaster, to provide land to repatriated families, to provide land to demobilized soldiers and families of soldiers who were disabled or died in the line of duty, to facilitate economic development, to facilitate economic land concessions by providing land to workers of large plantations (Chamkar) for residential purposes or family farming and to develop areas that have not been appropriately developed. Under the SLC programme, concession (Sampathian) rights would be granted as possession (Paukeas) if a Social Land Concession recipient remains on the land for a period of five years and follows legal duties. Then, he/she can apply to convert the concession rights to ownership (RGC, 2003). Sub-Decree No.146 on Economic Land Concessions aims to stimulate investment to improve productivity and agricultural diversity through large scale plantation in rural Cambodia and to create jobs in the country side (RGC, 2005). We can see that within ELC, there can be a SLC. Illustration 8 below illustrates the legal framework on land management in Cambodia.

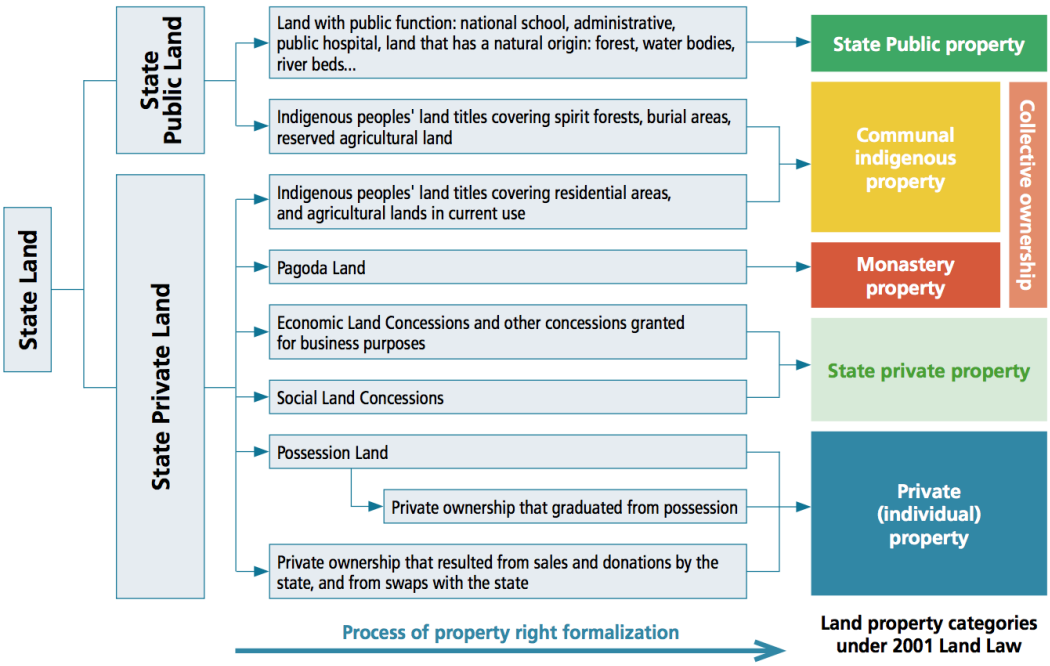


Illustration 8 Process of property right formalization under the land law 2001

Source: Diepart (2015a, p. 16)

According to the above land and legal framework, we can see that the RGC's land reform programme focused on measures to strengthen land management, land distribution and land use (RGC, 2014b). Therefore, even though there is no specific measure to handle with youth integration program, the existing land law, especially social land concession, and existing National Development Strategic Plan (NDSP) and Agricultural Sector Strategic Development Plan 2014-2018 (MAFF, 2015) clearly stated the commitment the government in reforming land and land distribution. These would provide accessible space for land distribution for future youth integration program in farming sectors.

As of June 2014, 12,374 households have been granted social land concession of which 49,312 ha for demobilized soldiers, 50,103 ha for civil poor, and 13,752 ha supported by donors. This accounted for only 0.6% of total Cambodia's land (Diepart, 2016). This amount of land is very small comparing to land that has been distributed to economic land concession. Given the supply of unqualified job in secondary the tertiary sector is not meet outweighed demand of the active labor from rural area, there will be more youth have to be accommodated in small holder farming. Therefore, there would be more land needed in the future at the expense of forest land and wetland. The possibility to get land is to reform and reallocate the canceled economic land concession to smallholder farmers. Therefore, more

ambitious program for social land concession shall be taken into consideration by the Royal Government of Cambodia (Diepart, 2016).

Table 86 Estimation of land distribution by land tenure regimes

Land Categories	Area size	
	Ha	% of total
Systematic Land Registration*	1,023,125	5.60%
Land titles under Order 01*	1,010,429	5.60%
Other cultivated areas (untitled + with sporadic land titles) *	1,037,829	5.70%
Social Land Concessions (SLCs)*	**113,167**	**0.60%**
Economic Land Concessions (ELCs)	2,114,485	11.60%
ELCs Cancelled	**433,240**	**2.40%**
Protected Areas (PA) + Protection Forests (PF)	3,667,404	20.20%
Forest Concessions (FC) - unclear status	1,761,390	9.70%
Community Forestry (CF)	410,025	2.30%
Forest Cover (unclassified)	2,576,702	14.20%
Water bodies	827,088	4.60%
Roads	50,000	0.30%
Settlements + Infrastructure	343,172	1.90%
Undetermined (Non-Forest)	2,792,882	15.40%
Total Cambodia	**18,160,93**	**100.00%**

Source: Diepart (2016, p. 17)

*Note: * is smallholder agricultural land.*

5.4 Factors determine youth to settle in farming

5.4.1 Generation born and land access

In Takeo in both irrigate and non-irrigated zone, those who were born in 1980s have less access to education, especially those who fail secondary and high school exam during 1996-1998 when there is a change of minister of education who tightens the educational exam procedure. Youth generation born in 1980-81 and 81 in Takeo province tend to settle in farming with their land quota distributed by the state to youth's parent. Parents is then morally obliged to share this land quota of between 18a to 20a to youth at their marriage. Normally, youth settle in farming at their marriage. As shown by reason of settlement in Tram Kak and Prey Kabas in chapter 3, the main of settlement in the villages of Tram Kak and Prey Kabas is driven by marriage with resident in the villages. However, this small land share quota is very unlikely to sustain the living; therefore, husband or wife has to engage in non-farm activities to complement family living including migration to city or abroad (Thailand or South Korea). But those who were born later have no land. So, the strategy depends on the performance of their education. Parents always advise children about this condition and motivate them to do well on education and want them to pursue higher education in order to find higher non-farm income job (with stable salary). This was revealed

by the qualitative interview with key informant. Being aware of their family situation of having no more land, youth is aspired for non-farm job. Their only choice is doing best in education. But they are unsure if their parents' situation is able to finance their study are not. If not success in education, the last resort is only to work on farming and migration for labor based work.

The situation is quite different from low density area zone. Those who were born in late 1980s early 1990s have very limited or even no access to education due to instability and security of the area. Together with the growing family members, with a gradual stability in the area provided access to clear land, parents living within and nearby provinces decided to move to low density and occupied more land for children. Those who get marriage between years 1996-2002 and later tend to get land from parent between one to two hectares from both bride or/and groom's side. Married couple tries to mobilize resource such as migration to accumulate land. Some youth families get up to 5 ha or more due to the combination of land share at their marriage and this land is to secure family living and children education. Youth of the parents in the previous generation in late 1970s early 1980s tend to settle more in farming due to low access to education. The school development starts once the new villages were established in between year 1996-2002 when the new settlement took place. Youth mainly drop out at primary school and secondary school. In later 2008, even though high school is available but many youths drop out already. Therefore, children who born in late 1980s and early 1990s generation tend to settle in farming. The field observation suggests that it takes up to 2 generations (children of those who born in late 1990s) of people in Otdar Meanchey to get to high school and higher education given the poverty in the area. Those who get land between 4 and 6 ha of agricultural land tend to secure living than those who get less than this. Due to low land productivities, those who have land between 2 and 3 ha are unlikely to sustain their living and there by migration is at typically strategy of youth family in this area to accumulate capital to expand land and farm investment.

5.4.2 Political integration at different time impacted on different integration in farming

As already mentioned in chapter 3, institutional environment, which refers to different stages of different political integration, impacted on different waves of migration and settlement in farming. The story of Otdar Meanchey shares similar story and link to Khmer Rouge integration (*Samaharenekam*) impacted on different waves of settlement in new area in Northwest Cambodia especially in Battambang province which has been described by Diepart and Dupuis (2014), and Diepart (2015a). Otdar Meanchey has more stories to tell up to 2008

and 2011 where there is small arm clash between Cambodia and Thailand over territory of Preah Vihear temple which impacted once again on the land acquisition and land conflict between local people, military and the concession company. This political integration creates a condition of open up zone pioneer that provides access to people to occupy the land in the new area and clear forest for cultivation. The combination of growing family members, around the zone pioneer, drives a family a local initiation to move and settle in new area.

5.4.3 Low level of education determines young people's choice of farming

The study supports the observation that young people have difficulties in finding jobs outside agriculture because they have no education. Rural youth have to face uncertainty in seeking decent job beside agriculture due to the low level of education particularly in low density area where the political integration and remoteness determine the access of people to mainly primary school. One youth group leader in Otdar Meanchey reveals that youth in rural areas lack knowledge and skills, and hence often also lack self-confidence. Therefore, they have difficulties in finding jobs besides farming. One key informant in Takeo province argues that to get non-farm job requires high level of education and very strong social network such as having relative in the city. Pursuing higher education is big investment for farmers. Only few farmers can afford to send their children and youth to secondary and high school while the majority of youth drop out. Survey indicates that majority of youths aged 15-30 drop out at secondary and high schools.

5.4.4 Gender and way of household subdivide land to children

Both quantitative and qualitative data show that in Cambodia the way in which family shares land to children is no discrimination between boy and girl. This very much depends on family land availability of both bride and groom. Parents tend to plan land for all children if they have land. For example, case 103 in Otdar Meanchey where the land is planned equally among children even they are single (See Table 77 in chapter 3, page 228). However, if land situation is critical, families tend to follow the tradition that land shall be given to any son or daughter, but mostly daughter, who decided to live with and take care of parents when they get old. Nevertheless, parents give open choice to children. In many cases, parents leave the choice to children by saying that *"this is very much dependent on children performance in education. If children do well, family would like to mobilize resource to support their education such as borrowing micro finance. However, if they fail, there is only one last resort is to live and work in farming with parents or to leave or to migrate to find non-farm works or agricultural wage labors."* Therefore, the study found no discrimination among children

whether boy or girl or even the rank of the children but rather the choice and situation of individual youth who succeed in education in non-farm job or fail in education or in migration.

5.4.5 Non-farm job is not easily accessible: Knowledge and skill demand but competition

Both youth and adult family perceive that it is not easy to find non-farm job because they do not have migration experience. Low level of educations is the main constraint for them to integrate into high labour productivities non-farm job. The case study of YAE-CEDAC clearly reveal that many youths decided to taking part in YAE program had experienced the hardship from the previous migration such as working as private security, construction work, garment factory work, private primary school teacher etc.

> *"I failed high school exam and I have no motivation to study for re-exam. I wish to become primary school teacher. I seat for exam several times and did not pass. I decided to migrate to Phnom Penh to find work. I worked as garment worker for a while, and then I worked for private company. However, the works is very hard and I earn very little just enough for survival in the city. I spent 4 years on those work and I did not save much. I then return home and work on farm and then get marriage. I got 0.2ha from my parents and 0.2 ha from my wife's parents. Farming is hard work and I never wish to do farm work but if I do not farm, I will not have food to sustain living. Now I have to do construction work to earn extra income to support my family.", Said 31 years old married youth in Chrey Thnoat village, Tram Kak commune (Case 273-TK-1-Youth-UH).*

5.4.5 Couple strategy

Any member of the youth couple has to engage in non-farm activities such as construction work, wage labour sells or to migrate after working on the farm for a while. Adult household is also dependent on remittance from young migrant to maintain its durability of livelihood in case their farming does not meet the need. Youth have to leave behind their children with parents and remittance is sending home to support baby and to support parents. The combination of land share from both bride and groom also increase the land size and the support from parents in both sides to strengthen the capacity of youth integration in farming. Migration youth expect to have land share from parents, tend to return back and marriage in home village (Yagura, 2012).

5.4.6 Investment in children education

Although parents' aspiration is to see children doing well in education, two factors determine the children performance in education including children own performance in education and family socio-economic status. Some family who have poor social economic status tend not to afford children education and thereby, youth have to drop out and seek alternative activities such as farming, migration or non-farm work. Children's performances in education also determine the commitment of the family to invest with an expectation that they can finish their study and seek non-farm job such as salaried employed that may contribute to family economy in the future.

There is a form of sacrifice of family member to drop out to seek non-farm work or to migrate among family members in order to help lifting family situation and thereby investing on education of some particular family members. There is no discrimination among male and female who sacrificed. It is very much dependent on who is doing well and not in education. The distribution of family members who drop out and on migration shows both man and woman. The impression from the qualitative interview suggests that women tend to sacrifice to drop out and take up farm work or to migrate to do non-farm work such as garment factory worker to support man family members who are still studying high school or continuing higher education.

The investment in children education also takes the form of borrowing from micro finance institution especially when children need to pursue higher education at university such as paying school fee (in case that children did not get scholarship), living costs and other cost and sending rice and agricultural product from home village. Selling agricultural land for supporting children education is also done by household. This situation is impressively found in Prey Kabas district where people seem better off than any other zones.

5.5 Discussion and conclusion

Analysis perception of single youth, youth household and adult household suggest that there is no discrimination among them regarding the choice of occupation in farming. Rural youth and household tend to give positive view on farming. It is also found the same among the Malaysian youth (Abdullah, Samah, & Othman, 2012).

Cambodian single rural youths have been brought up in agricultural setting and learn to farm since their childhood, thereby, they tend to view that it is not difficult if they start farm work. However, youth households who already set up in and experience in farming share

their first experience that it is not easy especially referring to the fact of lacking technical knowledge and experience. They, hence, need parents to support at least one to two years. Adult households tend to view that it is easy referring to the fact that they have experience and it is culture and tradition that they used to practice. However, the study found that in irrigated area where rice is intensified, traditional knowledge is no longer applied; youth would need more technical knowledge on rice farming.

While the perception studies on Indian youth in farming found poor income from farming drive youth to lose faith in agriculture and dislike farming (Narain, Singh, & Singh, 2016), this study found no relation between economic situation and the perception on farming. The triangulation between farm type, farm economic capacity situation in comparison with the minimum threshold of poverty provide no clear-cut answer that situation of farm household economic does influence the perception toward farming. However, the qualitative interview suggests that learning the experience from unsuccessful migration, the perception on the difficulty to seek non-farm activities beside farming drive the households to perceive that farming is a good option for them and their safety-net. Hence, though wishing their children to do well in education and seek alternatives beside farming, still majority of rural households reveal intension to hand over the farm to children or subdivide land for children under the moral obligation: *"sharing the survival"*. This is because children have low level of education and hence they have very few alternatives beside farming.

The situation of farm economic such as low profit, small land that drive rural household to motivate children to do well in education in order to seek alternatives outside the farming sector. On the other hand, the limited offer of low skill job for rural youth who mainly drop out at below high school become a learning experience for youth and some farm families to view farming as one of the good option for rural youth. *"Farming is good for the poor. Farming requires less technical knowledge. Farming is better than migration (construction work and garment work). Farming is a source of livelihood. Without farming, we will be poor. No farm, no food."* These quotations are expressed by respondents from the social economic survey. Therefore, from individual youth and family perspective, there is a strong motivation for choice of occupation in farming given that there is no alternative linking their low level of education of rural youth.

Unlike Bylander (2013) who found that household increasingly perceive agriculture-based livelihood strategies as unwise and risky due to the recurring of environmental shock. This study found opposite that rural household who does not have alternative and poor access

to non-farm sector tend to view that farming is their safety-net and provides basic source of living and support children basic education. Migration is, hence, on one hand a strategy to recover the farm operational cost for keeping the continuity of rural farming and livelihood. On the other hand, migration is to earn the complementary income added to the farm income that cannot support the daily living due to small land as well as to accumulate household asset such as land expansion, buying two-wheel tractor and to start up self-business.

The case study of YAE-CEDAC's youth integration in farming project shows that youths taking part in the project have very strong commitment toward farming from both youth and parents in supporting youths to start up farm work. However, as indicated by life story of YAE, except those fresh high school graduates, all YAEs used to have migration experience and unsuccessful migration. This is the reason that motivated them to go back and settle in farm.

Given not so many alternatives available especially accessibility to non-farm job, farming is one of the motivation for rural youth to decide for future job. This can be seen through single youth view on farming and youth and adult household view on farming. However, the quality of farming itself determines the view whether farming is good or not good. That is the farm capacity of generating income to meet living.

The only last option is farming or migration if children fail in education. Given the land is not available to subdivide in zone high density areas such as Tram Kak and Prey Kabas. Tram Kak and Prey Kabas strongly motivate children to study well in order to integrate themselves into non-farm sector, while in Otdar Meanchey access to school is still limited for rural youths. More youths are going to drop out below high school and engage in farm work or migrate to Thailand. Given the situation of land is still available from the previous occupation by parents, youths would likely to settle more on farming at their marriage in the area even on the small land about 1 to 2 hectares.

The aspirations of rural parents are to see children working on other non-farm jobs which could generate higher income than farming. However, since their ability of supporting children education is limited, mostly rural youth can afford up to only high school or less. Some drop out because of their poor performance in school. Thank to this, they are living with their parents either helping farming activities, seasonal off-farm activities such as harvest corn, or bean in other area or migrating to Thailand.

The way people see agriculture is a good option or not may be different from parents' generations and children education, experience in farming and the context of land availability at different location such as low-density area in Otdar Meanchey, high density area non-irrigated area in Tram Kak and high-density area irrigated area in Prey Kabas.

In low density area, given high level of drop out both youth and adult family tend to design future for their children by trying to expand land in order to secure the future of their children. This can be seen through the initiative to occupy the land, to move from old village to settle in new village and get more land or to migrate (by single drop-out youth, or married youth, or household head), particularly to Thailand in order to accumulate capital to buy rice land or residential land. In this area, many more youth are like to settle in farming even on the small land between 1 and 2 ha which is the size below the minimum threshold of living. The future of youth couple that are going to settle in farming is going to combine the farming and migration particularly to Thailand and in within Cambodia. The facilitation of cross-border pass currently done by the government would help facilitate migration of those rural households and contribute to improve livelihood of smallholder farming. The improvement of farming via the combination with both farm and non-farming would help the household able to invest in future generation children's higher education so that they can integrate into non-farm activities in the future.

In high density area like Prey Kabas and Tram Kak, situation of land does not permit younger generation of youth to settle on farming provided that the youth's land quota shared by the state in very early 1980s was already given to youth who, by now, are at the age of more than 30 years old. Hence, youth couple who got their land quota in 1980s and adult family who have children born in late 1980s have no alternatives but to motivate and invest in children education so that they can integrate into non-farm sectors. The existing farming would have to combine with non-farm activities either by migrant youth or by household head. Therefore, the existing farming is safety net for them if they failed in migration or when they pause from migration. Given investment of education is expensive and not many family can afford. The last resort of drop out youth is going to be accommodated by the current farming and wait for opportunity to migrate or seek non-farm activities. In this sense, household in this area must have a complementary income either by self-business or salaried employees.

Drop-out youths tend to see farming as good options because they do not have alternatives besides farming especially in the situation of the limited availability of non-farm activities. Farming is not the first aspiration for youth currently studying even though they

share positive view on farming and have no discrimination on farm work. Farming is considered as their last resort when they failed in education. They aspire to work on non-farm activities such as salaried employees or become civil servant such as teacher that they can combine the non-farm activities with farming activities. However, this very much depends on youth performance in education that drive parents' motivation to mobilize resource such as borrowing relatives, and use relative network in the city to invest on those children.

In parents' perspectives, doing well in education and seeking non-farm job are their first aspirations. If children could not do well in education, the last resort is to stay at home and help working on the farm or migrating to seek non-farm job which contributing to family if the existing farm has already met the labor demand. The land availability for subdivision is the main problem. Those who were born in the time that land was distributed successful or failure in education, parent is obliged to share his/her land quota but for those who were born later, this land share is optional and parents have no moral obligation to share land. Then, land subdivision is dependent on the capacity of the parents to accumulate the land after the period of land distribution.

Drop out either take up farming or migrate for non-farm job has a form of sacrifice and investment in order to invest and support any member of the family to do well education and seek non-farm job. There is no discrimination on rank of children or gender. For example, younger sister can take up farming to support older brother to study at university (Case of PB) or older sister drops out and takes up farming to support younger sister and brother to attain high school (case of Tram Kak) and vice versa. Those who succeed in study and get non-farm work tend to help family and family member who currently studying at secondary or high school. The previous migration could be a social network for youth either dropping out or finishing high school to follow the path elders either university or non-farm work. That is why the term investment in education is very vague in a broader sense.

A case study with YAE-CEDAC shows the same thing as survey that youth having hard experience on migration views non-farm work is difficult job and earn less. That is their first motivation to participate in YAE program. However, after few years of experience farming, the degradation of farm economic drive some YAEs to quit farming and seek non-farm job and they expect to resume farm work again when they do well in non-farm work and regain their financial capital for continuing farm work.

Unlike many studies demonstrate that youth is growing more disinterested in farming. Cambodian youth and family show no discrimination of farm work and regards farm work as better option comparing to other low productivities non-farm work such as garment work.

Farm work is considered as safety net for rural Cambodian family. Migration is temporal job of life trajectory and seeks financial capital to invest, to strengthen and to expand farming activities when they get old and are unable to migrate anymore.

The assumption that family farm profitability or economic is the main factor to drive youth or family member to decide to move or to stay in farming is partly correct when talking about any discrete point of time. However, considering time span in the life cycle trajectory, I can see that farming plays an important role in ensuring safety of the family and therefore, migration is a temporary activity to seek financial capital to invest on their safety package when they are no longer able to do non-farm work.

Although farming is not so profitable, low level education and limitation of availability of non-farm job drive youth and family to perceive that farming is a good option. Therefore, the initial assumption that degradation of farm economic is the factor that drives people to perceive farm work is not a good option is not correct. So, do my initial hypothesis to say that the capacity to generate profit of family farming do tell the prospect for future integration is not favorable is also not correct. Because in reality, youth have to install in farming even though the land is very small far below the MSI. Under moral obligation of rural household *"sharing the survival"* is atomized to youth even 0.1 ha at their marriage. That is because of the institutional environment such as land distribution in 1980, 1981 and 1982, political integration in 1991, 1996, and 1998, exam tightening (academic lifted) policy on education in 1998, the beginning stage development of non-farm activities and the event of baby boom in 1980s. This gives us the prospect that youth would have to install more in farming in the future and they are going to combine both farm and non-farm activities. Therefore, more land would be needed.

Given that many rural youths often drop out at secondary and high schools and going to settle in farming, the integration of agricultural skill in secondary or high school could be a part of solution. In addition, due to the fact that rural youths often lack self-confidence and life skill, personal development and livelihood skill should be included in the training in order to aspire youth and their family to foresee the future challenges and initiate their aspirations and choice for the proper response.

Role of CBOs in the survey and qualitative interview is mainly religious purpose and poverty relieve such as saving group, rice bank, village bank but play no role in supporting youth settle in farming. Therefore, youth integration is mainly done by family own initiative to secure the future of their children. Very few attempts have been done by NGOs such as CEDAC to integrate youth into farming. However, very few cases proved to be successful

thank to the strong family support and the combination of non-farm activities of family member. The integration program of CEDAC can help youth overcome the technical constraints related to farming but not the farm economic that meet the need of the rural household. The limitation of financial support for youth to start farming is also one of the challenges of the program.

This study based on the current situation of farming where many households in the small land holder farm type and the situation of youth drop out mainly on secondary school especially in low density area, the perception on availability of non-farm activities given by respondents, the motivation indicate in the perception there is still a strong motivation of smallholder family farmer to design future of their children in farming and single youth perception who has no-discrimination on farm work if it is profitable, and role of farming as a safety net for them, I concludes that many more youths would have to settle in farming. Under the shared motor or shared rule as *"sharing the survival"*, land is going to subdivide among the small holder farming to their children as observe in some cases in zone Tram Kak and Prey Kabas and clearly indicate in zone Otdar Meanchey. This finding supported by the recent work of Diepart (2016) who runs the demographic scenarios on active worker, job offer in secondary and third sector with different required land scenarios updated from the work of Pillot et al. (2000). Diepart (2016) shows that the grow of unqualified job would not be enough responding to the growth of active workers supplied from rural area, and, therefore, in all scenarios, smallholder farming in Cambodia would be definitely need more land to accommodate those growth active workers. Even if the existing legal framework under the social land concession provides ground for land distribution; however, the question of youth occupation in farming is neither at the political will of the government nor at the policy idea so far. Therefore, further research on this matter such as the work of Diepart (2016), Pillot et al. (2000), Pillot (2007) and the study on youth integration in farming would be necessary for informing the policy maker. Rural migration study, rural settlement and youth integration in small holder farming are not at the attention of Cambodian's research interest so far. Promoting this thematic in the research arena in Cambodia would help informing the policy maker and political will of the Royal Government of Cambodia.

The study concludes that given the absence of institutional support, youth integration in farming have been done on family institution. Local based community organization are mainly for religion purpose and existing development program are mainly contribute to enhance rural living condition which plays no role in supporting youth in farming. There are very few youth integration programs which have been attempt to trial that can overcome the

technical constraint of farming such as YAE project of CEDAC. However, without the strong policy support from the government such as facilitate access to land, credit for starting up farm work and lack state coordination program regarding employment creation in farming, youth integration in farming either done by family or NGO program would face the serious challenge in term of maintaining economic sustainability of rural household and the sustainability of the intervention program by NGOs.

CHAPTER 6: THE FUTURE PROSPECTS FOR YOUTH INTEGRATION IN FAMILY FARMING IN CAMBODIA

SYNTHESIS OF STUDY RESULTS AND CONCLUSION

This dissertation contributes to the ongoing debates whether rural development should focus on small farming or non-farm farm activities development (Rigg, 1997, pp. 165-198; 1998, 2006), and whether or not farming is attractive to the youth (White, 2011). The dissertation contributes by examining the extent to which Cambodian family farming can accommodate the youth; what is the role of non-farm activities; how youth and adults perceive of farming; and what are the institutional dimensions of possible future youth integration in farming. Youth in farming is defined as single or couple aged persons below or equal to 35 years old engaging and exploiting livelihood from farming activities.

The present chapter summarizes the main findings from chapter three, four, and five in order to reflect and to draw conclusions on the prospect of integrating youth in family farming in Cambodia. In chapter three, I explored the general situation of family farming in the two provinces of Cambodia-Takeo (high population density area) and Otdar Meanchey (a low population density area) to understand the economic sustainability of farming in the two areas, i.e. what earnings each activity in farming could generate in combination with non-farms income sources. I concluded that, for most households, farming alone cannot meet the families' actual subsistence needs. To see different livelihood strategy, based on their farming activities, I grouped the households into different farm types, and found that a majority of farm household had a financial surplus thanks to the combination of farm and non-farm activities. However, when comparing this situation to the minimum threshold of poverty per household (See page 144, 166, 175), the results show that a majority of the rural households in fact live under the threshold which implies that they are living under hard situation. In Chapter four, I investigate farm capacity for future youth integration in youth and adult household respectively. It appears that, on the one hand, a majority of the households cannot add even one additional member into their current farming systems. In spite of this, all types of households actually host many young people, who have not been able to get employment in other sectors. This situation drives rural household to secure the future for their children by sub-dividing their land referring to the moral obligation of *"sharing the survival"*. In the future, an increasing number of young people therefore must survive by doing farming on even smaller plots of land below the minimum surface for sustainable integration in farming

(MSI). Therefore, young people will increasingly be forced to combining farm with non-farm activities. In the current study, this is seen most clearly, in the low density area, where households migrate into Otdar Meanchey province to acquire more land for their children.

In Chapter five, I examine how individual single youth, youth couple (youth household) and adult household perceive of and value agricultural work. In the Chapter, moreover, I explore the role of CBOs, NGOs, and policy in supporting youth integration in farming. I find that youth integration has been done solely by family initiative. The CBOs that are active in the study areas are mainly religious, aim at organizing saving groups, or are concerned with development activities that play no role in supporting youth start-up in farming. Only CEDAC has a small youth integration test program. The results show, moreover, that a majority of the young people (YAE), who have taken part in the program for several years have quit the program. They have learned that the outcome from farming cannot cover their subsistence. The villagers call this *"the livelihood factor"* or *"Kak Ta Chi Veak Pheap."* Through the CEDAC case study, I found that the program provides support to the youth in terms of entrepreneurship, personal development, and technical knowledge. However, the main challenge for the youth to start up farms are the lack of funds to help them access markets, and the general problem of creating a livelihood surplus based on farming alone.

With regard to existing national policies related youth integration in farming, I found that there are not yet such policies in place for the idea of creating youth employment in farming. There are related land policies, particularly regarding social land concession, that could provide access to land for youth integration in family farming. In practice, state and donor supported programs have made some efforts to accommodate this need. However, there has hardly been any implementation of land tenure reforms within the framework of social land concessions. . For the same reason, I with Diepart (2016) suggest that the cancelled economic land concessions should be reallocated to people and that the government should ensure implementation of relevant programs under the existing social land concession scheme.

6.1 Economic sustainability of farming need a complementary from non-farm activities

In Rural Cambodia, due to the small farm size 59 percent of rural household will encounter economic unsustainability unless they can complement their incomes with non-farm activities. My study shows that non-farm income has contributed to ensuring incomes above

subsistence level for 76% of the rural households. However, comparing with the average minimum threshold of poverty per household, my results also show that more than 60 per cent of the household live below the threshold level (See page 158, 166, 175). The combined picture shows that the prospects for future sustainability of family farming in the study areas are not good.

This could explain why people decide to move away from farming and why it is not attractive to youth. Scholars often observe that in Cambodia and other developing countries, development projects aiming at raising rural agricultural productivities fail after the projects finish one or two years. The most of the common answer lie upon the lack of ownership and motivation of farmer. But I rarely see any study explain this situation from the sustainability of economic of family farming linking to the obvious poverty situation. My study shows that it is in fact not the lacking of ownership or motivation but rather that the families cannot meet their own livelihood needs through farming alone. This creates the kind of trend and shock, which is also explained in the sustainable livelihood framework (Ellis & Freeman, 2005). I see this as a constant degradation of rural livelihoods. It naturally drives people to quit farming or seek alternatives particularly in the form of long-term migration. While this is in line with economic migration theory, which explains that the push and pull factor of migration is personal calculations of costs versus benefit, where each individual compare status quo to an anticipated destination. Economic migration theory, however, cannot explain how the farming family as an organization or an institution makes decisions about migration.

However, there is also limited availability of non-farm activities. Migration to cities therefore requires skill and strong social networks even for a job as unskilled garment worker. Rural households therefore initiate and develop local non-farm activities, such as small scale business as a complement to farm work.

The tendency is for small land poor resource households to rely more on non-farm activities. For example, the households in TK-1 with average farm size 0.38 ha, 60 per cent of income is from non-farm farming activities. However, for the farms with more than 0.78 ha, farming contributes more than 64 per cent to total household income. In general, 68 per cent of total income is from farming. Given that more than 65 per cent of total expenses are on food, farming still play major role in contributing to household income as well as ensuring food security to household.

The Government's most relevant recent effort is to facilitate legal migration. This is expressed in the official labor employment policy. However, it is likely that this offer will not be enough to accommodate the growing rural active labor force. The answer to the question whether development should focus on small-farm or non-farm employment which Rigg (2006) raised is not easy. Based on my study in Cambodia, I share the view of d'Orfeuil (2012) that governments in developing countries, including in Cambodia, lack capacity to transform non-farm sectors to accommodate the growing labor forces. This puts pressure on small holding farming and result in double exclusion. This double peasant exclusion should be acknowledged as a global problem on line with poverty and hunger, climate change and environmental degradation.

The historical demographic-economic transition processes of the European countries that can keep transition without sustaining structural unemployment can no longer serve as a model for developing countries in Africa and Asia with rapidly increasing numbers of young people entering job market and seeking for jobs (d'Orfeuil, 2012). As far as food security and poverty of rural household is concerned, in my view from this doctoral study, the priority should be given to small farming first. This view is supported by the P. Hazell, Poulton, Wiggins, and Dorward (2006, p. 35); and Dorward et al. (2004, p. 17). Without an assertive agenda towards small farm agriculture, poverty will likely increase, migrations to urban areas could be overwhelming (P. Hazell et al., 2006).

6.2 Motivation, perception on farming: to leave or to stay

The present study shows that youth and households have positive views on farming. They think that farming can provide them their basic subsistence needs and provide their children with basic education. In addition, farming can allow them to diversify their incomes such as being teacher (civil servants), have a small business (self-employed), or migrate.

The CEDAC case shows that rural households "hang in" agriculture if their assets and activities are engaged to maintain their livelihood. Rural households "step up" if the current assets are invested to expand activities, production and income will improve livelihood. Rural households " step out" if existing activities are engaged into the accumulation of assets that can provide a base for moving out into different activities for example accumulation of livestock as saving that can be sold to finance children's education (Dorward et al., 2009).

Unlike some African countries, such as Ethiopia, where studies suggest that policy prescriptions aiming at integrating young literate farmers would be challenged by the parents,

who are strongly against the idea engaging in agriculture (Tadele & Ayalew, 2012, p. 22). The present study concludes that smallholder farmers in Cambodia have a much more positive attitude towards the role of agriculture. Unlike White (2011) who argue that agriculture is unattractive to young people and Hall et al. (2012), who states that 'there is increasing evidence from across Southeast Asia that farmers would like to get out of agriculture themselves and, even more, that they hope their children will not become farmers', this study thus shows a different perspective (Diepart, 2015b; Maltoni, 2006a, 2006b, 2007; Pilgrim et al., 2012). Having concluded so, I acknowledge that this is very much dependent on the youth generation (cohort), I have studied, and that future atomization of land could change the general view toward farming in rural Cambodia.

6.3 Future prospect of youth and Cambodian family farming

Given the low level of education of rural youth and limited job offered in urban area, rural youth will face few alternatives and settlement in farming sound promising to them at their marriage. Under to moral obligation of parents to share to the survival to children, will is going to sub-divide or otherwise youth have to work and reside within the current small land farming. This situation is very challenge for current farming in term of sustaining livelihood. Non-farm activities will have to play even more important role in complementary to the farm income. The smallholder farming will have to accommodate more youth in the future and they will be in need of land.

On international Labor Day 1 May 2012, the Royal Government of Cambodia announced that there is sign of labor shortage in garment industry, construction, and agriculture and called for rural people to work within the country rather than to migrate abroad (RFI, 2012). Kang and Siv (2013), however, conclude that withdrawal of labor force from the agricultural sector would impact negatively on agricultural productivity. However, this doctoral study concludes that since migration is due to scarcity of land, avoided migration cannot increase productivity. On the contrary, the earning from non-farm activities and remittance from migration is likely to be used for farm investment, investment on children education, supporting daily food consumption, and expansion of household assets.

Where is the arable land that should meet the need of the growing young labor force? As suggested by previous study such as Ngo and Chan (2010a), Ngo and Chan (2010b), Hansen and Neth (2006) and Yoeu (2016) that investment on large scale plantation via economic land concession (ELCs) have not led to increased agricultural productivity or

economic growth in Cambodia. Redefining Cambodian land tenure such as distribution of cancelled ELCs to rural land less or land poor could be a solution to the future land demand.

In Cambodia, it is not a matter of like or dislike farming by youth or adult but it is a matter of having enough land to meet employment in farming that meet the subsistence living or not. So far, supporting youth integration in farming is solely done by family initiative. Without enough institutional support for youth integration in farming, and without very strong state desire to transform the agricultural sector and land tenure systems, the motivation from youth and farm household alone, even with NGOs support, will yield no prospect of long term sustainability of farming and rural livelihood (Wampfer & Bergès, 2017; Wampfler, 2014).

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APPENDIX

Appendix – 01 Land and labor productivity of cropping systems

Land and labor productivities of crops in the three study areas

1. Otdar Meanchey

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
OMC.HR.Land	184	0.00	20.00	703.15	3.8215	2.84615
OMC.HR.GVA.$.per.ha	180	140.00	703.13	51361.17	285.3398	108.14637
OMC.HR.VA.$.per.ha	180	97.50	610.00	44138.07	245.2115	97.33021
OMC.HR.IC.$.per.ha	180	0.00	351.56	7223.10	40.1283	38.02370
OMC.HR.PL.$.per.ha	180	0.00	347.50	13413.07	74.5171	56.97450
OMC.HR.Labor.Require.per.ha	180	0.00	192.00	8787.85	48.8214	27.96754
OMC.HR.Labor.family.per.ha	180	0.00	156.00	5365.37	29.8076	23.72011
OMC.HR.LAND.Productivity.$.outlier	170	131.25	610.00	43050.65	253.2391	94.13005
OMC.HR.LABOR.Productivity.$.outlier	155	1.11	10.95	733.62	4.7331	2.34091
OMC.HR.Profit.$.per.ha	180	12.86	563.88	30725.00	170.6945	100.85432
OMC.HR.Profit.$.Rate.per.ha.outlier	151	.22	4.29	249.45	1.6520	1.10053
Valid N (listwise)	126					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
OMC.HR.Labor	184	0.00	737.00	29651.35	161.1486	115.74688
OMC.HR.GVA.$	184	0.00	9000.00	191745.65	1042.0959	973.68461
OMC.HR.VA.$	184	0.0	8687.5	166071.0	902.560	905.8549
OMC.HR.Consumption.$	184	0.00	2400.00	100256.36	544.8715	348.18226
OMC.HR.IC.$	184	0.00	590.00	25674.63	139.5360	127.92920
OMC.HR.PL.$	184	0.00	2300.00	50219.23	272.9306	290.52821
OMC.HR.Profit.$	184	0.00	7187.50	115951.80	630.1728	753.12939
Valid N (listwise)	184					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
OMC.AC.Land	53	0.00	5.00	37.41	0.71	0.98
OMC.AC.GVA.$.per.ha	53	15.02	6250.00	45048.97	849.98	1397.15
OMC.AC.VA.$.per.ha	52	-40.00	5871.00	34552.43	664.47	1154.10
OMC.AC.Income.$.per.ha	53	0.00	6250.00	39689.19	748.85	1344.33
OMC.AC.Consumption.$.per.ha	51	0.00	1000.00	5359.78	105.09	232.66
OMC.AC.PL.$.per.ha	50	0.00	475.00	2909.93	58.20	99.04
OMC.AC.IC.$.per.ha	50	0.00	2375.00	7889.43	157.79	442.58
OMC.AC.Labor.Require.per.ha	51	8.00	3100.00	13435.20	263.44	494.09
OMC.AC.Labor.family.per.ha	51	8.00	3100.00	12813.45	251.24	497.66
OMC.AC.LAND.Productivity.$.outlier	53	-40.00	5871.00	36699.85	692.45	1139.26
OMC.AC.LABOR.Productivity.$.outlier	40	0.10	16.67	184.26	4.61	4.01
OMC.AC.Profit$.per.ha	50	-252.40	5871.00	31496.67	629.93	1185.65
OMC.AC.Profit$.Rate.outlier	32	0.14	7.57	87.12	2.72	2.11
Valid N (listwise)	29					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
OMC.VG.Land	35	0.00	1.50	9.45	0.27	0.37
OMC.VG.GVA.$.per.ha	35	50.00	50000.00	94787.26	2708.21	8376.52
OMC.VG.VA.$.per.ha	35	-37.50	50000.00	90605.50	2588.73	8389.41
OMC.VG.Income.$.per.ha	35	0.00	37500.00	68915.07	1969.00	6308.18
OMC.VG.Consumption.$.per.ha	35	-18.56	12500.00	25872.19	739.21	2206.55
OMC.VG.PL.$.per.ha	35	0.00	562.50	1351.62	38.62	116.11
OMC.VG.IC.$.per.ha	35	0.00	968.89	4200.33	120.01	231.00
OMC.VG.Labor.Require.per.ha	35	14.50	33333.33	65067.57	1859.07	5789.54
OMC.VG.Labor.family.per.ha	35	6.00	33333.33	64720.75	1849.16	5789.28
OMC.VG.LAND.Productivity.$.outlier	31	60.50	4375.00	34075.50	1099.21	1251.97
OMC.VG.LABOR.Productivity.$.outlier	29	0.54	14.83	129.77	4.47	4.07
OMC.VG.Profit$.per.ha	35	-95.00	50000.00	89253.88	2550.11	8399.28
OMC.VG.Profit$.Rate.outlier	20	-0.43	10.99	61.83	3.09	3.70
Valid N (listwise)	17					

2 Prey Kabas

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.HR.Land.total.ha	20	.06	1.30	11.06	.55	.31
R.HR.Yield.4calcul.outlier	17	1.67	6.20	71.44	4.20	1.27
Preykabas.HR.GVA$.per.ha	20	416.67	3375.00	25215.40	1260.77	735.57
Preykabas.HR.VA$.per.ha	20	296.20	2906.25	18052.34	902.62	625.01
Preykabas.HR.PL$.per.ha	20	0.00	493.75	3601.43	180.07	133.41
Preykabas.HR.IC$.per.ha	20	0.00	1166.67	7058.72	352.94	247.84
Preykabas.HR.Labor.Estimated.per.ha	20	29.69	211.25	1436.45	71.82	47.89
Preykabas.HR.Labor.Estimated.family.per.ha	20	1.22	112.50	592.61	29.63	31.84
Preykabas.HR.LAND.Productivity.outlier	19	296.20	1745.83	15146.09	797.16	421.40
Preykabas.HR.LABOR.Productivity.outlier.estimated	17	5.97	16.97	189.18	11.13	3.28
Preykabas.HR.Profit$.per.ha	20	184.50	2412.50	14450.90	722.55	551.70
Preykabas.HR.Profit$.Rate	19	.33	3.46	26.18	1.38	.85
Valid N (listwise)	14					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.HR.Land.total.ha	20	.06	1.30	11.06	.55	.31
Preykabas.HR.GVA$	20	150.00	1750.00	12264.13	613.21	429.60
Preykabas.HR.VA$	20	87.50	1251.75	8474.89	423.74	317.52
Preykabas.HR.Income$	20	0.00	1625.00	6988.88	349.44	454.72
Preykabas.HR.Consumption$	20	0.00	672.00	5275.25	263.76	187.35
Preykabas.HR.PL$	20	0.00	348.75	1871.00	93.55	85.25
Preykabas.HR.IC$	20	0.00	609.70	3693.24	184.66	164.14
Preykabas.HR.Profit$	20	72.50	903.00	6603.89	330.19	254.48
Valid N (listwise)	20					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.2R.Land.total.ha	79	.09	2.65	63.58	.80	.45
R.2R.Yield.Average1.2.outlier	74	1.75	8.36	351.17	4.75	1.33
R.2R.Price.mean.1.2	78	635.00	1425.00	68928.00	883.69	142.58
Preykabas.2R.GVA$.per.ha	79	860.29	7887.23	231235.22	2927.03	1453.48
Preykabas.2R.VA$.per.ha	79	-28.13	3617.71	101119.96	1280.00	759.95
Preykabas.2R.PL$.per.ha	79	50.00	888.89	23809.30	301.38	170.77

Preykabas.2R.IC$.per.ha	79	210.38	3157.34	63754.35	807.02	414.82
Preykabas.2R.Labor.total.per.ha	79	35.47	537.78	10572.17	133.82	102.37
Preykabas.2R.Labor.family.per.ha	79	4.29	277.78	4559.04	57.71	59.59
Preykabas.2R.LAND.Productivity.outlier	76	309.92	3461.82	97239.46	1279.47	701.35
Preykabas.2R.LABOR.Productivity.outlier	66	3.72	24.73	799.10	12.11	5.53
Preykabas.2R.Profit$.per.ha	79	-318.13	3419.79	77310.66	978.62	725.03
Preykabas.2R.Profit$.Rate	79	-.20	3.62	76.79	.97	.77
Valid N (listwise)	60					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.2R.Land.total.ha	79	.09	2.65	63.58	.8048	.44744
Preykabas.2R.GVA$	79	264.00	4837.50	125986.68	1594.7680	991.53374
Preykabas.2R.VA$	79	-14.06	2912.50	76642.09	970.1531	693.56032
Preykabas.2R.Income$	79	0.00	4597.50	93881.21	1188.3697	943.49846
Preykabas.2R.Consumption$	79	0.00	1380.00	32105.47	406.3984	361.94770
Preykabas.2R.PL$	79	30.00	781.25	17596.88	222.7453	145.77523
Preykabas.2R.IC$	79	101.00	2904.75	49344.60	624.6152	459.50156
Preykabas.2R.Profit$	79	-200.88	2593.75	59045.22	747.4078	643.87246
Valid N (listwise)	79					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.3R.Land.total.ha	17	.30	1.72	11.14	.66	.39
R.3R.Yield.Average1.2.3.outlier	17	2.83	7.56	85.87	5.05	1.40
Preykabas.3R.GVA$.per.ha	17	790.00	8604.17	59684.48	3510.85	1750.71
Preykabas.3R.VA$.per.ha	17	285.85	10538.96	42659.99	2312.11	2306.50
Preykabas.3R.PL$.per.ha	17	0.00	1143.75	6977.13	410.42	295.03
Preykabas.3R.IC$.per.ha	17	283.33	2066.20	20378.65	1198.74	442.79
Preykabas.3R.Labor.per.ha	17	40.57	382.12	2522.00	148.35	96.29
Preykabas.3R.Labor.family.per.ha	17	6.67	167.27	1084.42	63.79	57.50
Preykabas.3R.LAND.Productivity.outlier	10	1701.14	2710.03	22613.49	2261.35	320.15
Preykabas.3R.LABOR.Productivity.outlier	12	6.55	28.65	145.50	12.13	6.03
Preykabas.3R.Profit$.per.ha	17	144.34	9830.63	35682.86	1901.69	2225.67
Preykabas.3R.Profit$.Rate	17	.14	4.62	22.49	1.32	1.21
Valid N (listwise)	9					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.3R.Land.total.ha	17	.30	1.72	11.14	.66	.39
Preykabas.3R.GVA$	17	474.00	7800.00	37483.68	2204.92	1706.83
Preykabas.3R.VA$	17	231.63	4661.25	24663.39	1379.76	1218.60
Preykabas.3R.PL$	17	0.00	675.00	4023.38	236.67	172.19
Preykabas.3R.IC$	17	170.00	3138.75	14027.79	825.16	728.09
Preykabas.3R.Income$	17	474.00	7800.00	31397.88	1846.93	1711.14
Preykabas.3R.Consumption$	17	0.00	1662.50	6085.80	357.99	441.88
Preykabas.3R.Profit$	17	153.00	4136.25	20640.02	1143.09	1140.33
Valid N (listwise)	17					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Preykabas.DR.Land.total.ha	57	0.25	6.00	59.37	1.04	0.90
R.DR.Yield	57	1.31	11.92	307.93	5.40	1.63
R.DR.Yield.outlier	54	3.00	8.00	292.95	5.43	1.20

Preykabas.DR.GVA$.per.ha	57	328.13	2980.00	68931.87	1209.33	398.91
Preykabas.DR.VA$.per.ha	57	169.27	2245.00	45713.62	801.99	381.99
Preykabas.DR.PL$.per.ha	57	0.00	688.49	10059.68	176.49	129.47
Preykabas.DR.IC$.per.ha	57	74.48	1006.25	23218.25	407.34	176.79
Preykabas.DR.Labor.Estimated.per.ha	57	18.67	56.00	3117.92	54.70	6.88
Preykabas.DR.Labor.family.per.ha	57	0.00	57.89	605.83	10.63	11.84
Preykabas.DR.LAND.Productivity.outlier	56	169.27	1573.60	43468.62	776.23	331.71
Preykabas.DR.LABOR.Productivity.Adjusted	57	5.56	54.16	1400.06	24.56	12.05
Preykabas.DR.Profit$.per.ha	57	-5.15	1645.00	35653.94	625.51	351.50
Preykabas.DR.Profit$.Rate	57	-0.01	5.70	72.93	1.28	0.99
Valid N (listwise)	54					

3. Tram Kak

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Tramkak.ER.HR.Land	52	.12	2.10	33.68	.65	.43
Tramkak.ER.HR.R1.Yield.outlier	49	.92	7.70	141.55	2.89	1.59
Tramkak.ER.HR.R1.Price.per.kg	27	900.00	1300.00	29380.00	1088.15	103.33
Tramkak.ER.HR.R2.Yield.outlier	50	.80	4.67	120.86	2.42	1.04
Tramkak.ER.HR.R2.Price.per.kg	26	800.00	1300.00	29030.00	1116.54	111.68
Tramkak.ER.HR.GVA$.per.ha	52	283.33	2681.25	50417.17	969.56	513.04
Tramkak.ER.HR.VA$.per.ha	52	225.00	2403.13	40199.30	773.06	467.92
Tramkak.ER.HR.Income$.per.ha	52	0.00	1058.82	13699.07	263.44	299.71
Tramkak.ER.HR.Consumption$.per.ha	52	0.00	2475.00	36718.10	706.12	458.98
Tramkak.ER.HR.IC$.per.ha	52	35.42	645.83	10217.87	196.50	108.54
Tramkak.ER.HR.PL$.per.ha	52	0.00	389.26	2277.36	43.80	81.08
Tramkak.ER.HR.Labor.Require.per.ha	52	46.67	650.00	9825.07	188.94	117.31
Tramkak.ER.HR.Labor.family.per.ha	52	40.48	545.00	8828.42	169.78	103.81
Tramkak.ER.HR.Land.productivity.outlier	50	225.00	1625.00	35893.49	717.87	380.14
Tramkak.ER.HR.Labor.productivity.outlier	50	1.40	9.81	222.31	4.45	2.31
Tramkak.ER.HR.Profit$.per.ha	52	225.00	2403.13	37921.94	729.27	454.27
Tramkak.ER.HR.Profit$.Rate.outlier	49	.37	8.64	153.37	3.13	1.63
Tramkak.ER.HR.VA$	52	36.50	2835.00	25372.45	487.93	463.97
Tramkak.ER.HR.Profit$	52	30.50	2255.00	23224.20	446.62	393.40
Valid N (listwise)	10					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Tramkak.ER.HR.Land	52	.12	2.10	33.68	.65	.43
Tramkak.ER.HR.R1.Yield.outlier	49	.92	7.70	141.55	2.89	1.59
Tramkak.ER.HR.R2.Yield.outlier	50	.80	4.67	120.86	2.42	1.04
Tramkak.ER.HR.GVA$	52	90.00	3137.50	31211.53	600.22	519.04
Tramkak.ER.HR.VA$	52	36.50	2835.00	25372.45	487.93	463.97
Tramkak.ER.HR.Income$	52	0.00	1150.00	9645.45	185.49	254.92
Tramkak.ER.HR.Consumption$	52	0.00	2625.00	21566.08	414.73	386.02
Tramkak.ER.HR.IC$	52	10.63	492.50	5839.08	112.29	78.23
Tramkak.ER.HR.PL$	52	0.00	580.00	2148.25	41.31	110.80
Tramkak.ER.HR.Profit$	52	30.50	2255.00	23224.20	446.62	393.40

Valid N (listwise)	47					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Tramkak.VG.Land	34	0.01	0.72	6.12	0.18	0.19
Tramkak.VG.GVA$.per.ha	34	138.89	31000.00	87168.50	2563.78	5497.15
Tramkak.VG.VA$.per.ha	34	-37.50	29333.33	77750.68	2286.78	5190.41
Tramkak.VG.Income$.per.ha	34	0.00	31000.00	85775.60	2522.81	5513.45
Tramkak.VG.Consumption$.per.ha	34	0.00	525.00	1392.90	40.97	110.41
Tramkak.VG.PL$.per.ha	34	0.00	0.00	0.00	0.00	0.00
Tramkak.VG.IC$.per.ha	34	0.00	1875.00	9417.81	276.99	444.55
Tramkak.VG.Labor.per.ha	34	8.33	1400.00	8041.35	236.51	293.41
Tramkak.VG.Labor.family.per.ha	34	8.33	1400.00	8041.35	236.51	293.41
Tramkak.VG.Land.Productivity$.outlier	31	85.00	29333.33	77777.35	2508.95	5390.40
Tramkak.VG.Labor.Productivity$.outlier	33	0.06	36.16	416.69	12.63	10.80
Tramkak.VG.Profit$.per.ha	34	-37.50	29333.33	77750.68	2286.78	5190.41
Tramkak.VG.Profit$.Rate.outlier	25	-0.17	17.60	124.38	4.98	4.65
Valid N (listwise)	22					

Descriptive Statistics

	N	Minimum	Maximum	Sum	Mean	Std. Deviation
Tramkak.AC.Land	38	.03	1.02	9.42	.25	.21
Tramkak.AC.GVA$.per.ha	38	30.00	2571.43	26624.25	700.64	612.27
Tramkak.AC.VA$.per.ha	38	-210.00	2006.07	19596.82	515.71	535.05
Tramkak.AC.Income$.per.ha	38	0.00	2571.43	24830.63	653.44	610.97
Tramkak.AC.Consumption$.per.ha	38	0.00	1000.00	1793.61	47.20	176.56
Tramkak.AC.PL$.per.ha	38	0.00	0.00	0.00	.00	.00
Tramkak.AC.IC$.per.ha	38	0.00	755.21	7027.42	184.93	167.18
Tramkak.AC.Labor.per.ha	38	10.00	755.56	6960.50	183.17	199.42
Tramkak.AC.Labor.family.per.ha	38	10.00	755.56	6960.50	183.17	199.42
Tramkak.AC.Land.pro.outlier	33	23.44	1544.44	18099.33	548.46	456.27
Tramkak.AC.Labor.pro.outlier	24	1.33	9.99	95.83	3.99	2.05
Tramkak.AC.Profit$.per.ha	38	-210.00	2006.07	19596.82	515.71	535.05
Tramkak.AC.Profit$.Rate.outlier	30	.31	10.63	92.55	3.08	2.57
Valid N (listwise)	21					

Appendix – 02 Access to credit

Source of borrowing

Zone	Source of borrowing	N	%	Mean	Std. Deviation	Minimum	Maximum	SUM
Tam Kak	Family/relatives	7	18%	163	136	25	375	1138
	Your neighbor	1	3%	250		250	250	250
	MFI/Bank	21	54%	371	403	25	2000	7788
	Rice bank/village bank	1	3%	75		75	75	75
	Saving group	9	23%	414	298	50	1000	3725
	Total	39	100%	333	342	25	2000	12975
Prey Kabas	Family/relatives	15	25%	590	641	25	2000	8850
	Your neighbor	4	7%	184	101	38	250	738
	MFI/Bank	39	64%	1131	1039	100	5000	44125
	Rice bank/village bank	2	3%	375	177	250	500	750
	Saving group	1	2%	125		125	125	125
	Total	61	100%	895	945	25	5000	54588
Otdar Meanchey	Family/relatives	8	17%	366	400	25	1000	2925
	Your neighbor	13	27%	325	296	5	1000	4230
	NGOs	2	4%	150	141	50	250	300
	Trader/Employer/Agricultural firm	2	4%	100	35	75	125	200
	MFI/Bank	16	33%	584	751	125	3000	9350
	Rice bank/village bank	6	13%	283	357	50	1000	1700
	Saving group	2	4%	28	31	6	50	56
	Total	48	100%	383	511	5	3000	18761
Total	Family/relatives	30	20%	430	522	25	2000	12913
	Your neighbor	18	12%	290	259	5	1000	5218
	NGOs	2	1%	150	141	50	250	300
	Trader/Employer/Agricultural firm	2	1%	100	35	75	125	200
	MFI/Bank	76	51%	806	906	25	5000	61263
	Rice bank/village bank	9	6%	281	302	50	1000	2525
	Saving group	12	8%	326	301	6	1000	3906
	Total	148	100%	579	739	5	5000	86324

Purpose of borrowing by zone

Zone	Purpose of borrowing	Frequency	Percent	Valid Percent	Cumulative Percent
Tam Kak	For agricultural work, buy agricultural tools/inputs	7	7.2	17.1	17.1
	Investment	2	2.1	4.9	22.0
	To feed the family (buy more food)	5	5.2	12.2	34.1
	To pay for the medical treatment	4	4.1	9.8	43.9
	To pay for children to go to school	2	2.1	4.9	48.8
	To organize wedding/festival	6	6.2	14.6	63.4
	For migration	1	1.0	2.4	65.9
	To repay previous debt	1	1.0	2.4	68.3
	To cope with crop failure	2	2.1	4.9	73.2
	For young married couple starting business	2	2.1	4.9	78.0
	To buy land	1	1.0	2.4	80.5
	To buy motorcycle	2	2.1	4.9	85.4
	To build household or part of the house	6	6.2	14.6	100.0
	Total	41	42.3	100.0	
	Missing System	56	57.7		
	Total	97	100.0		
Prey Kabas	For agricultural work, buy agricultural tools/inputs	16	15.7	25.8	25.8
	Investment	6	5.9	9.7	35.5
	To feed the family (buy more food)	6	5.9	9.7	45.2
	To pay for the medical treatment	2	2.0	3.2	48.4
	To pay for children to go to school	6	5.9	9.7	58.1
	To organize wedding/festival	2	2.0	3.2	61.3
	To repay previous debt	1	1.0	1.6	62.9
	To cope with crop failure	3	2.9	4.8	67.7
	For young married couple starting business	1	1.0	1.6	69.4
	To buy land	17	16.7	27.4	96.8
	To buy motorcycle	1	1.0	1.6	98.4
	To build household or part of the house	1	1.0	1.6	100.0
	Total	62	60.8	100.0	
	Missing System	40	39.2		
	Total	102	100.0		
Otdar Meanchey	For agricultural work, buy agricultural tools/inputs	102	55.4	77.3	77.3
	Investment	3	1.6	2.3	79.5
	To feed the family (buy more food)	6	3.3	4.5	84.1
	To pay for the medical treatment	11	6.0	8.3	92.4
	To pay for children to go to school	1	.5	.8	93.2
	To organize wedding/festival	2	1.1	1.5	94.7
	For migration	2	1.1	1.5	96.2
	To cope with crop failure	4	2.2	3.0	99.2
	To buy motorcycle	1	.5	.8	100.0
	Total	132	71.7	100.0	
	Missing System	52	28.3		
	Total	184	100.0		

Reason for not borrowing by zone

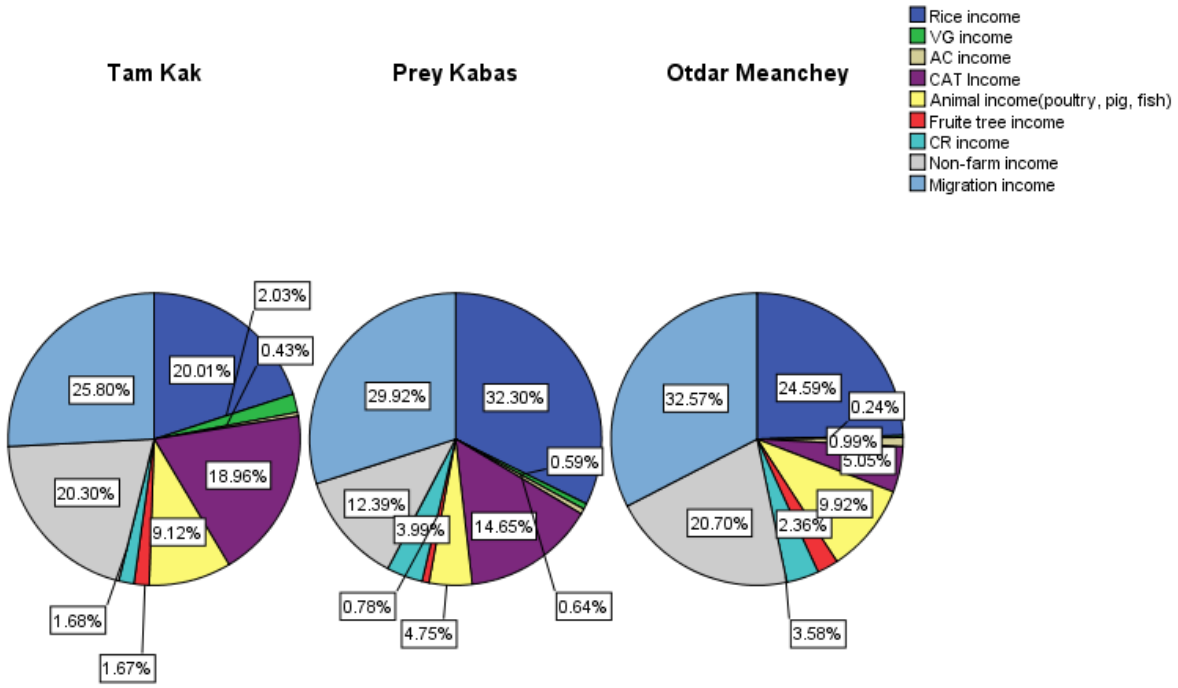
Zone	Reasons for not borrowing	Frequency	Percent	Valid Percent	Cumulative Percent
Tam Kak	Do not need	47	48.5	83.9	83.9
	Cannot afford	7	7.2	12.5	96.4
	To high interest	1	1.0	1.8	98.2
	Family support	1	1.0	1.8	100.0
	Total	56	57.7	100.0	
	Missing System	41	42.3		
	Total	97	100.0		
Prey Kabas	Do not need	36	35.3	90.0	90.0
	Other	4	3.9	10.0	100.0
	Total	40	39.2	100.0	
	Missing System	62	60.8		
	Total	102	100.0		
Otdar Meanchey	Do not need	36	19.6	67.9	67.9
	Cannot afford	16	8.7	30.2	98.1
	To high interest	1	.5	1.9	100.0
	Total	53	28.8	100.0	
	Missing System	131	71.2		
	Total	184	100.0		
Total	Do not need	122	31.85	82.43	82.43
	Cannot afford	23	6.01	15.54	97.97
	To high interest	2	0.52	1.35	99.32
	Family support	1	0.26	0.68	100.00
	Total	148	38.64	100.00	
	Missing System	235	61.36		
	Total	383	100.00		

Appendix – 03 Income situation and income sources

Income status: positive or negative

Zone	Income		Borrow? No	Borrow? Yes	Total
Tam Kak	Income negative	Count	14	13	27
		%	51.9%	48.1%	100.0%
	Income positive	Count	42	28	70
		%	60.0%	40.0%	100.0%
	Total	Count	56	41	97
		%	57.7%	42.3%	100.0%
Prey Kabas	Income negative	Count	6	14	20
		%	30.0%	70.0%	100.0%
	Income positive	Count	34	48	82
		%	41.5%	58.5%	100.0%
	Total	Count	40	62	102
		%	39.2%	60.8%	100.0%
Otdar Meanchey	Income negative	Count	7	37	44
		%	15.9%	84.1%	100.0%
	Income positive	Count	45	95	140
		%	32.1%	67.9%	100.0%
	Total	Count	52	132	184
		%	28.3%	71.7%	100.0%
Total	Income negative	Count	27	64	91
			29.7%	70.3%	100.0%
	Income positive	Count	121	171	292
		%	41.4%	58.6%	100.0%
	Total	Count	148	235	383
		%	38.6%	61.4%	100.0%

Income sources



Appendix – 04 Level of education of family member of 382 household surveyed

Educational level of all family member of 382 household surveyed by zone

Zone	School	Age	Do they currently study?					
			No		Yes		Total	
			N	Percent	No	Percent	No	Percent
Tam Kak	Pre-school	0-6	41	89.13%	5	10.87%	46	100.00%
	Primary school	7-12	2	3.77%	51	96.23%	53	100.00%
	Secondary school	13-15	3	9.38%	29	90.63%	32	100.00%
	High school	16-18	23	53.49%	20	46.51%	43	100.00%
	University/vocational school	19-22	34	70.83%	14	29.17%	48	100.00%
	Upper university	23-30	80	93.02%	6	6.98%	86	100.00%
	Upper university	31-35	38	97.44%	1	2.56%	39	100.00%
		36+	154	100.00%	0	0.00%	154	100.00%
	Total		375	74.85%	126	25.15%	501	100.00%
Prey Kabas	Pre-school	0-6	55	87.30%	8	12.70%	63	100.00%
	Primary school	7-12	0	0.00%	43	100.00%	43	100.00%
	Secondary school	13-15	1	3.33%	29	96.67%	30	100.00%
	High school	16-18	6	20.00%	24	80.00%	30	100.00%
	University/vocational school	19-22	29	51.79%	27	48.21%	56	100.00%
	Upper university	23-30	109	86.51%	17	13.49%	126	100.00%
	Upper university	31-35	51	98.08%	1	1.92%	52	100.00%
		36+	142	100.00%	0	0.00%	142	100.00%
	Total		393	72.51%	149	27.49%	542	100.00%
Otdar Meanchey	Pre-school	0-6	121	80.13%	30	19.87%	151	100.00%
	Primary school	7-12	12	8.96%	122	91.04%	134	100.00%
	Secondary school	13-15	13	17.57%	61	82.43%	74	100.00%
	High school	16-18	57	69.51%	25	30.49%	82	100.00%
	University/vocational school	19-22	104	85.95%	17	14.05%	121	100.00%
	Upper university	23-30	217	93.53%	15	6.47%	232	100.00%
	Upper university	31-35	67	100.00%	0	0.00%	67	100.00%
		36+	281	100.00%	0	0.00%	281	100.00%
	Total		872	76.36%	270	23.64%	1142	100.00%
Total	Pre-school	0-6	217	83.46%	43	16.54%	260	100.00%
	Primary school	7-12	14	6.09%	216	93.91%	230	100.00%
	Secondary school	13-15	17	12.50%	119	87.50%	136	100.00%
	High school	16-18	86	55.48%	69	44.52%	155	100.00%
	University/vocational school	19-22	167	74.22%	58	25.78%	225	100.00%
	Upper university	23-30	406	91.44%	38	8.56%	444	100.00%
	Upper university	31-35	156	98.73%	2	1.27%	158	100.00%
		36+	577	100.00%	0	0.00%	577	100.00%
	Total		1640	75.06%	545	24.94%	2185	100.00%

Drop out youth education by zone

Zone	Educational Level	Frequency	Percent	Cumulative Percent
Tam Kak	Primary school	25	18.0	18.0
	Secondary school	66	47.5	65.5
	High school	41	29.5	95.0
	Vocational training	2	1.4	96.4
	Bachelor	2	1.4	97.8
	Illiterate	3	2.2	100.0
	Total	139	100.0	
Prey Kabas	Primary school	54	37.2	37.2
	Secondary school	55	37.9	75.2
	High school	28	19.3	94.5
	Vocational training	1	.7	95.2
	Bachelor	4	2.8	97.9
	Illiterate	3	2.1	100.0
	Total	145	100.0	
Otdar Meanchey	Primary school	182	47.3	47.3
	Secondary school	82	21.3	68.6
	High school	36	9.4	77.9
	Vocational training	6	1.6	79.5
	Bachelor	5	1.3	80.8
	Illiterate	74	19.2	100.0
	Total	385	100.0	
Total	Primary school	261	39.0	39.0
	Secondary school	203	30.3	69.4
	High school	105	15.7	85.1
	Vocational training	9	1.3	86.4
	Bachelor	11	1.6	88.0
	Illiterate	80	12.0	100.0
	Total	669	100.0	

Education of youth currently studying

Zone	Educational level	Frequency	Percent	Valid Percent	Cumulative Percent
Tam Kak	Primary school	2	3.8	3.8	3.8
	Secondary school	17	32.7	32.7	36.5
	High school	28	53.8	53.8	90.4
	Bachelor	5	9.6	9.6	100.0
	Total	52	100.0	100.0	
Prey Kabas	Primary school	3	3.8	3.8	3.8
	Secondary school	18	22.5	22.5	26.3
	High school	30	37.5	37.5	63.8
	Vocational training	1	1.3	1.3	65.0
	Bachelor	28	35.0	35.0	100.0
	Total	80	100.0	100.0	
Otdar Meanchey	Primary school	10	13.9	13.9	13.9
	Secondary school	27	37.5	37.5	51.4
	High school	23	31.9	31.9	83.3
	Vocational training	2	2.8	2.8	86.1
	Bachelor	10	13.9	13.9	100.0
	Total	72	100.0	100.0	
Total	Primary school	15	7.4	7.4	7.4
	Secondary school	62	30.4	30.4	37.7
	High school	81	39.7	39.7	77.5
	Vocational training	3	1.5	1.5	78.9
	Bachelor	43	21.1	21.1	100.0
	Total	204	100.0	100.0	

Adult educational level by zone

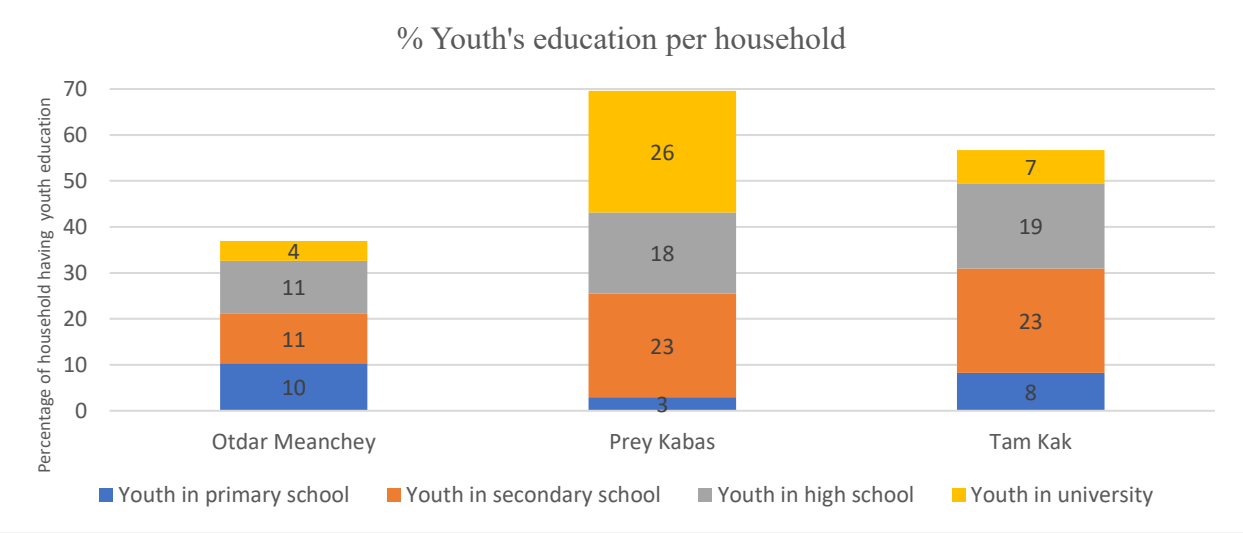
Zone	Educational level	Frequency	Percent	Valid Percent	Cumulative Percent
Tam Kak	No school	21	10.9	10.9	10.9
	Primary school	99	51.3	51.3	62.2
	Secondary school	55	28.5	28.5	90.7
	High school	14	7.3	7.3	97.9
	Vocational training	1	.5	.5	98.4
	Bachelor	3	1.6	1.6	100.0
	Total	193	100.0	100.0	
Prey Kabas	No school	36	18.6	18.6	18.6
	Primary school	83	42.8	42.8	61.3
	Secondary school	58	29.9	29.9	91.2
	High school	14	7.2	7.2	98.5
	Bachelor	1	.5	.5	99.0
	Study at pagoda	2	1.0	1.0	100.0
	Total	194	100.0	100.0	
Otdar Meanchey	No school	164	47.1	47.1	47.1
	Primary school	140	40.2	40.2	87.4
	Secondary school	30	8.6	8.6	96.0
	High school	11	3.2	3.2	99.1
	Vocational training	1	.3	.3	99.4
	Bachelor	2	.6	.6	100.0
	Total	348	100.0	100.0	
Total	No school	221	30.1	30.1	30.1
	Primary school	322	43.8	43.8	73.9
	Secondary school	143	19.5	19.5	93.3
	High school	39	5.3	5.3	98.6
	Vocational training	2	.3	.3	98.9
	Bachelor	6	.8	.8	99.7
	Study at pagoda	2	.3	.3	100.0
	Total	735	100.0	100.0	

Appendix – 05 Educational investment

1. The average cost of expenditure on education per child at different level

Zone	University cost			High school per person	Secondary school per person	Primary school per person
	University living allowance/year/person	University fee/year/person	University per person			
Otdar Meanchey	502	480	982	170	128	33
Prey Kabas	851	437	1288	168	168	51
Tam Kak	840	350	1190	224	138	41
Grand Total	781	425	1206	187	147	37

2. Percentage of household having children studying at different level



3. Percentage of household having children studying at different level

Youth studying	Type	N	%
University 7%	TK-1	3	43%
	TK-2	1	14%
	TK-3	3	43%
	Total	7	100%
High school 19%	TK-1	7	39%
	TK-2	1	6%
	TK-3	10	56%
	Total	18	100%
Secondary 23%	TK-1	6	27%
	TK-2	6	27%
	TK-3	10	45%
	Total	22	100%
Primary 8%	TK-1	4	50%
	TK-2	1	13%
	TK-3	3	38%
	Total	8	100%

Youth studying	Type	N	%
University 26%	PB-1	9	38%
	PB-2	6	25%
	PB-3	9	38%
	Total	24	100%
High school 18%	PB-1	3	18%
	PB-2	12	71%
	PB-3	2	12%
	Total	17	100%
Secondary 23%	PB-1	5	25%
	PB-2	12	60%
	PB-3	3	15%
	Total	20	100%
Primary 3%	PB-1	1	33%
	PB-2	2	67%
	PB-3	0	0%
	Total	3	100%

Youth studying	Type	N	%
University 4%	OMC-1	5	71%
	OMC-2	2	29%
	Total	7	100%
High school 11%	OMC-1	10	53%
	OMC-2	9	47%
	Total	19	100%
Secondary 11%	OMC-1	10	50%
	OMC-2	8	40%
	OMC-3	1	5%
	OMC-4	1	5%
	Total	20	100%
Primary 10%	OMC-1	10	53%
	OMC-2	7	37%
	OMC-3	1	5%
	OMC-4	1	5%
	Total	19	100%

3. Household having children studying at different level by farm type by zone

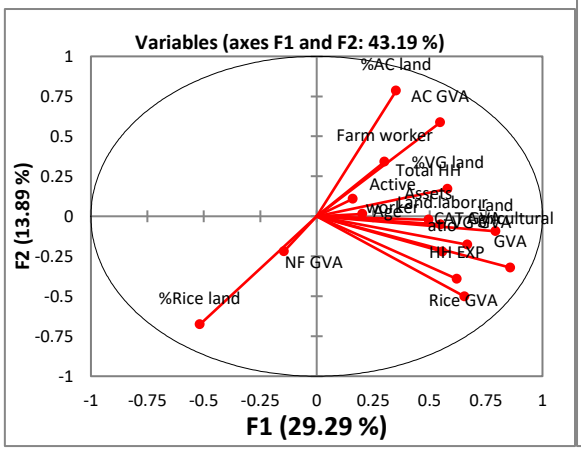
Zone	Type	HH Having youth studying primary school		HH Having youth studying secondary school		HH Having youth studying high school		HH Having youth studying upper high school or university		Total	
		N	%	N	%	N	%	N	%	N	%
Otdar Meanchey	OMC-1	10	29%	10	29%	10	29%	5	14%	35	100%
	OMC-2	7	27%	8	31%	9	35%	2	8%	26	100%
	OMC-3	1	50%	1	50%		0%		0%	2	100%
	OMC-4	1	50%	1	50%		0%		0%	2	100%
	Total	19	29%	20	31%	19	29%	7	11%	65	100%
Prey Kabas	PB-1	1	6%	5	28%	3	17%	9	50%	18	100%
	PB-2	2	6%	12	38%	12	38%	6	19%	32	100%
	PB-3		0%	3	21%	2	14%	9	64%	14	100%
	Total	3	5%	20	31%	17	27%	24	38%	64	100%
Tam Kak	TK-1	4	20%	6	30%	7	35%	3	15%	20	100%
	TK-2	1	11%	6	67%	1	11%	1	11%	9	100%
	TK-3	3	12%	10	38%	10	38%	3	12%	26	100%
	Total	8	15%	22	40%	18	33%	7	13%	55	100%

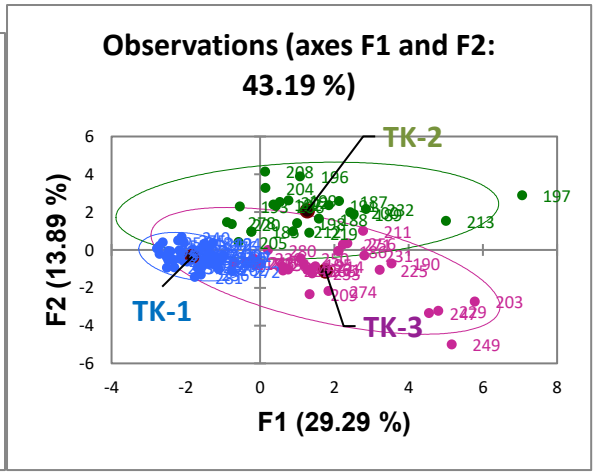
Appendix-Land holding per household in zone Tram Kak, Prey Kabas and Otdar Meanchey

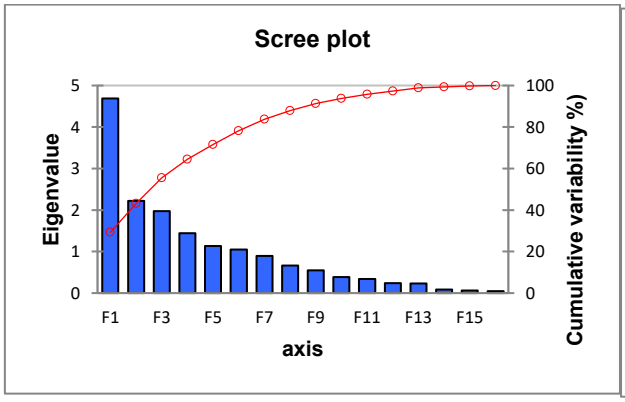
Zone		Household size (person)	Farm size (ha)	Total active worker	Farm active worker	Land-labor ratio	Percentage Rice land	Percentage AC land	Percentage VG land
Tam Kak	N	95	95	95	95	95	95	95	95
	Mean	4.84	0.75	2.96	2.20	0.37	83.85	10.23	5.91
	Std. Deviation	1.39	0.56	1.22	0.86	0.33	21.11	17.03	11.11
	Minimum	2.00	0.10	1.00	1.00	0.03	21.74	0.00	0.00
	Maximum	8.00	2.81	7.00	6.00	2.81	100.00	71.43	44.44
Prey Kabas	N	102	102	102	102	102	102	102	102
	Mean	5.00	1.45	2.76	2.40	0.66	98.93	0.61	0.46
	Std. Deviation	1.70	1.00	1.10	0.81	0.52	7.04	4.05	3.43
	Minimum	2.00	0.17	1.00	1.00	0.07	33.33	0.00	0.00
	Maximum	11.00	7.08	7.00	5.00	3.54	100.00	33.33	33.33
Otdar Meanchey	N	180	180	180	180	180	180	180	180
	Mean	5.57	4.16	3.45	2.93	1.62	94.71	4.55	0.75
	Std. Deviation	2.01	3.15	1.66	1.39	1.28	12.12	11.65	2.72
	Minimum	2.00	0.16	1.00	1.00	0.08	37.04	0.00	0.00
	Maximum	19.00	25.00	13.00	11.00	9.00	100.00	62.96	25.00
Total	N	377	377	377	377	377	377	377	377
	Mean	5.23	2.56	3.14	2.60	1.05	93.12	4.91	1.97
	Std. Deviation	1.81	2.73	1.45	1.18	1.10	15.06	12.40	6.54
	Minimum	2.00	0.10	1.00	1.00	0.03	21.74	0.00	0.00
	Maximum	19.00	25.00	13.00	11.00	9.00	100.00	71.43	44.44

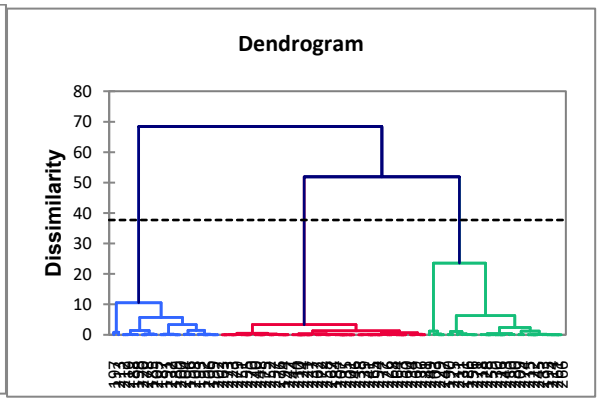
Appendix – 06 PCA and Cluster analysis inTram Kak, Prey Kabas and Otdar Meanchey

1. **PCA and Cluster analysis in zone Tram Kak**









Squared cosines of the variables in Tram Kak

Name of Variables	Component					
	F1	F2	F3	F4	F5	F6
Human resources						
Total Active Worker	0.026	0.012	**0.685**	0.002	0.006	0.134
Active Farm Worker	0.091	0.117	**0.465**	0.043	0.015	0.000
Age of Household Head	0.041	0.000	**0.463**	0.003	0.033	0.005
Land resources						
Farm size	**0.628**	0.009	0.000	0.023	0.235	0.040
Land Labor Ratio	0.311	0.049	0.102	0.104	**0.311**	0.046
% Rice land	0.268	**0.457**	0.074	0.000	0.093	0.028
% AC land	0.124	**0.615**	0.012	0.101	0.005	0.007
% VG land	0.337	0.029	0.037	**0.402**	0.013	0.052
Financial resources						
Total household assets	0.246	0.000	0.024	0.014	0.032	0.084
HH expenditure	**0.386**	0.154	0.004	0.042	0.153	0.000
HH income sources						
Agricultural GVA	**0.735**	0.103	0.009	0.001	0.015	0.030
Rice GVA	**0.428**	0.251	0.018	0.006	0.004	0.003
AC GVA	0.300	**0.344**	0.003	0.106	0.007	0.007
VG GVA	0.300	0.003	0.056	**0.381**	0.000	0.082
CAT GVA	**0.447**	0.032	0.017	0.001	0.015	0.101
Total non-farm income	0.021	0.048	0.003	0.214	0.195	**0.432**
Eigenvalues	4.687	2.223	1.973	1.444	1.133	1.053
Cumulative explained variance	29.29	43.19	55.52	64.54	71.62	78.20

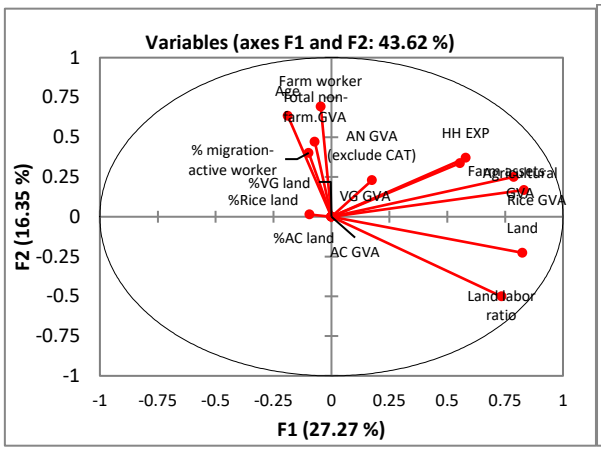
Correlation Matrix variable PCA in Tram Kak

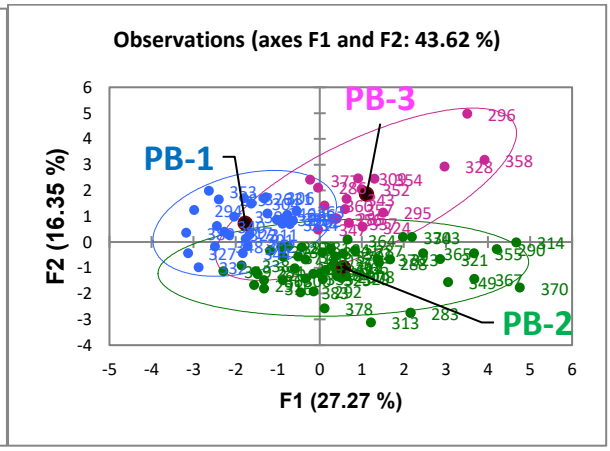
Correlation matrix (Pearson (n)): Tram Kak

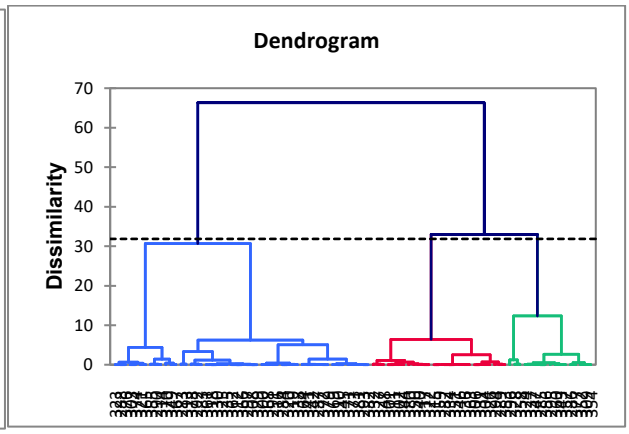
Variables	Rice GVA	VG GVA	AC GVA	CAT GVA	Active Farm Worker	% Rice land	% AC land	% VG land	HH expenditure	Agricultural GVA	Land Labor Ratio	Total Active Worker	Total household assets	Total non-farm income	Age of Household Head	Farm size
Rice GVA	**1**	**0.314**	0.089	**0.392**	0.110	0.008	-0.060	0.164	**0.567**	**0.785**	**0.349**	0.125	**0.309**	0.015	0.182	**0.503**
VG GVA	**0.314**	**1**	0.079	0.179	0.070	**-0.330**	0.018	**0.692**	**0.259**	**0.419**	**0.253**	-0.054	0.164	-0.166	0.003	**0.371**
AC GVA	0.089	0.079	**1**	**0.254**	**0.261**	**-0.578**	**0.665**	**0.215**	0.166	**0.294**	**0.291**	0.094	**0.255**	-0.130	0.067	**0.402**
CAT GVA	**0.392**	0.179	**0.254**	**1**	0.116	**-0.205**	0.117	**0.304**	**0.439**	**0.785**	**0.278**	0.097	0.194	-0.145	**0.237**	**0.417**
Active Farm Worker	0.110	0.070	**0.261**	0.116	**1**	-0.127	0.184	**0.213**	-0.020	0.186	-0.170	**0.597**	0.139	**-0.231**	**0.296**	**0.272**
% Rice land	0.008	**-0.330**	**-0.578**	**-0.205**	-0.127	**1**	**-0.764**	**-0.529**	-0.183	**-0.214**	-0.106	0.018	**-0.238**	-0.008	0.011	**-0.249**
% AC land	-0.060	0.018	**0.665**	0.117	0.184	**-0.764**	**1**	0.088	-0.013	0.074	0.109	0.026	0.156	-0.122	0.072	0.193
% VG land	0.164	**0.692**	**0.215**	**0.304**	**0.213**	**-0.529**	0.088	**1**	0.198	**0.420**	0.154	-0.003	**0.212**	-0.178	-0.024	**0.340**
HH expenditure	**0.567**	**0.259**	0.166	**0.439**	-0.020	-0.183	-0.013	0.198	**1**	**0.616**	**0.291**	0.020	**0.402**	0.175	0.096	**0.387**
Agricultural GVA	**0.785**	**0.419**	**0.294**	**0.785**	0.186	**-0.214**	0.074	**0.420**	**0.616**	**1**	**0.376**	0.105	**0.346**	-0.106	0.199	**0.581**
Land Labor Ratio	**0.349**	**0.253**	**0.291**	**0.278**	-0.170	-0.106	0.109	0.154	**0.291**	**0.376**	**1**	-0.078	**0.210**	0.024	-0.078	**0.803**
Total Active Worker	0.125	-0.054	0.094	0.097	**0.597**	0.018	0.026	-0.003	0.020	0.105	-0.078	**1**	-0.132	0.089	**0.453**	**0.218**
Total household assets	**0.309**	0.164	**0.255**	0.194	0.139	**-0.238**	0.156	**0.212**	**0.402**	**0.346**	**0.210**	-0.132	**1**	-0.068	0.036	**0.333**
Total non-farm income	0.015	-0.166	-0.130	-0.145	**-0.231**	-0.008	-0.122	-0.178	0.175	-0.106	0.024	0.089	-0.068	**1**	-0.038	-0.100
Age of Household Head	0.182	0.003	0.067	**0.237**	**0.296**	0.011	0.072	-0.024	0.096	0.199	-0.078	**0.453**	0.036	-0.038	**1**	0.068
Farm size	**0.503**	**0.371**	**0.402**	**0.417**	**0.272**	**-0.249**	0.193	**0.340**	**0.387**	**0.581**	**0.803**	**0.218**	**0.333**	-0.100	0.068	**1**

Values in bold are different from 0 with a significance level alpha=0.05

2. PCA and Cluster analysis in zone Prey Kabas







Squared cosines of the variables in Prey Kabas

Name of Variables	Component				
	F1	F2	F3	F4	F5
Human resources					
Active Farm Worker	0.002	**0.480**	0.231	0.040	0.063
% labor migration	0.010	0.161	0.049	0.189	**0.438**
Age of Household Head	0.035	**0.401**	0.080	0.112	0.027
Land resources					
Farm size	**0.680**	0.051	0.035	0.066	0.005
Land Labor Ratio	**0.540**	0.251	0.000	0.072	0.000
% Rice land	0.009	0.000	**0.467**	0.006	0.083
% AC land	**0.000**	0.000	0.000	0.000	0.000
% VG land	**0.000**	0.000	0.000	0.000	0.000
Financial resources					
Agricultural Asset	0.309	0.114	0.026	0.023	0.076
HH expenditure	**0.337**	0.137	0.099	0.010	0.001
HH income sources					
Agricultural GVA	**0.622**	0.063	0.008	0.068	0.040
Rice GVA	**0.693**	0.028	0.002	0.007	0.003
AC GVA	**0.000**	0.000	0.000	0.000	0.000
VG GVA	**0.000**	0.000	0.000	0.000	0.000
AN GVA	0.031	0.053	0.171	**0.458**	0.072
Total non-farm income	0.005	**0.222**	0.179	0.123	0.218
Eigenvalues	3.272	1.962	1.348	1.174	1.027
Cumulative explained variance	27.27	43.62	54.85	64.64	73.20

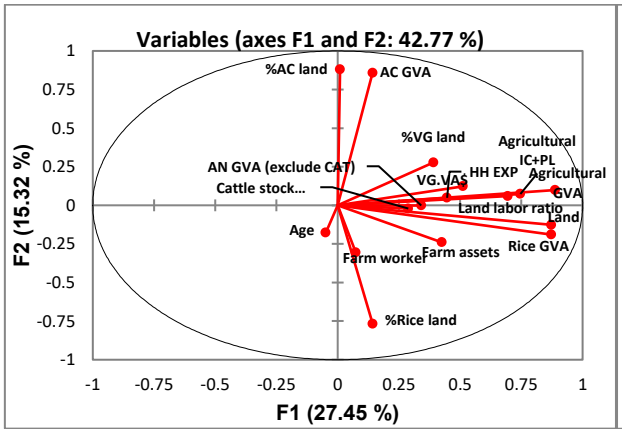
Correlation Matrix variable PCA in Prey Kabas

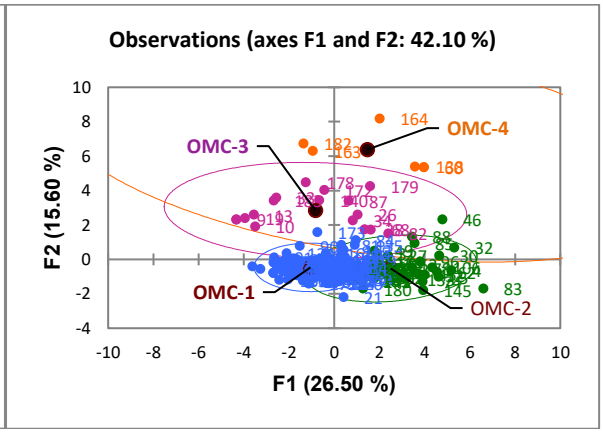
Correlation matrix (Pearson (n)): Zone Prey Kabas

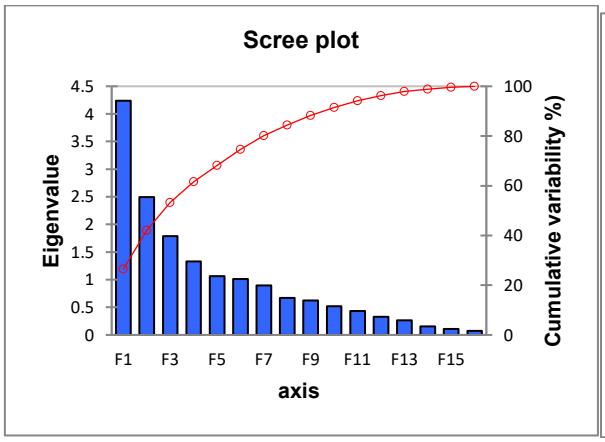
Variables	Rice GVA	VG GVA	AC GVA	Active Farm Worker	% Rice land	% AC land	% VG land	HH expenditure	Agricultural GVA	Land Labor Ratio	Total non-farm income	% labor migration	Agricultural Asset	AN GVA (exclu.cattle)	Farm size	Age of Household Head
Rice GVA	**1**			0.065	-0.068			**0.412**	**0.836**	**0.416**	0.014	0.034	**0.398**	-0.037	**0.554**	-0.090
VG GVA																
AC GVA																
Active Farm Worker	0.065			**1**	-0.139			0.031	0.089	**-0.398**	0.127	-0.021	**0.263**	0.039	-0.044	**0.419**
% Rice land	-0.068			-0.139	**1**			0.009	-0.054	-0.042	0.196	0.041	-0.042	0.096	-0.097	-0.045
% AC land																
% VG land																
HH expenditure	**0.412**			0.031	0.009			**1**	**0.433**	**0.257**	**0.268**	0.084	**0.303**	**0.239**	**0.337**	0.070
Agricultural GVA	**0.836**			0.089	-0.054			**0.433**	**1**	**0.295**	-0.048	0.028	**0.373**	**0.330**	**0.413**	-0.110
Land Labor Ratio	**0.416**			**-0.398**	-0.042			**0.257**	**0.295**	**1**	-0.190	-0.157	**0.212**	-0.018	**0.881**	**-0.254**
Total non-farm income	0.014			0.127	0.196			**0.268**	-0.048	-0.190	**1**	0.131	0.052	-0.034	-0.137	0.133
% labor migration	0.034			-0.021	0.041			0.084	0.028	-0.157	0.131	**1**	-0.052	0.025	-0.136	**0.311**
Agricultural Asset	**0.398**			**0.263**	-0.042			**0.303**	**0.373**	**0.212**	0.052	-0.052	**1**	0.138	**0.358**	0.035
AN GVA (exclu.cattle)	-0.037			0.039	0.096			**0.239**	**0.330**	-0.018	-0.034	0.025	0.138	**1**	-0.039	-0.049
Farm size	**0.554**			-0.044	-0.097			**0.337**	**0.413**	**0.881**	-0.137	-0.136	**0.358**	-0.039	**1**	-0.092
Age of Household Head	-0.090			**0.419**	-0.045			0.070	-0.110	**-0.254**	0.133	**0.311**	0.035	-0.049	-0.092	**1**

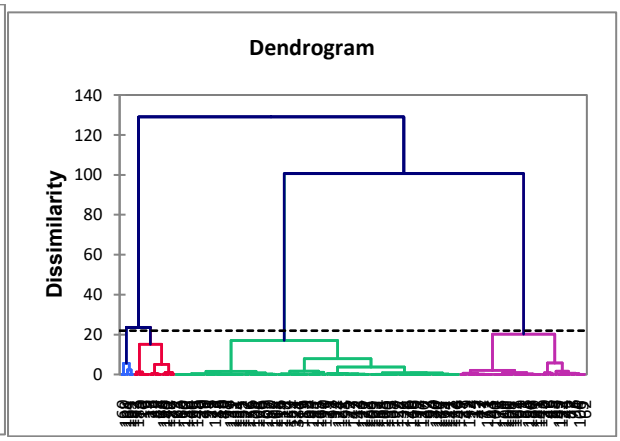
Values in bold are different from 0 with a significance level alpha=0.05

3. PCA and Cluster analysis in zone Otdar Meanchey









Squared cosines of the variables in Otdar Meanchey

Name of Variables	Component					
	F1	F2	F3	F4	F5	F6
Human resources						
Active Farm Worker	0.002	0.103	**0.439**	0.039	0.215	0.003
Age of Household Head	0.005	0.040	**0.533**	0.009	0.000	0.005
Land resources						
Farm size	**0.774**	0.020	0.004	0.015	0.061	0.001
Land Labor Ratio	**0.539**	0.004	0.191	0.094	0.000	0.013
% Rice land	0.025	**0.575**	0.036	0.001	0.017	0.004
% AC land	0.001	**0.736**	0.068	0.062	0.009	0.000
% VG land	0.099	0.108	0.037	**0.456**	0.011	0.005
Financial resources						
Agricultural Asset	0.200	0.065	0.033	0.095	0.001	0.132
HH expenditure	0.161	0.003	0.013	0.011	**0.497**	0.001
Agricultural Expense (IC+PL)	**0.611**	0.005	0.020	0.030	0.028	0.006
Cattle Stock Value	0.067	0.001	0.238	0.024	0.196	0.013
HH income sources						
Agricultural GVA	**0.758**	0.012	0.041	0.020	0.002	0.014
Rice GVA	**0.720**	0.054	0.008	0.001	0.008	0.010
AC GVA	0.030	**0.711**	0.067	0.030	0.001	0.000
VG GVA	0.105	0.059	0.061	**0.436**	0.009	0.063
AN GVA	0.141	0.000	0.001	0.007	0.006	**0.744**
Eigenvalues	4.240	2.496	1.789	1.329	1.062	1.014
Cumulative explained variance	26.50	42.10	53.28	61.59	68.23	74.57

Correlation Matrix variable PCA in Otdar Meanchey

Correlation matrix (Pearson (n)): Otdar Meanchey

Variables	Rice GVA	VG GVA	AC GVA	Active Farm Worker	% Rice land	% AC land	% VG land	HH expenditure	Agricultural GVA	Agricultural Expense (IC+PL)	Land Labor Ratio	Agricultural Asset	Cattle Stock Value	AN GVA (exclu.cattle)	Farm size	Age of Household Head
Rice GVA	**1**	**0.147**	-0.053	**0.159**	**0.238**	-0.125	0.139	**0.243**	**0.793**	**0.561**	**0.550**	**0.352**	**0.254**	**0.161**	**0.809**	0.016
VG GVA	**0.147**	**1**	0.109	-0.054	-0.056	0.021	**0.473**	0.138	**0.309**	**0.187**	**0.181**	-0.015	-0.004	0.019	**0.174**	-0.144
AC GVA	-0.053	0.109	**1**	-0.084	**-0.498**	**0.825**	**0.150**	**0.166**	**0.269**	**0.163**	0.102	-0.023	0.082	0.047	0.054	-0.048
Active Farm Worker	**0.159**	-0.054	-0.084	**1**	**0.162**	-0.058	-0.044	-0.084	0.105	-0.030	**-0.362**	**0.180**	0.105	0.053	**0.201**	**0.387**
% Rice land	**0.238**	-0.056	**-0.498**	**0.162**	**1**	**-0.592**	**-0.158**	0.119	0.016	0.074	0.121	**0.150**	0.014	0.068	**0.191**	-0.056
% AC land	-0.125	0.021	**0.825**	-0.058	**-0.592**	**1**	0.074	0.027	0.111	0.088	0.026	-0.106	0.016	-0.025	-0.021	-0.054
% VG land	0.139	**0.473**	**0.150**	-0.044	**-0.158**	0.074	**1**	0.134	**0.290**	**0.218**	**0.148**	-0.068	0.031	0.102	**0.155**	-0.136
HH expenditure	**0.243**	0.138	**0.166**	-0.084	0.119	0.027	0.134	**1**	**0.341**	**0.205**	**0.192**	**0.236**	**0.171**	**0.170**	**0.178**	0.078
Agricultural GVA	**0.793**	**0.309**	**0.269**	0.105	0.016	0.111	**0.290**	**0.341**	**1**	**0.551**	**0.474**	**0.254**	**0.370**	**0.409**	**0.705**	0.027
Agricultural Expense (IC+PL)	**0.561**	**0.187**	**0.163**	-0.030	0.074	0.088	**0.218**	**0.205**	**0.551**	**1**	**0.634**	**0.329**	0.027	**0.308**	**0.660**	-0.115
Land Labor Ratio	**0.550**	**0.181**	0.102	**-0.362**	0.121	0.026	**0.148**	**0.192**	**0.474**	**0.634**	**1**	**0.286**	-0.008	**0.148**	**0.683**	**-0.292**
Agricultural Asset	**0.352**	-0.015	-0.023	**0.180**	**0.150**	-0.106	-0.068	**0.236**	**0.254**	**0.329**	**0.286**	**1**	0.110	0.019	**0.384**	0.074
Cattle Stock Value	**0.254**	-0.004	0.082	0.105	0.014	0.016	0.031	**0.171**	**0.370**	0.027	-0.008	0.110	**1**	0.041	**0.159**	**0.205**
AN GVA (exclu.cattle)	**0.161**	0.019	0.047	0.053	0.068	-0.025	0.102	**0.170**	**0.409**	**0.308**	**0.148**	0.019	0.041	**1**	**0.255**	-0.044
Farm size	**0.809**	**0.174**	0.054	**0.201**	**0.191**	-0.021	**0.155**	**0.178**	**0.705**	**0.660**	**0.683**	**0.384**	**0.159**	**0.255**	**1**	0.025
Age of Household Head	0.016	-0.144	-0.048	**0.387**	-0.056	-0.054	-0.136	0.078	0.027	-0.115	**-0.292**	0.074	**0.205**	-0.044	0.025	**1**

Values in bold are different from 0 with a significance level alpha=0.05

Appendix – 07 Couple strategy- land share at marriage by youth and adult household

Tram Kak: land share at marriage by youth and adult household in farm type.

Zone	Farm type	Type of household	Couple strategy	Number of household	Land share at marriage		Land ownership		Change
					Mean	Std. Deviation	Mean	Std. Deviation	
Tam Kak	TK-1	Youth HH	[F]	2	0.20	0.00	0.30	0.14	0.10
			[M]	4	0.24	0.07	0.19	0.14	-0.05
			[M][F]	8	0.46	0.22	0.39	0.16	-0.07
			Total	14	0.36	0.20	0.32	0.17	-0.04
		Adult HH	[F]	8	0.36	0.22	0.38	0.24	0.02
			[M]	2	0.07	0.04	0.22	0.12	0.15
			[M][F]	7	0.34	0.13	0.44	0.17	0.10
			Total	17	0.32	0.19	0.38	0.21	0.07
	TK-2	Youth HH	[F]	2	0.16	0.20	0.46	0.23	0.30
			[M][F]	3	0.38	0.03	0.84	0.49	0.46
			Total	5	0.29	0.16	0.69	0.42	0.39
		Adult HH	[F]	3	0.28	0.17	1.14	0.72	0.86
			[M][F]	8	0.72	0.49	0.97	0.69	0.25
			Total	11	0.60	0.46	1.02	0.66	0.42
	TK-3	Youth HH	[F]	2	1.08	0.87	1.43	0.47	0.35
			[M]	1	0.36		2.81		2.45
			[M][F]	2	0.48	0.11	0.96	0.13	0.49
			Total	5	0.69	0.56	1.52	0.80	0.82
		Adult HH	[F]	1	0.32		1.00		0.68
			[M]	1	0.20		0.40		0.20
			[M][F]	12	0.45	0.19	1.25	0.65	0.81
			Total	14	0.42	0.19	1.17	0.64	0.75

Prey Kabas: land share at marriage by youth and adult household in farm type.

Zone	Farm type	Type of household	Couple strategy	Number of household	Land share at marriage		Land ownership		Change
					Mean	Std. Deviation	Mean	Std. Deviation	
Prey Kabas	PB-1	Youth HH	[F]	1	0.18		0.54		0.36
			[M][F]	1	0.08		0.17		0.09
			Total	2	0.13	0.07	0.36	0.26	0.23
		Adult HH	[F]	2	0.51	0.26	0.97	0.07	0.47
			[M]	3	0.30	0.10	0.56	0.18	0.26
			[M][F]	5	0.44	0.16	0.79	0.29	0.35
			Total	10	0.41	0.17	0.76	0.26	0.34
	PB-2	Youth HH	[F]	11	0.63	0.39	1.91	1.02	1.29
			[M]	2	0.24	0.08	0.86	0.70	0.62
			[M][F]	14	0.70	0.35	1.68	0.70	0.98
			Total	27	0.63	0.37	1.71	0.86	1.08
		Adult HH	[F]	2	0.96	0.34	2.06	0.79	1.10
			[M]	1	0.36		3.40		3.04
			[M][F]	9	0.64	0.37	1.56	0.63	0.92
			Total	12	0.67	0.37	1.80	0.80	1.12
	PB-3	Youth HH	[M][F]	1	0.38		1.20		0.82
			Total	1	0.38		1.20		0.82
		Adult HH	[F]	1	0.60		0.76		0.16
			[M]	2	0.12	0.11	1.23	0.18	1.11
			[M][F]	2	0.48	0.18	1.02	0.68	0.55
			Total	5	0.36	0.25	1.05	0.40	0.69

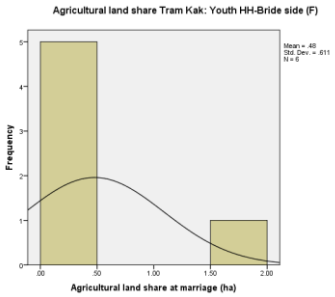
Prey Kabas: lan d shar e at mar riage by youth an d adult household in far m type.

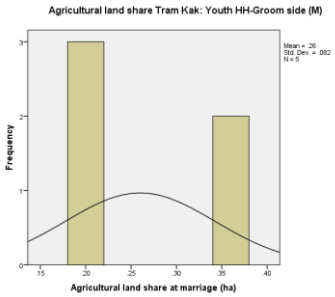
Zone	Farm type	Type of household	Couple strategy	Number of household	Land share at marriage		Land ownership		Change
					Mean	Std. Deviation	Mean	Std. Deviation	
Otdar Meanchey	OMC-1	Youth HH	[F]	7	1.38	1.08	2.11	0.57	0.73
			[M]	5	1.41	0.56	2.20	1.64	0.79
			[M][F]	8	4.00	1.41	2.69	1.16	-1.31
			Total	20	2.43	1.70	2.36	1.11	-0.07
		Adult HH	[F]	16	2.23	1.92	3.18	1.45	0.94
			[M]	8	1.75	0.46	4.34	2.81	2.59
			[M][F]	9	3.29	1.49	3.60	1.82	0.31
			Total	33	2.41	1.63	3.58	1.94	1.17
	OMC-2	Youth HH	[F]	4	2.79	2.27	7.08	1.02	4.29
			[M]	4	4.13	1.55	6.25	2.40	2.13
			[M][F]	5	3.60	2.41	4.52	0.68	0.92
			Total	13	3.51	2.03	5.84	1.77	2.33
		Adult HH	[F]	6	2.17	1.47	7.29	2.79	5.12
			[M]	1	1.00		6.88		5.88
			[M][F]	9	4.69	2.19	7.27	2.20	2.57
			Total	16	3.51	2.29	7.25	2.28	3.74
	OMC-3	Youth HH	[F]	1	3.00		5.51		2.51
			[M]	2	1.50	0.71	2.58	0.82	1.08
			[M][F]	1	3.00		4.00		1.00
			Total	4	2.25	0.96	3.67	1.47	1.42
		Adult HH	[F]	3	2.17	1.61	4.51	3.50	2.34
			[M]	1	1.00		4.10		3.10
			[M][F]	1	3.00		2.00		-1.00
			Total	5	2.10	1.34	3.93	2.70	1.83
	OMC-4	Youth HH	[F]	1	3.50		6.00		2.50
			[M]	1	5.50		4.50		-1.00
			[M][F]	1	2.00		2.00		0.00
			Total	3	3.67	1.76	4.17	2.02	0.50

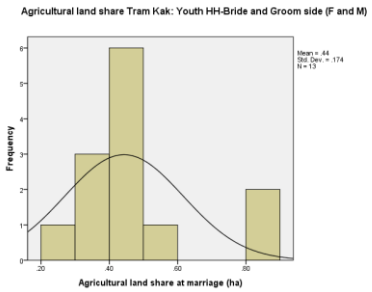
All zones: land share at marriage by youth and adult household in farm type.

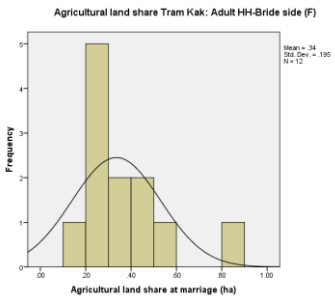
Zone	Type of household	Couple strategy	Number of household	Land share at marriage		Land ownership		Change
				Mean	Std. Deviation	Mean	Std. Deviation	
Tam Kak	Youth HH	[F]	6	0.48	0.61	0.73	0.60	0.25
		[M]	5	0.26	0.08	0.71	1.18	0.45
		[M][F]	13	0.44	0.17	0.58	0.35	0.14
		Total	24	0.41	0.32	0.64	0.62	0.23
	Adult HH	[F]	12	0.34	0.20	0.62	0.51	0.29
		[M]	3	0.11	0.08	0.28	0.14	0.16
		[M][F]	27	0.50	0.32	0.96	0.65	0.46
		Total	42	0.43	0.30	0.81	0.62	0.39
Prey Kabas	Youth HH	[F]	12	0.59	0.39	1.80	1.05	1.21
		[M]	2	0.24	0.08	0.86	0.70	0.62
		[M][F]	16	0.64	0.37	1.55	0.76	0.92
		Total	30	0.59	0.37	1.60	0.89	1.01
	Adult HH	[F]	5	0.71	0.32	1.36	0.75	0.66
		[M]	6	0.25	0.13	1.26	1.11	1.01
		[M][F]	16	0.56	0.30	1.25	0.63	0.69
		Total	27	0.52	0.31	1.27	0.75	0.76
Otdar Meanchey	Youth HH	[F]	13	2.10	1.60	4.20	2.48	2.10
		[M]	12	2.67	1.81	3.81	2.50	1.14
		[M][F]	15	3.67	1.72	3.34	1.31	-0.33
		Total	40	2.86	1.80	3.76	2.10	0.90
	Adult HH	[F]	25	2.21	1.72	4.32	2.65	2.11
		[M]	10	1.60	0.52	4.57	2.61	2.97
		[M][F]	19	3.94	1.91	5.25	2.76	1.31
		Total	54	2.71	1.88	4.70	2.67	1.99

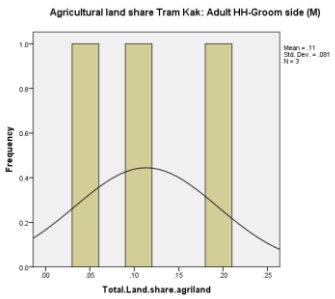
Tram Kak: land share at marriage for youth and adult household

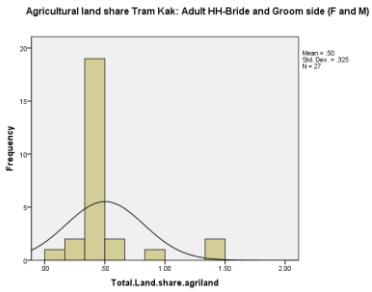




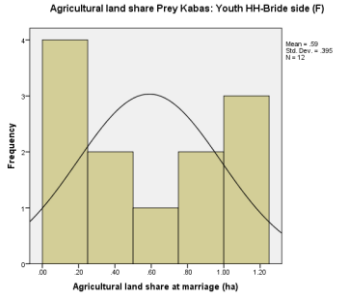


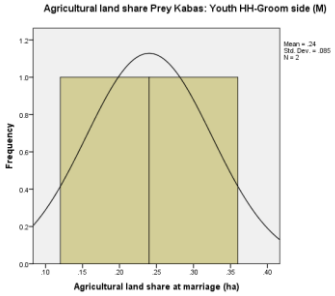


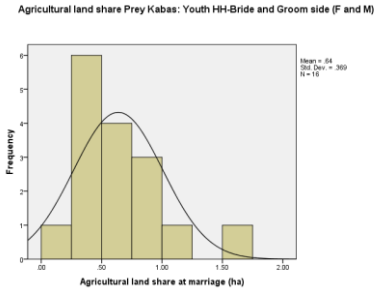


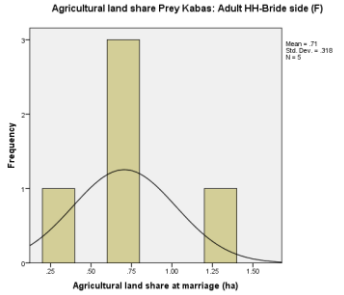


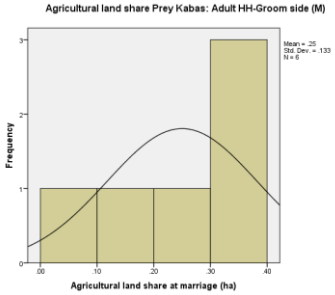
Prey Kabas: land share at marriage for youth and adult household

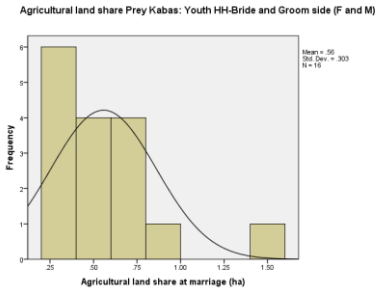




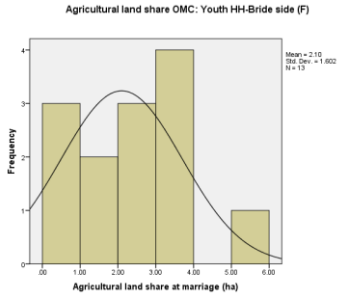


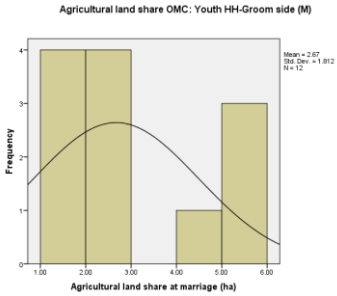


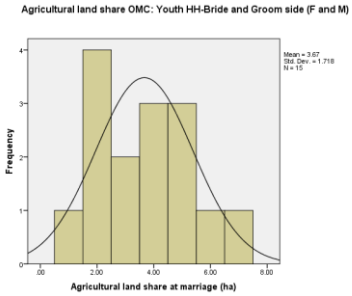


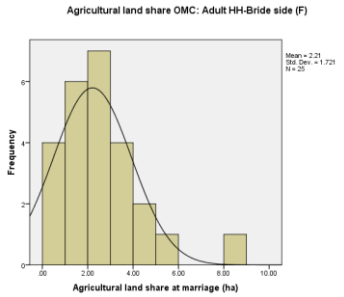


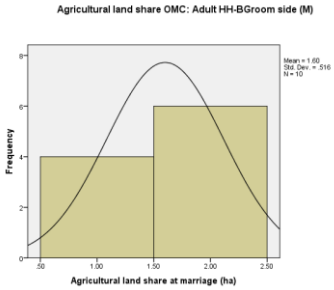
Otdar Meanchey: land share at marriage for youth and adult household

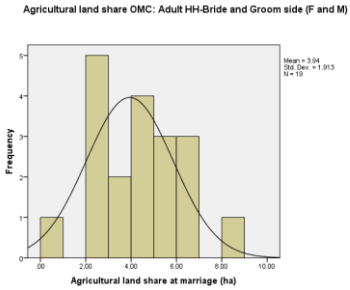






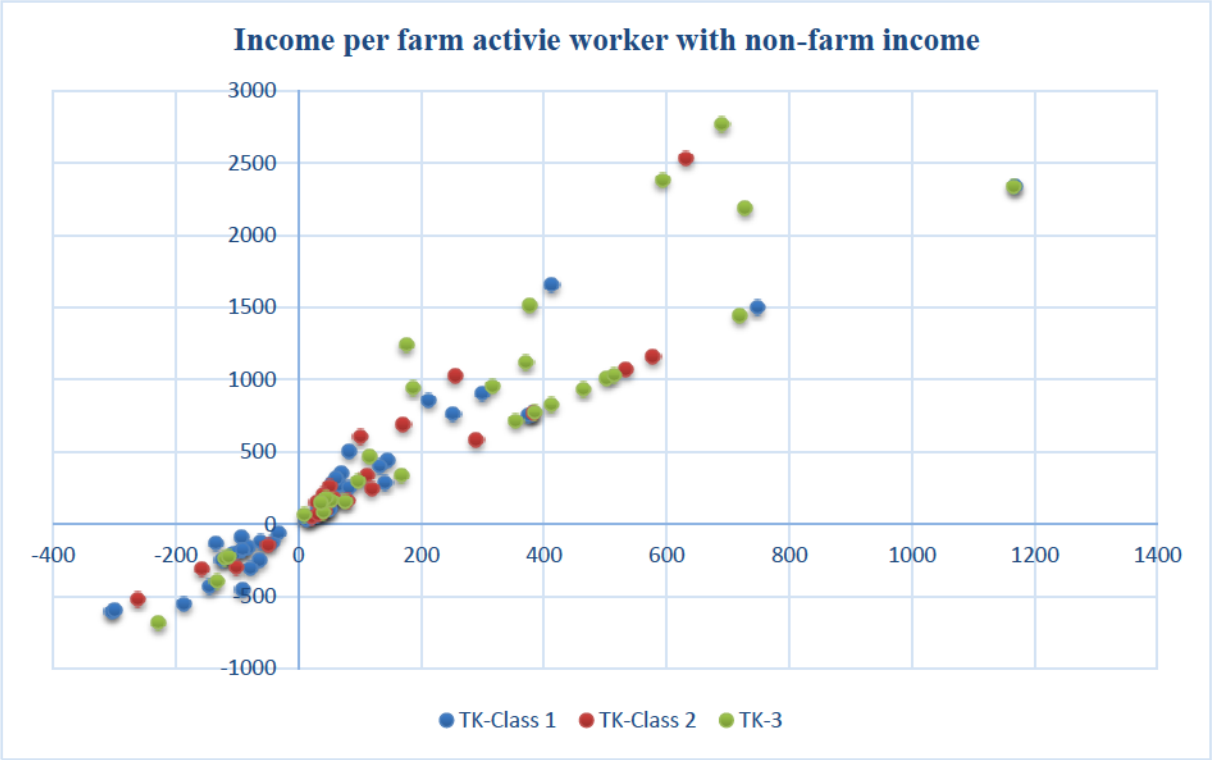


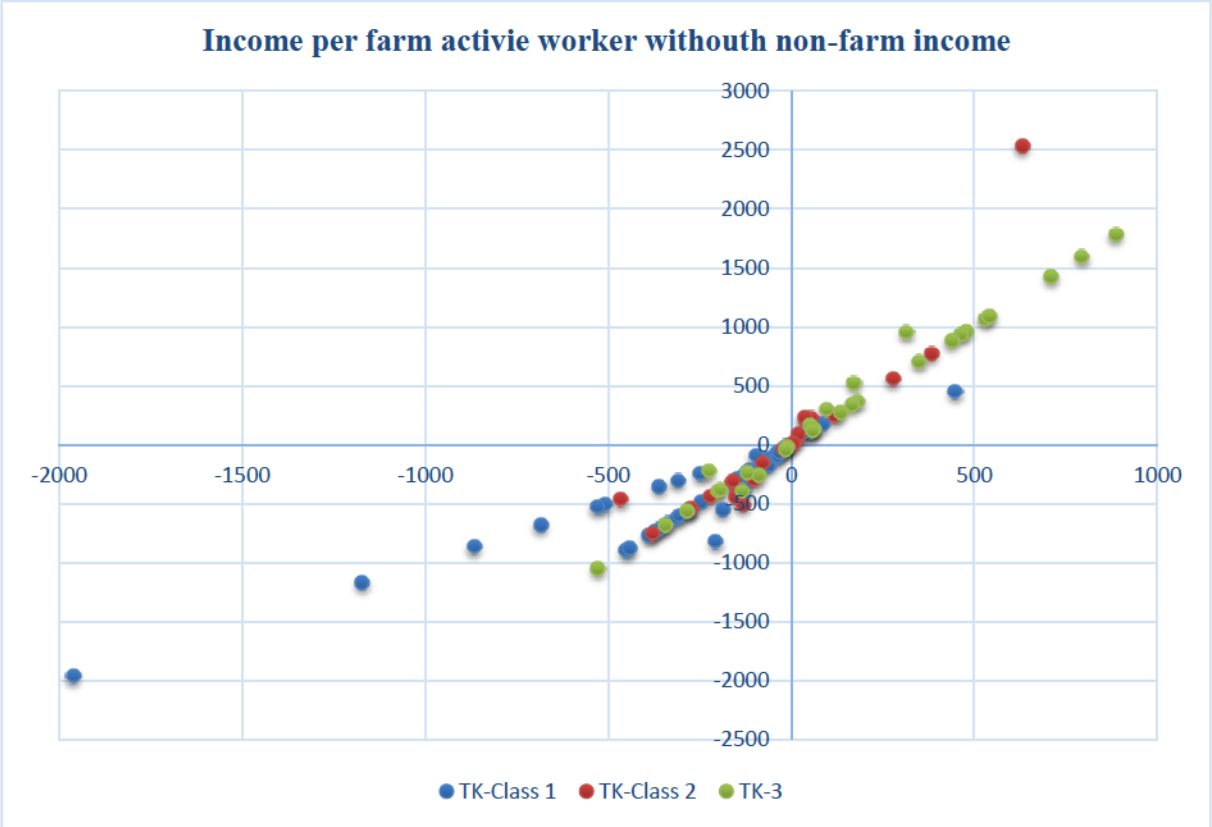




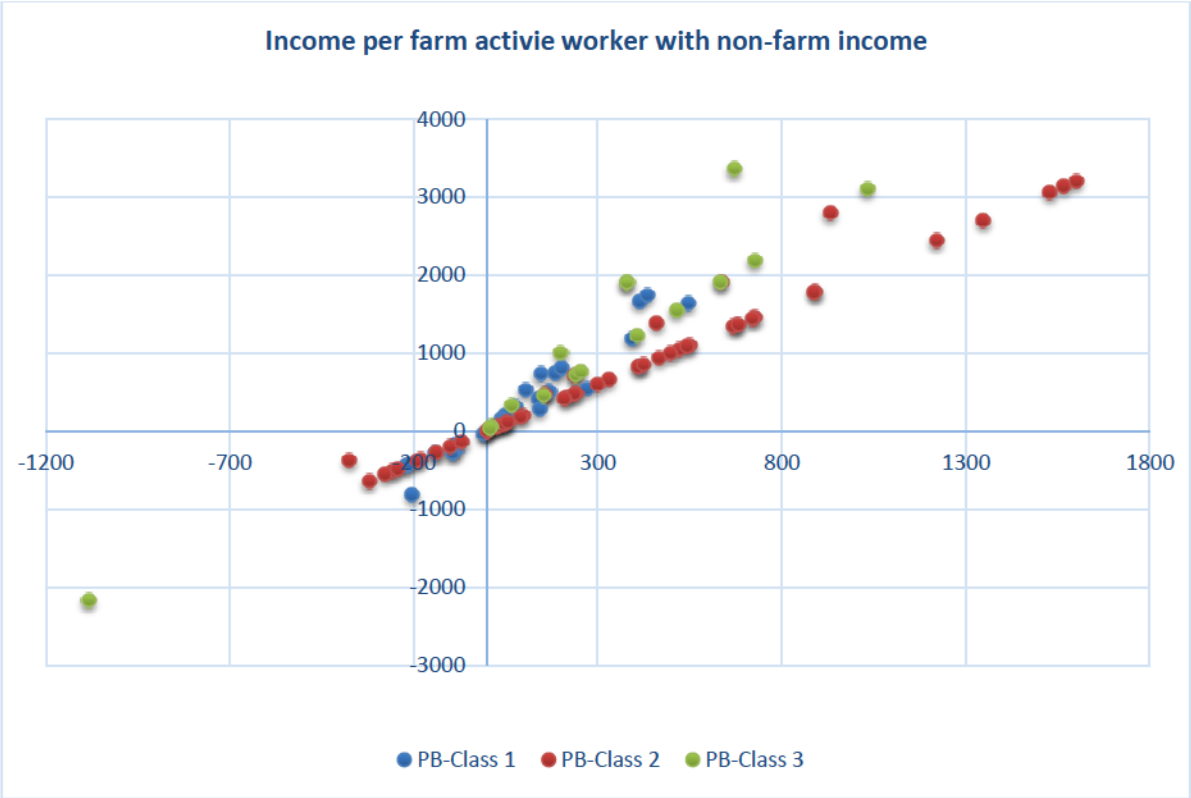
Appendix – 08 Household Economic by farm type with and without non-farm income per farm active worker

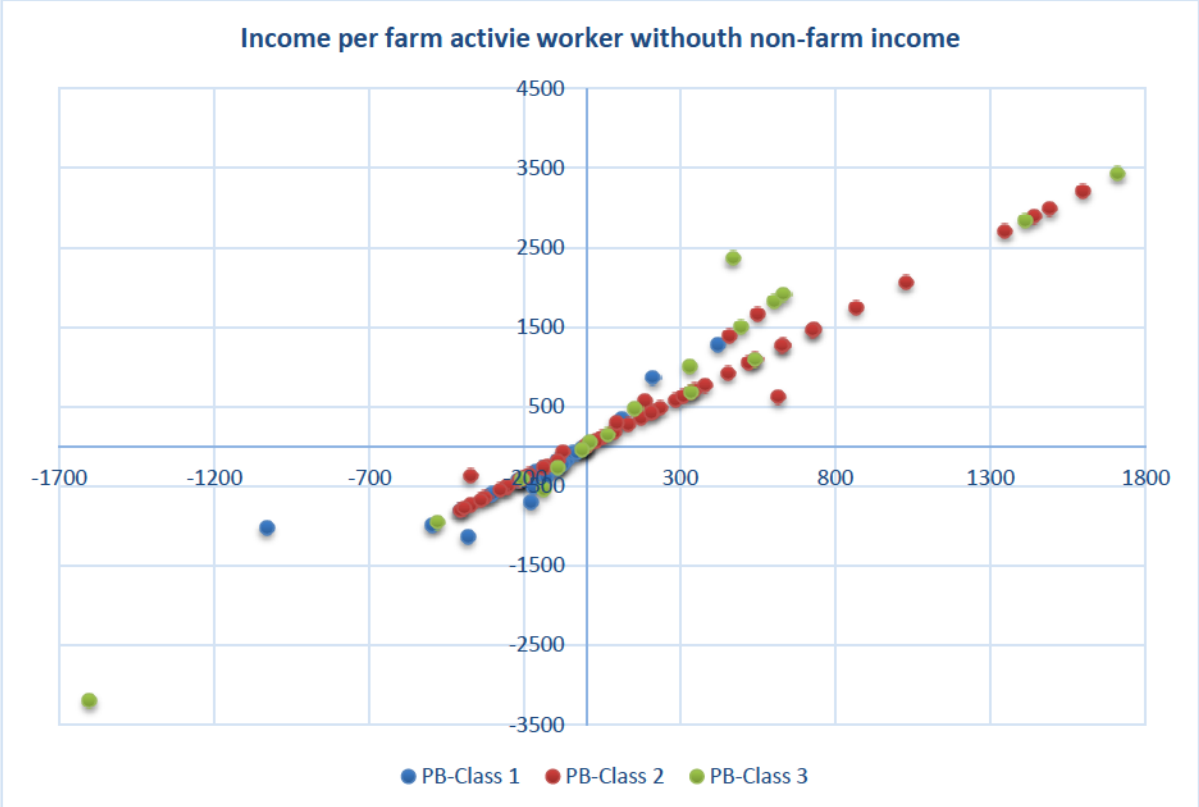
Tram Kak

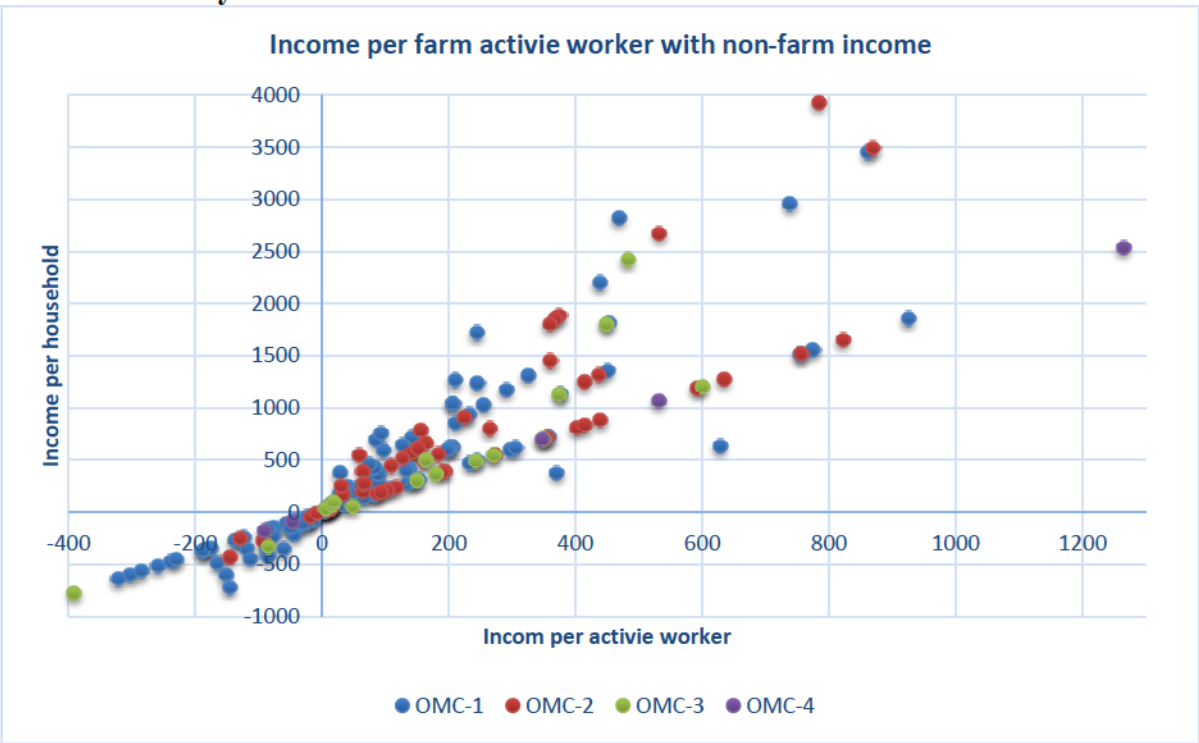




Prey Kabas


Income per farm activie worker with non-farm income
4000
3000
2000
1000
0
-1000
-2000
-3000
-1200
-700
-200
300
800
1300
1800
PB-Class 1
PB-Class 2
PB-Class 3


Income per farm activie worker withouth non-farm income
4500
3500
2500
1500
500
-500
-1500
-2500
-3500
-1700
-1200
-700
-200
300
800
1300
1800
PB-Class 1
PB-Class 2
PB-Class 3

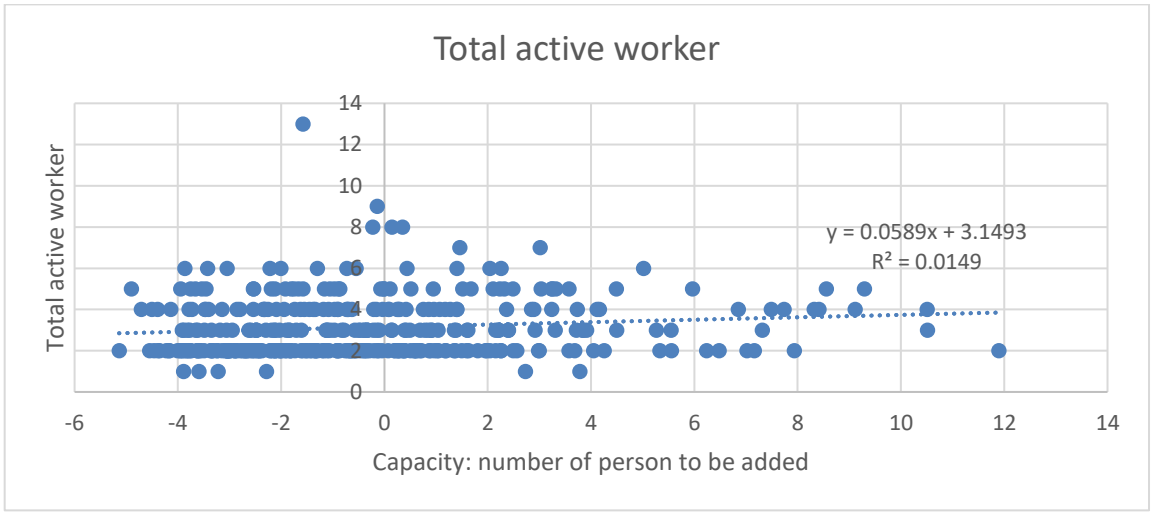

Income per farm activie worker with non-farm income
Income per household
Incom per activie worker
4000
3500
3000
2500
2000
1500
1000
500
0
-500
-1000
-400
-200
0
200
400
600
800
1000
1200
OMC-1
OMC-2
OMC-3
OMC-4

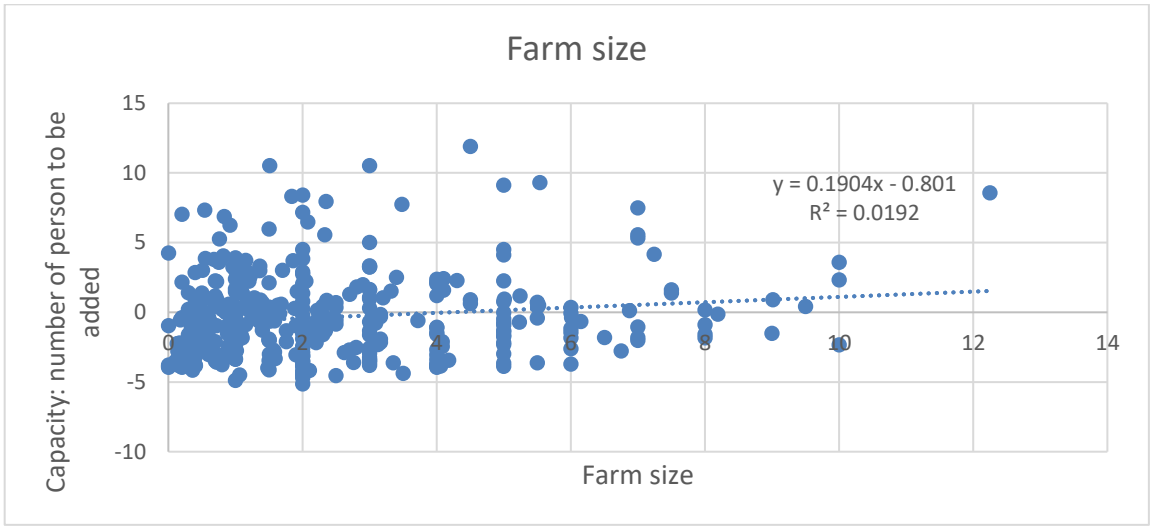

Income per farm activie worker withouth non-farm income
Income per household
Income per activie worker
4000
3500
3000
2500
2000
1500
1000
500
0
-500
-1000
-1500
-2000
-2500
-2300
-1800
-1300
-800
-300
200
700
1200
OMC-1
OMC-2
OMC-3
OMC-4

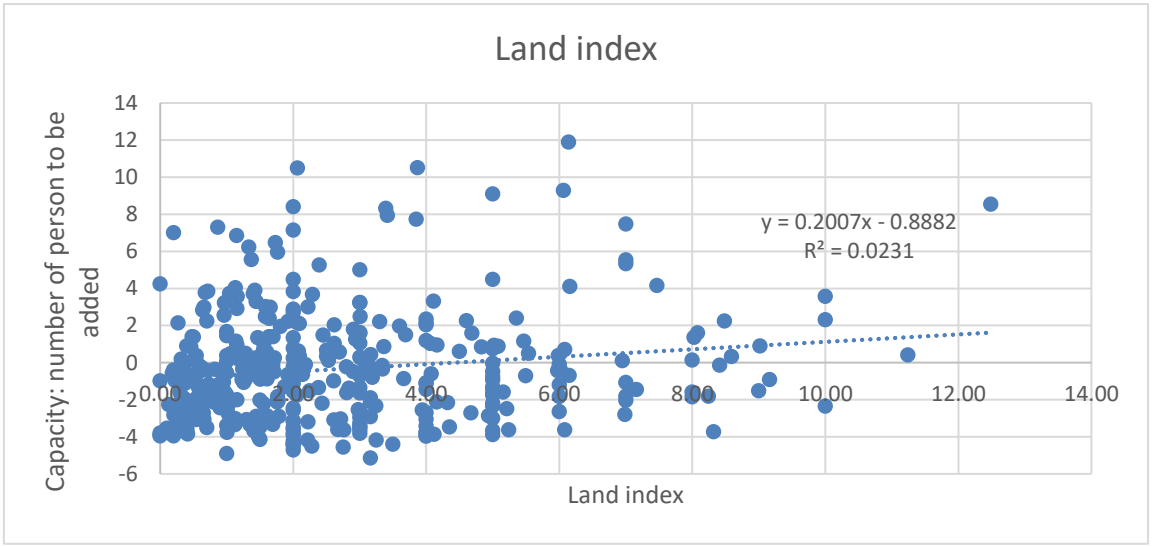
Appendix – 09 Youth integration capacity by zone by youth ad ult household

Zone	HH	Capacity	Number of household	%	Number of person to be added	Youth Farming	Youth Migration	Youth Non-farming	Youth Studying	Youth total	Under youth
Tam Kak	Youth HH	No	18	72%	-39.46	30	2	2	0	34	33
		Subsistence	2	8%	0.47	3	0	1	0	4	4
		Yes	5	20%	13.27	6	0	4	0	10	10
		Total	25	100%	-25.72	39	2	7	0	48	47
	Adult HH	No	40	56%	-79.91	25	34	0	29	88	32
		Subsistence	10	14%	4.36	7	9	3	6	25	9
		Yes	21	30%	89.59	11	18	1	25	55	12
		Total	71	100%	14.04	43	61	4	60	168	53
	Total	No	58	60%	-119.37	55	36	2	29	122	65
		Subsistence	12	13%	4.83	10	9	4	6	29	13
		Yes	26	27%	102.86	17	18	5	25	65	22
		Total	96	100%	-11.68	82	63	11	60	216	100
Prey Kabas	Youth HH	No	19	59%	-35.22	36	0	1	4	41	34
		Subsistence	4	13%	2.43	8	0	0	1	9	7
		Yes	9	28%	24.96	17	2	1	2	22	19
		Total	32	100%	-7.83	61	2	2	7	72	60
	Adult HH	No	38	60%	-66.73	40	14	1	40	95	29
		Subsistence	9	14%	4.16	8	1	4	10	23	3
		Yes	16	25%	54.67	17	8	1	22	48	15
		Total	63	100%	-7.90	65	23	6	72	166	47
	Total	No	57	60%	-101.95	76	14	2	44	136	63
		Subsistence	13	14%	6.59	16	1	4	11	32	10
		Yes	25	26%	79.63	34	10	2	24	70	34
		Total	95	100%	-15.74	126	25	8	79	238	107
Otdar Meanchey	Youth HH	No	40	75%	-95.51	77	5	2	5	89	73
		Subsistence	7	13%	3.48	13	0	1	0	14	13
		Yes	6	11%	28.30	10	0	2	2	14	9
		Total	53	100%	-63.73	100	5	5	7	117	95
	Adult HH	No	78	61%	-185.27	131	40	5	26	202	107
		Subsistence	13	10%	7.02	21	7	3	4	35	20
		Yes	37	29%	134.91	47	21	15	36	119	50
		Total	128	100%	-43.34	199	68	23	66	356	177
	Total	No	118	65%	-280.78	208	45	7	31	291	180
		Subsistence	20	11%	10.49	34	7	4	4	49	33
		Yes	43	24%	163.21	57	21	17	38	133	59
		Total	181	100%	-107.07	299	73	28	73	473	272
All zones	Youth HH	No	77	70%	-170.19	143	7	5	9	164	140
		Subsistence	13	12%	6.37	24	0	2	1	27	24
		Yes	20	18%	66.53	33	2	7	4	46	38
		Total	110	100%	-97.29	200	9	14	14	237	202
	Adult HH	No	156	60%	-331.91	196	88	6	95	385	168
		Subsistence	32	12%	15.54	36	17	10	20	83	32
		Yes	74	28%	279.17	75	47	17	83	222	77
		Total	262	100%	-37.20	307	152	33	198	690	277
	Total	No	233	63%	-502.10	339	95	11	104	549	308
		Subsistence	45	12%	21.91	60	17	12	21	110	56
		Yes	94	25%	345.70	108	49	24	87	268	115
		Total	372	100%	-134.49	507	161	47	212	927	479

Appendix – 10 Factors of production correlation







Descriptive Statistics

	Mean	Std. Deviation	N
Number of additional feeding person based on total HH VA	-0.34	2.99	372
Total active worker	3.13	1.44	372
Land farm size (Rice, AC, VG)	2.40	2.18	372
Agricultural IC and PL	638.26	649.54	372
Land index	2.71	2.26	372

Correlations

		Number of additional feeding person	Total active worker	Land farm size (Rice, AC, VG)	Agricultural IC and PL	Land index
Number of additional feeding person	Pearson Correlation	1	.122*	.139**	.228**	.152**
	Sig. (2-tailed)		.019	.007	.000	.003
	N	372	372	372	372	372
Total active worker	Pearson Correlation	.122*	1	.244**	-.092	.214**
	Sig. (2-tailed)	.019		.000	.075	.000
	N	372	372	372	372	372
Land farm size (Rice, AC, VG)	Pearson Correlation	.139**	.244**	1	.226**	.960**
	Sig. (2-tailed)	.007	.000		.000	.000
	N	372	372	372	372	372
Agricultural IC and PL	Pearson Correlation	.228**	-.092	.226**	1	.260**
	Sig. (2-tailed)	.000	.075	.000		.000
	N	372	372	372	372	372
Land index	Pearson Correlation	.152**	.214**	.960**	.260**	1
	Sig. (2-tailed)	.003	.000	.000	.000	
	N	372	372	372	372	372

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix – 11 Perception on agriculture by type by youth adult by capacity

Do you think that agriculture is good option?						
Zone	Farm type	Household	Capacity	Response	Frequency	Percent
Tam Kak	TK-1	Youth HH	No	Yes	13	100
			Yes	Yes	2	100
		Adult HH	No	No	2	8
				Yes	21	88
				No idea	1	4
				Total	24	100
			Subsistence	Yes	3	100
			Yes	Yes	2	100
	TK-2	Youth HH	No	Yes	3	100
			Subsistence	Yes	1	100
			Yes	Yes	1	100
		Adult HH	No	Yes	11	92
				No idea	1	8
				Total	12	100
			Subsistence	Yes	2	100
			Yes	Yes	4	100
	TK-3	Youth HH	No	No	1	50
				Yes	1	50
				Total	2	100
			Subsistence	Yes	1	100
			Yes	Yes	2	100
		Adult HH	No	Yes	4	100
			Subsistence	Yes	5	100
			Yes	Yes	15	100
Prey Kabas	PB-1	Youth HH	No	Yes	1	50
				No idea	1	50
				Total	2	100
		Adult HH	No	No	3	15
				Yes	17	85
				Total	20	100
			Subsistence	Yes	2	100
			Yes	Yes	3	100
	PB-2	Youth HH	No	No	1	6
				Yes	15	88
				No idea	1	6
				Total	17	100
			Subsistence	Yes	4	100
			Yes	Yes	8	100
		Adult HH	No	No	2	13
				Yes	13	87
				Total	15	100
			Subsistence	No	1	33
				Yes	2	67
				Total	3	100
			Yes	Yes	4	100
	PB-3	Youth HH	Yes	Yes	1	100
		Adult HH	No	Yes	3	100
			Subsistence	Yes	4	100
			Yes	No	3	33
				Yes	6	67
				Total	9	100

Do you think that agriculture is good option?						
Zone	Farm type	Household	Capacity	Response	Frequency	Percent
Otdar Meanchey	OMC-1	Youth HH	No	No	2	8
				Yes	22	88
				No idea	1	4
				Total	25	100
			Subsistence	Yes	2	67
				No idea	1	33
				Total	3	100
			Yes	Yes	2	100
		Adult HH	No	No	3	5
				Yes	46	84
				No idea	6	11
				Total	55	100
			Subsistence	Yes	5	71
				No idea	2	29
				Total	7	100
			Yes	No	4	21
				Yes	14	74
				No idea	1	5
				Total	19	100
	OMC-2	Youth HH	No	No	2	18
				Yes	9	82
				Total	11	100
			Subsistence	Yes	2	100
			Yes	Yes	1	33
				No idea	2	67
				Total	3	100
		Adult HH	No	Yes	13	93
				No idea	1	7
				Total	14	100
			Subsistence	No	1	20
				Yes	4	80
				Total	5	100
			Yes	Yes	12	86
				No idea	2	14
				Total	14	100
	OMC-3	Youth HH	No	Yes	3	100
			Subsistence	No idea	1	100
		Adult HH	No	Yes	6	75
				No idea	2	25
				Total	8	100
			Subsistence	Yes	1	100
			Yes	Yes	2	67
				No idea	1	33
				Total	3	100
	OMC-4	Youth HH	No	Yes	1	100
			Subsistence	Yes	1	100
			Yes	Yes	1	100
		Adult HH	No	Yes	1	100
			Yes	Yes	1	100.0

Do you have any intention to hand over your farm work to you children?							
Zone	Household	Farm type	Capacity	Response	Frequency	Percent	Valid Percent
Tam Kak	Youth HH	TK-1	No	No	8	62	62
				Yes	5	38	38
				Total	13	100	100
			Yes	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
		TK-2	No	No	1	33	33
				Yes	2	67	67
				Total	3	100	100
			Subsistence	Yes	1	100	100
			Yes	Yes	1	100	100
		TK-3	No	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
			Subsistence	No	1	100	100
			Yes	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
	Adult HH	TK-1	No	No	4	17	17
				Yes	20	83	83
				Total	24	100	100
			Subsistence	Yes	3	100	100
			Yes	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
		TK-2	No	No	2	17	18
				Yes	9	75	82
				Total	11	92	100
				Missing System	1	8	
				Total	12	100	
			Subsistence	Yes	2	100	100
			Yes	Yes	4	100	100
		TK-3	No	Yes	4	100	100
			Subsistence	No	2	40	40
				Yes	3	60	60
				Total	5	100	100
			Yes	No	6	40	40
				Yes	9	60	60
				Total	15	100	100

Do you have any intention to hand over your farm work to you children?							
Zone	Household	Farm type	Capacity	Response	Frequency	Percent	Valid Percent
Prey Kabas	Youth HH	PB-1	No	No	1	50	100
				Missing System	1	50	
				Total	2	100	
		PB-2	No	No	5	29	29
				Yes	12	71	71
				Total	17	100	100
			Subsistence	No	1	25	25
				Yes	3	75	75
				Total	4	100	100
			Yes	No	4	50	50
				Yes	4	50	50
				Total	8	100	100
		PB-3	Yes	Yes	1	100	100
	Adult HH	PB-1	No	No	7	35	35
				Yes	13	65	65
				Total	20	100	100
			Subsistence	Yes	2	100	100
			Yes	Yes	3	100	100
		PB-2	No	No	1	7	7
				Yes	14	93	93
				Total	15	100	100
			Subsistence	No	1	33	33
				Yes	2	67	67
				Total	3	100	100
			Yes	No	2	50	50
				Yes	2	50	50
				Total	4	100	100
		PB-3	No	Yes	3	100	100
			Subsistence	No	1	25	25
				Yes	3	75	75
				Total	4	100	100
			Yes	No	2	22	25
				Yes	6	67	75
				Total	8	89	100
				Missing System	1	11	
				Total	9	100	

Do you have any intention to hand over your farm work to you children?							
Zone	Household	Farm type	Capacity	Response	Frequency	Percent	Valid Percent
Otdar Meanchey	Youth HH	OMC-1	No	No	7	28	28
				Yes	18	72	72
				Total	25	100	100
			Subsistence	No	1	33	50
				Yes	1	33	50
				Total	2	67	100
				Missing System	1	33	
			Total		3	100	
			Yes	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
		OMC-2	No	No	4	36	36
				Yes	7	64	64
				Total	11	100	100
			Subsistence	No	1	50	50
				Yes	1	50	50
				Total	2	100	100
			Yes	No	1	33	50
				Yes	1	33	50
				Total	2	67	100
				Missing System	1	33	
			Total		3	100	
		OMC-3	No	Yes	3	100	100
			Subsistence	No	1	100	100
		OMC-4	No	No	1	100	100
			Subsistence	No	1	100	100
			Yes	Yes	1	100	100
	Adult HH	OMC-1	No	No	7	13	13
				Yes	45	82	87
				Total	52	95	100
				Missing System	3	5	
			Total		55	100	
			Subsistence	No	1	14	20
				Yes	4	57	80
				Total	5	71	100
				Missing System	2	29	
			Total		7	100	
			Yes	No	6	32	33
				Yes	12	63	67
				Total	18	95	100
				Missing System	1	5	
			Total		19	100	
		OMC-2	No	No	3	21	21
				Yes	11	79	79
				Total	14	100	100
			Subsistence	Yes	5	100	100
			Yes	No	3	21	21
				Yes	11	79	79
				Total	14	100	100
		OMC-3	No	No	3	38	43
				Yes	4	50	57
				Total	7	88	100
				Missing System	1	13	
			Total		8	100	
			Subsistence	Yes	1	100	100
			Yes	Yes	3	100	100
		OMC-4	No	No	1	100	100
			Yes	Yes	1	100	100

Appendix – 12 Asset standard estimated value for asset conversion to monetary value

Household Assets	Assume price for local estimate value
1. Mobile phone	**$30**
2. Radio	**$5**
3. Television	**$70**
4. Satellite receiver	**$100**
5. Karaoke system	**$200**
6. Cassette Player	**$20**
7. DVD or VCD Player	**$20**
8. Fan	**$15**
9. Air conditioner	**$300**
10. Paraffin lamp	**$1**
11. Torch	**$2**
12. Recharge Battery Lamp	**$30**
13. Bio Gas	**$550**
14. Table	**$10**
15. Chair	**$2**
16. Bed	**$30**
17. Bicycle	**$50**
18. Pulling cart	**$60**
19. Horse cart	**$120**
20. Motor bike	**$800**
21. Car (tourism)	**$4,000**
22. Car (transport)	**$5,000**
23. Remorque (for two-wheel tractor)	**$300**
24. Truck	**$7,000**
25. Electricity generator	**$300**
26. Small scale rice mill	**$500**
27. Other……	**$10**
Agricultural equipment	
1. Plow	**$150**
2. Rake	**$150**
3. Oxen chart	**$400**
4. Motor-plow (Two wheels tractor)	**$2,200**
5.Remorque for motor plow	**$300**
6. Tractor	**$10,000**
7. Waterpump	**$300**
8. Grass trimming machine	**$150**
9. Pesticide sprayer	**$30**
11.Threshing machine	**$4,000**
12. Harvest machine	**$15,000**
11.Other……	**$100**
Cattle stock value based on data from sample	Price
1 head	**$500**

Appendix – 13 Detail activities in the main categories of non-farm activities

No	Self-Business	No	Salary based	No	Labor based	No	Migration	No	Agricultural wage labor
1	Businessman	1	Civil servant or LA	1	Carpenter (Cheang Cheur)	1	Agricultural wage labor	1	Transplant rice
2	Buy and Sell agricultural product (trade)	2	Driver	2	Construction	2	Assistance of shop keeper	2	Harvest rice
3	Buy and sell poultry	3	Military	3	Garment worker (near village)	3	Businessman	3	Transport rice
4	Food processing (including small scale food processing)	4	Pension fund	4	Grass harvest	4	Buy and Sell agricultural product (trade)	4	Spray pesticide
5	Hairdresser/hair cutter	5	Salaried employment in private company	5	Handicraft	5	Casino work	5	Manual weeding
6	Hire two-wheel tractor for plough	6	Teacher	6	Harvest Machine	6	Civil servant or LA	6	Land clearance
7	Junk collectors	7	Village chief	7	Land digger	7	Construction	7	Drive two-wheel tractor
8	Local petty trader (including petroleum street seller)			8	Organize wedding party food	8	Cooker	8	Harvest cassava
9	Mechanic			9	Other non-farm jobs	9	Driver	9	Other relevant wage labor in agriculture
10	Moto taxi			10	Religious master ceremony	10	Garment worker (in city)		
11	Renting two-wheel tractor to transport rice product			11	Taxi driver (Pro Lan)	11	Remittance		
12	Rice mill			12	Threshing machine worker	12	Salaried employment		
14	Sell wood			13	Timber cutter	13	Shop keeper		
15	Shop keeper			14	Washing clothes for others	14	Urban services		
17	Palm sugar production					15	Remittance		
18	Small industries								
19	Tailor								
21	Taxi								
22	Threshing rice with own machine								

Appendix – 14 Non-farm activities in the three study areas

Small business detail activities by gender

Zone	Detail small business activities	Male		Female		Total	
		N	%	N	%	N	%
TK	Local petty trader (including petroleum street seller)	1	100%	0	0%	1	100%
	Food processing (including small scale food processing)	0	0%	3	100%	3	100%
	Shop keeper	1	8%	11	92%	12	100%
	Rice mill	2	50%	2	50%	4	100%
	Businessman	1	100%	0	0%	1	100%
	Small industries	1	100%	0	0%	1	100%
	Tailor	0	0%	2	100%	2	100%
	Hairdresser/hair cutter	1	100%	0	0%	1	100%
	Buy and Sell agricultural product (trade)	0	0%	2	100%	2	100%
	Buy and sell poultry	1	100%	0	0%	1	100%
	Total	8	29%	20	71%	28	100%
PB	Fishing	1	100%	0	0%	1	100%
	Local petty trader (including petroleum street seller)	3	100%	0	0%	3	100%
	Food processing (including small scale food processing)	0	0%	2	100%	2	100%
	Shop keeper	2	20%	8	80%	10	100%
	Rice mill	0	0%	1	100%	1	100%
	Businessman	2	40%	3	60%	5	100%
	Mechanic	1	100%	0	0%	1	100%
	Tailor	0	0%	1	100%	1	100%
	Junk collectors	1	33%	2	67%	3	100%
	Hairdresser/hair cutter	0	0%	1	100%	1	100%
	Buy and sell poultry	1	100%	0	0%	1	100%
	Total	11	38%	18	62%	29	100%
OMC	Local petty trader (including petroleum street seller)	0	0%	2	100%	2	100%
	Food processing (including small scale food processing)	0	0%	2	100%	2	100%
	Shop keeper	6	22%	21	78%	27	100%
	Rice mill	0	0%	1	100%	1	100%
	Small industries	1	100%	0	0%	1	100%
	Hairdresser/hair cutter	1	50%	1	50%	2	100%
	Other non-farm jobs	1	100%	0	0%	1	100%
	Buy and Sell agricultural product (trade)	2	50%	2	50%	4	100%
	Taxi	1	100%	0	0%	1	100%
	Total	12	29.27%	29	70.73%	41	100%
Total	Fishing	1	100%	0	0%	1	100%
	Local petty trader (including petroleum street seller)	4	67%	2	33%	6	100%

Food processing (including small scale food processing)	0	0%	7	100%	7	100%
Shop keeper	9	18%	40	82%	49	100%
Rice mill	2	33%	4	67%	6	100%
Businessman	3	50%	3	50%	6	100%
Mechanic	1	100%	0	0%	1	100%
Small industries	2	100%	0	0%	2	100%
Tailor	0	0%	3	100%	3	100%
Junk collectors	1	100%	0	0%	1	100%
Haidresser/hair cutter	2	40%	3	60%	5	100%
Other non-farm jobs	1	100%	0	0%	1	100%
Buy and Sell agricultural product (trade)	2	29%	5	71%	7	100%
Buy and sell poultry	2	100%	0	0%	2	100%
Taxi	1	100%	0	0%	1	100%
Total	31	32%	67	68%	98	100%

Relation to household head who do small business activities in the village in three zones

Relation to HH head	Male		Female		Total	
	N	%	N	%	N	%
HH head	25	81%	9	13%	34	35%
Husband/wife	0	0%	45	67%	45	46%
Son/Daughter	1	3%	12	18%	13	13%
Parents	0	0%	1	1%	1	1%
Son/daughter in law	5	16%	0	0%	5	5%
Total	31	100%	67	100%	98	100%

Relation to household head doing construction work

Relation to HH head	Male		Female		Total	
	N	%	N	%	N	%
HH head	29	91%	2	100%	30	91%
Son/Daughter	3	9%	0	0%	3	9%
Total	32	100%	2	100%	34	100%

Small business labor productivity and labor inputs by activity

Zone	Small business labor input by activity	N	%	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
						Std. De	Min	Max	Std. De	Min	Max
Tam KaK	Local petty trader (including petroleum street seller)	1	3.57%	1.39	180	.	1.39	1.39	.	180	180
	Food processing (including small scale food processing)	3	10.71%	1.00	224	0.50	0.50	1.50	138	90	365
	Shop keeper	12	42.86%	1.97	337	1.36	0.75	5.00	95	36	365
	Rice mill	4	14.29%	2.21	365	2.06	0.50	5.00	92	180	365
	Businessman	1	3.57%	5.00	360	.	5.00	5.00	.	360	360
	Small industries	1	3.57%	2.00	360	.	2.00	2.00	.	360	360
	Tailor	2	7.14%	1.27	180	1.075	0.51	2.03	0	180	180
	Hairdresser/hair cutter	1	3.57%	2.00	365	.	2.00	2.00	.	365	365
	Buy and Sell agricultural product (trade)	2	7.14%	2.50	365	0	2.50	2.50	0	365	365
	Buy and sell poultry	1	3.57%	2.50	240	.	2.50	2.50	.	240	240
	Total	28	100.00%	2.00	295	1.35	0.5	5.00	99	36	365
Prey Kabas	Fishing	1	3.57%	5.80	210	.	5.80	5.80	.	210	210
	Local petty trader (including petroleum street seller)	3	10.71%	2.98	301	1.85	1.37	5.00	103	183	365
	Food processing (including small scale food processing)	2	7.14%	1.88	365	0	1.88	1.88	0	365	365
	Shop keeper	10	35.71%	2.31	321	1.75	0.49	5.00	91	120	365
	Rice mill	1	3.57%	3.75	365	.	3.75	3.75	.	365	365
	Businessman	5	17.86%	6.80	218	4.40	1.50	10.00	134	120	365
	Mechanic	1	3.57%	1.67	360	.	1.67	1.67	.	360	360
	Tailor	1	3.57%	1.00	180	.	1.00	1.00		180	180
	Junk collectors	1	3.57%	1.83	300	.	1.83	1.83		300	300
	Hairdresser/hair cutter	2	7.14%	1.25	365	0.59	0.83	1.67	173	120	365
	Buy and sell poultry	1	3.57%	2.08	300	.	2.08	2.08	.	300	300
	Total	28	100.00%	3.21	290	2.79	0.49	10	102	120	365
Otdar Mean Chey	Local petty trader (including petroleum street seller)	2	4.88%	2.98	195	3.50	0.50	5.45	191	60	330
	Food processing (including small scale food processing)	2	4.88%	3.38	261	2.30	1.75	5.00	148	156	365
	Shop keeper	27	65.85%	2.74	282	2.23	0.50	8.63	97	60	365

	Rice mill	1	2.44%	1.00	300	.	1.00	1.00		300	300
	Small industries	1	2.44%	5.00	365	.	5.00	5.00	.	365	365
	Haindresser/hair cutter	2	4.88%	0.69	270	0.20	0.56	0.83	127	180	360
	Other non-farm jobs	1	2.44%	5.07	360	.	5.07	5.07		360	360
	Buy and Sell agricultural product (trade)	4	9.76%	2.95	188	1.15	1.40	4.17	199	16	360
	Taxi	1	2.44%	7.50	360	.	7.50	7.50		360	360
	Total	41	100.00%	2.89	273	2.21	0.5	8.63	113	16	365
Total	Fishing	1	1.03%	5.80	210	.	5.80	5.80	.	210	210
	Local petty trader (including petroleum street seller)	6	6.19%	2.71	246	2.06	0.50	5.45	124	60	365
	Food processing (including small scale food processing)	7	7.22%	1.93	275	1.45	0.50	5.00	119	90	365
	Shop keeper	49	50.52%	2.47	303	1.95	0.49	8.63	97	36	365
	Rice mill	6	6.19%	3.13	282	0.88	2.50	3.75	84	180	365
	Businessman	6	6.19%	6.50	242	4	1.50	10.00	133	120	365
	Mechanic	1	1.03%	1.67	360	.	1.67	1.67	.	360	360
	Small industries	2	2.06%	3.50	333	2.12	2.00	5.00	46	300	365
	Tailor	3	3.09%	1.27	180	1.08	0.51	2.03	0	180	180
	Junk collectors	1	1.03%	1.83	300	.	1.83	1.83		300	300
	Haindresser/hair cutter	5	5.15%	1.26	278	0.68	0.56	2.00	119	120	365
	Other non-farm jobs	1	1.03%	5.07	360	.	5.07	5.07		360	360
	Buy and Sell agricultural product (trade)	6	6.19%	2.13	247	0.64	1.40	2.50	179	16	365
	Buy and sell poultry	2	2.06%	2.29	270	0.29	2.08	2.50	42	240	300
	Taxi	1	1.03%	7.50	360	.	7.50	7.50		360	360
	Total	97	100.00%	2.72	285	2.23	0.49	10	105	16	365

*Total is 98 but one case was excluded due to extreme value

Construction work labor productivity and labor inputs

Zone	Migration destination	N	Construction Mean Labor productivity	Construction Mean Labor input	Labor productivity			Labor input		
					Std. De	Min	Max	Std. De	Min	Max
Tam KaK	1.Interview village	13	4.22	75	0.66	3.33	5	50.56	10	180
	4.In province in the interview province	2	4.38	165	0.88	3.75	5	190.92	30	300
	5.In other provinces	4	3.65	90	0.21	3.33	3.75	64.81	30	180
	Total	19	4.11	87	0.64	3.33	5	72.23	10	300
Prey Kabas	1.Interview village	3	4.10	45	0.31	3.85	4.44	20.00	25	65
	6.Thailand	1	5.00	300	.	5	5	.	300	300
	Total	4	4.32	109	0.52	3.85	5	128.54	25	300
Otdar Meanchey	1.Interview village	4	4.99	77	1.75	3.75	7.46	29.02	60	120
	3. In a district in the interview district	3	2.92	143	0.72	2.5	3.75	187.71	30	360
	5.In other provinces	4	3.44	48	0.31	3	3.75	68.79	3	150
	Total	11	3.86	85	1.38	2.5	7.46	101.52	3	360
Total	1.Interview village	20	4.35	71	0.94	3.33	7.46	43.73	10	180
	3. In a district in the interview district	3	2.92	143	0.72	2.5	3.75	187.71	30	360
	4.In province in the interview province	2	4.38	165	0.88	3.75	5	190.92	30	300
	5.In other provinces	8	3.54	69	0.27	3	3.75	65.77	3	180
	6.Thailand	1	5.00	300	.	5	5	.	300	300
	Total	34	4.0565	89	0.92	2.5	7.46	86.76	3	360

Salary detail activities by labor productivity and labor input

	Small business labor productivity by activity	N	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
					Std. De	Min	Max	Std. De	Min	Max
Tam KaK	Salaried employment	2	1.72	261	0.81	1.15	2.30	0	261	261
	Teacher	2	2.87	261	0.81	2.30	3.45	0	261	261
	Civil servant or LA,	2	3.62	261	1.87	2.30	4.94	0	261	261
	Casino work	1	2.30	261	.	2.50	2.50	.	365	365
	Village chief	1	2.30	261	.	2.30	2.30	.	261	261
	Total	8	2.44	245	1.30	0.77	4.94	46.32	130	261
Prey Kabas	Salaried employment	1	3.45	261	.	3.45	3.45	.	261	261
	Teacher	3	2.72	261	1.78	0.69	4.02	0	261	261
	Civil servant or LA,	1	2.39	180	.	2.39	2.39	.	180	180
	Assistance of shop keeper	2	5.50	360	0.71	5.00	6.00	0	360	360
	Cooker	2	3.16	261	2.03	1.72	4.60	0	261	261
	Village chief	2	1.68	130	0.23	1.52	1.85	0	130	130
	Total	11	3.15	248	1.66	0.69	6	76.53	130	360
Otdar Meanchey	Salaried employment	1	5.75	261	.	5.75	5.75	.	261	261
	Driver	2	7.82	261	0.65	7.36	8.28	0	261	261
	Teacher	7	4.17	261	2.14	1.72	7.36	0	261	261
	Civil servant or LA,	7	3.69	261	2.09	1.72	7.82	0	261	261
	Others non-farm job	1	5.00	360	.	5	5	.	360	360
	Military	6	3.07	261	0.33	2.64	3.45	0	261	261
	Village chief	5	0.91	130	0.21	0.69	1.15	0	130	130
	Total	29	3.60	242	2.21	0.69	8.28	55.08	130	360
Total	Salaried employment	4	3.16	261	1.96	1.15	5.75	0	261	261
	Driver	2	7.82	261	0.65	7.36	8.28	0	261	261
	Teacher	12	3.59	261	1.91	0.69	7.36	0	261	261
	Civil servant or LA,	10	3.55	253	1.86	1.72	7.82	25.61	180	261
	Assistance of shop keeper	2	5.50	360	0.71	5.00	6.00	0	360	360
	Others non-farm job	1	5.00	360	.	5.00	5.00	.	360	360
	Military	6	3.07	261	0.33	2.64	3.45	0	261	261
	Cooker	2	3.16	261	2.03	1.72	4.60	0	261	261
	Casino work	1	2.30	261	.	2.50	2.50	.	365	365
	Village chief	8	1.08	130	0.42	0.69	1.85	0	130	130
	Total	48	3.30	244	1.99	0.69	8.28	58.1324	130	360

Average Non-farm income per person and average number of family member per family by zone

		Number of household		Non-farm income per person				Number of people working on non-farm			
Zone	Class of Non-farm income per person	N	%	Mean	Std. Deviation	Minimum	Maximum	Mean	Std. Deviation	Minimum	Maximum
Tam KaK	<= 50.00	8	14%	27.34	15.89	5.00	50.00	1.25	0.46	1	2
	50.01 - 100.00	5	9%	80.50	16.99	55.00	100.00	1.00	0.00	1	1
	100.01 - 300.00	16	28%	187.97	71.78	107.00	300.00	1.13	0.34	1	2
	300.01 - 500.00	13	23%	399.46	62.58	312.50	500.00	1.31	0.63	1	3
	500.01 - 1000.00	9	16%	679.17	148.75	515.00	912.50	1.33	0.50	1	2
	1000.01+	6	11%	1388.96	279.48	1050.00	1825.00	1.17	0.41	1	2
	Total	57	100%	408.21	414.07	5.00	1825.00	1.21	0.45	1	3
Prey Kabas	<= 50.00	6	8%	37.92	13.46	22.50	50.00	1.33	0.52	1	2
	50.01 - 100.00	7	10%	86.75	9.93	75.00	100.00	1.29	0.49	1	2
	100.01 - 300.00	27	38%	210.37	55.55	107.50	300.00	1.78	0.93	1	4
	300.01 - 500.00	7	10%	413.04	32.98	365.00	446.25	1.57	0.53	1	2
	500.01 - 1000.00	19	26%	761.82	165.27	517.50	1000.00	1.21	0.42	1	2
	1000.01+	6	8%	1490.63	370.93	1050.00	1825.00	1.33	0.82	1	3
	Total	72	100%	455.89	429.75	22.50	1825.00	1.49	0.73	1	4
Otdar Mean Chey	<= 50.00	53	39%	23.69	12.17	7.50	50.00	1.72	0.95	1	5
	50.01 - 100.00	20	15%	75.23	15.16	52.75	100.00	1.35	0.49	1	2
	100.01 - 300.00	17	13%	191.50	65.58	125.00	300.00	1.41	0.51	1	2
	300.01 - 500.00	12	9%	425.63	45.35	360.00	493.75	2.00	0.85	1	4
	500.01 - 1000.00	20	15%	809.19	145.01	504.00	948.50	1.40	0.60	1	3
	1000.01+	14	10%	1876.74	533.13	1050.00	3150.00	1.43	0.51	1	2
	Total	136	100%	393.98	598.97	7.50	3150.00	1.57	0.77	1	5
Total	<= 50.00	67	25%	25.40	13.20	5.00	50.00	1.63	0.88	1	5
	50.01 - 100.00	32	12%	78.57	14.84	52.75	100.00	1.28	0.46	1	2
	100.01 - 300.00	60	23%	199.05	62.81	107.00	300.00	1.50	0.75	1	4
	300.01 - 500.00	32	12%	412.24	50.93	312.50	500.00	1.63	0.75	1	4
	500.01 - 1000.00	48	18%	766.06	158.03	504.00	1000.00	1.31	0.51	1	3
	1000.01+	26	10%	1675.07	491.45	1050.00	3150.00	1.35	0.56	1	3
	Total	265	100%	413.86	519.80	5.00	3150.00	1.47	0.71	1	5

Average Migration income per migrant and average number of migrant per family by zone

		Number of household		Average migration income per migrant				Average number of migrant per family			
Zone	Total Migration income per migrant	N	%	Mean	Std. Deviation	Minimum	Maximum	Mean	Std. Deviation	Minimum	Maximum
Tam KaK	<= 100.00	5	14%	79.25	26.60	38	100	1.80	1.30	1	4
	100.01 - 300.00	15	43%	200.17	60.57	113	300	1.87	1.19	1	5
	300.01 - 500.00	4	11%	402.50	66.52	360	500	1.50	0.58	1	2
	500.01 - 1000.00	9	26%	661.11	145.30	550	1000	1.33	0.50	1	2
	1000.01+	2	6%	1428.13	101.65	1356	1500	1.50	0.71	1	2
	Total	35	100%	394.71	346.70	38	1500	1.66	0.97	1	5
Prey Kabas	<= 100.00	2	17%	36.25	33.59	13	60	1.00	0.00	1	1
	100.01 - 300.00	3	25%	150.00	0.00	150	150	1.67	1.15	1	3
	300.01 - 500.00	2	17%	380.00	28.28	360	400	1.00	0.00	1	1
	500.01 - 1000.00	4	33%	625.00	50.00	600	700	1.50	1.00	1	3
	1000.01+	1	8%	1980.00	.	1980	1980	2.00	.	2	2
	Total	12	100%	480.21	529.50	13	1980	1.42	0.79	1	3
Otdar Mean Chey	<= 100.00	11	25%	62.95	34.38	13	100	1.45	0.93	1	4
	100.01 - 300.00	13	30%	224.42	78.95	125	300	1.62	0.77	1	3
	300.01 - 500.00	6	14%	441.08	83.49	302	500	1.83	0.75	1	3
	500.01 - 1000.00	7	16%	655.71	147.41	600	990	1.14	0.38	1	2
	1000.01+	7	16%	1507.86	464.04	1020	2160	1.29	0.76	1	3
	Total	44	100%	486.40	526.62	13	2160	1.48	0.76	1	4
Total	<= 100.00	18	20%	64.51	32.98	13	100	1.50	0.99	1	4
	100.01 - 300.00	31	34%	205.48	68.43	113	300	1.74	1.00	1	5
	300.01 - 500.00	12	13%	418.04	71.33	302	500	1.58	0.67	1	3
	500.01 - 1000.00	20	22%	652.00	127.84	550	1000	1.30	0.57	1	3
	1000.01+	10	11%	1539.13	412.07	1020	2160	1.40	0.70	1	3
	Total	91	100%	450.32	462.75	13	2160	1.54	0.85	1	5

Detail of non-farm activities in three zones

Main non-farm activities all zone	N	Percent of all activities in zone	Percent	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
						Std. De	Min	Max	Std. De	Min	Max
Salaried employment	48	9%	100.00%	3.30	244	1.99	0.69	8.28	58.132	130	360
Salaried employment	4		8.33%	3.16	261	1.96	1.15	5.75	0	261	261
Driver	2		4.17%	7.82	261	0.65	7.36	8.28	0	261	261
Teacher	12		25.00%	3.59	261	1.91	0.69	7.36	0	261	261
Civil servant or LA,	10		20.83%	3.55	253	1.86	1.72	7.82	25.61	180	261
Assistance of shop keeper	2		4.17%	5.50	360	0.71	5.00	6.00	0	360	360
Other non-farm jobs	1		2.08%	5.00	360	.	5.00	5.00	.	360	360
Military	6		12.50%	3.07	261	0.33	2.64	3.45	0	261	261
Cooker	2		4.17%	3.16	261	2.03	1.72	4.60	0	261	261
Casino work	1		2.08%	2.30	261	.	2.50	2.50	.	365	365
Village chief	8		16.67%	1.08	130	0.42	0.69	1.85	0	130	130
Palm sugar production	2	0.37%		3.50	74	3.89	0.75	6.25	65.76	27	120
Small business	97	18%	100.00%	2.72	285	2.23	0.49	10	105	16	365
Fishing	1		1.03%	5.80	210	.	5.80	5.80	.	210	210
Local petty trader (including petroleum street seller)	6		6.19%	2.71	246	2.06	0.50	5.45	124	60	365
Food processing (including small scale food processing)	7		7.22%	1.93	275	1.45	0.50	5.00	119	90	365
Shop keeper	49		50.52%	2.47	303	1.95	0.49	8.63	97	36	365
Rice mill	6		6.19%	3.13	282	0.88	2.50	3.75	84	180	365
Businessman	6		6.19%	6.50	242	4	1.50	10.00	133	120	365
Mechanic	1		1.03%	1.67	360	.	1.67	1.67	.	360	360
Small industries	2		2.06%	3.50	333	2.12	2.00	5.00	46	300	365
Tailor	3		3.09%	1.27	180	1.08	0.51	2.03	0	180	180
Junk collectors	1		1.03%	1.83	300	.	1.83	1.83		300	300
Hairdresser/hair cutter	5		5.15%	1.26	278	0.68	0.56	2.00	119	120	365
Other non-farm jobs	1		1.03%	5.07	360	.	5.07	5.07		360	360
Buy and Sell agricultural product (trade)	6		6.19%	2.13	247	0.64	1.40	2.50	179	16	365
Buy and sell poultry	2		2.06%	2.29	270	0.29	2.08	2.50	42	240	300
Taxi	1		1.03%	7.50	360	.	7.50	7.50		360	360
Agricultural wage labor	172	32%		3.65	11	1	2	8	10	2	50
Construction work	34	6%		4.06	89	0.92	2.5	7.46	86.76	3	360
Weaving or handicraft work	34	6%		1.38	181	0.72	0.50	3.50	81.65	50.00	365
Garment work	12	2%		1.67	302.50	0.32	1.00	2.50	95	90	360
Moto taxi	6	1%		3.42	272	0.96	2.50	5.00	150	4	365
Other non-farm activities	23	4%		4.59	40.09	2.38	0.50	10.00	56	1	180
Remittance USD/Year/person	109	20%		270		242	12.5	1020			
Total people doing activities	537	100%									

Detail of non-farm activities in Otdar Meanchey

Non-farm activities in Otdar Meanchey	N	Percent of all activities in zone	Percent in main category	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
						Std. De	Min	Max	Std. De	Min	Max
Salaried employment	28	9.86%	100%	5.75	261	.	5.75	5.75	.	261	261
Driver	2		7.14%	7.82	261	0.65	7.36	8.28	0	261	261
Teacher	7		25.00%	4.17	261	2.14	1.72	7.36	0	261	261
Civil servant or LA,	7		25.00%	3.69	261	2.09	1.72	7.82	0	261	261
Other non-farm jobs	1		3.57%	5.00	360	.	5	5	.	360	360
Military	6		21.43%	3.07	261	0.33	2.64	3.45	0	261	261
Village chief	5		17.86%	0.91	130	0.21	0.69	1.15	0	130	130
Palm sugar production	1	0.35%		0.75	27	.	0.75	0.75	.	27	27
Small business	41	14.44%	100%	2.89	273.37	2.21	0.50	8.63	112.67	16.00	365
Local petty trader (including petroleum street seller)	2		4.88%	2.98	195	3.50	0.50	5.45	191	60	330
Food processing (including small scale food processing)	2		4.88%	3.38	261	2.30	1.75	5.00	148	156	365
Shop keeper	27		65.85%	2.74	282	2.23	0.50	8.63	97	60	365
Rice mill	1		2.44%	1.00	300	.	1.00	1.00		300	300
Small industries	1		2.44%	5.00	365	.	5.00	5.00	.	365	365
Hairdresser/hair cutter	2		4.88%	0.69	270	0.20	0.56	0.83	127	180	360
Other non-farm jobs	1		2.44%	5.07	360	.	5.07	5.07		360	360
Buy and Sell agricultural product (trade)	4		9.76%	2.95	188	1.15	1.40	4.17	199	16	360
Taxi	1		2.44%	7.50	360	.	7.50	7.50		360	360
Agricultural wage labor	128	45.07%		3.47	10	0.89	2.50	7.50	9.02	2.00	45
Construction work	11	3.87%		3.86	85	1.38	2.5	7.46	101.52	3	360
Weaving or handicraft work	0.00	0.00%	.	.	.	.	.	.	.	.	.
Garment work	2.00	0.70%		2.08	360.00	0.59	1.67	2.50	0.00	360.00	360
Moto taxi	3.00	1.06%		3.92	184	1.01	3.00	5.00	180.50	4	365
Other non-farm activities	10	3.52%		3.69	32.20	1.38	0.83	6.25	47	1	156
Remittance USD/Year/person	60	21.13%		461.03	.	429.79	12.5	2100	.	.	.
Total people doing activities	**284**										

Summary of non-farm activities in Zone Tram Kak

Non-farm activities Tram Kak	N	Percent of all activities in zone	Percent	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
						Std. De	Min	Max	Std. De	Min	Max
Salaried employment	8	6%	100%	2.44	245	1.30	0.77	4.94	46.32	130	261
Salaried employment	2		25.00%	1.72	261	0.81	1.15	2.30	0	261	261
Teacher	2		25.00%	2.87	261	0.81	2.30	3.45	0	261	261
Civil servant or LA,	2		25.00%	3.62	261	1.87	2.30	4.94	0.00	261	261
Casino work	1		12.50%	2.30	261	.	2.50	2.50	.	365	365
Village chief	1		12.50%	2.30	261	.	2.30	2.30	.	261	261
Palm sugar production	0	0%	0	6.25	120		6.25	6.25	.	120	120
Small business	28	21%	100%	2.00	295	1.35	0.5	5.00	99	36	365
Local petty trader (including petroleum street seller)	1		3.57%	1.39	180	.	1.39	1.39	.	180	180
Food processing (including small scale food processing)	3		10.71%	1.00	224	0.50	0.50	1.50	138	90	365
Shop keeper	12		42.86%	1.97	337	1.36	0.75	5.00	95	36	365
Rice mill	4		14.29%	2.21	365	2.06	0.50	5.00	92	180	365
Businessman	1		3.57%	5.00	360	.	5.00	5.00	.	360	360
Small industries	1		3.57%	2.00	360	.	2.00	2.00	.	360	360
Tailor	2		7.14%	1.27	180	1.075	0.51	2.03	0	180	180
Hairdresser/hair cutter	1		3.57%	2.00	365	.	2.00	2.00	.	365	365
Buy and Sell agricultural product (trade)	2		7.14%	2.50	365	0	2.50	2.50	0	365	365
Buy and sell poultry	1		3.57%	2.50	240	.	2.50	2.50	.	240	240
Agricultural wage labor	17	13%		3.49	10	1.02	1.67	6.25	8.10	3	30
Construction work	19	14%		4.11	87	0.64	3.33	5	72.23	10	300
Weaving or handicraft work	0	0%	.	.	.	.	.	.	.	.	.
Garment work	8	6%		1.65	308	0.05	1.52	1.67	80	180	360
Moto taxi	2	2%		3.13	365	0.88	2.50	3.75	0.00	365	365
Other non-farm activities	4	3%		6.52	14	2.07	3.75	8.57	12	4	30
Remittance USD/Year/person	46	35%		236.30		198.25	12.5	1000	.	.	.
Total people doing activities	**132**	100%									

Summary of non-farm activities in Zone Prey Kabas

Non-farm activities Prey Kabas	N	Percent of all activities in zone	Percent	Mean Labor productivity	Mean Labor input	Labor productivity			Labor input		
						Std. De	Min	Max	Std. De	Min	Max
Salaried employment	11	8%	100%	2.44	245	1.30	0.77	4.94	46.32	130	261
Salaried employment	1		9.09%	3.45	261	.	3.45	3.45	.	261	261
Teacher	3		27.27%	2.72	261	1.78	0.69	4.02	0	261	261
Civil servant or LA,	1		9.09%	2.39	180	.	2.39	2.39	.	180	180
Assistance of shop keeper	2		18.18%	5.50	360	0.71	5.00	6.00	0	360	360
Cooker	2		18.18%	3.16	261	2.03	1.72	4.60	0	261	261
Village chief	2		18.18%	1.68	130	0.23	1.52	1.85	0	130	130
Palm sugar production	0	0%	.	.	.	.	.	.	.	.	.
Small business	28	21%	467%	3.21	290	2.79	0.49	10	102	120	365
Fishing	1		16.67%	5.80	210	.	5.80	5.80	.	210	210
Local petty trader (including petroleum street seller)	3		50.00%	2.98	301	1.85	1.37	5.00	103	183	365
Food processing (including small scale food processing)	2		33.33%	1.88	365	0	1.88	1.88	0	365	365
Shop keeper	10		166.67%	2.31	321	1.75	0.49	5.00	91	120	365
Rice mill	1		16.67%	3.75	365	.	3.75	3.75	.	365	365
Businessman	5		83.33%	6.80	218	4.40	1.50	10.00	134	120	365
Mechanic	1		16.67%	1.67	360	.	1.67	1.67	.	360	360
Tailor	1		16.67%	1.00	180	.	1.00	1.00		180	180
Junk collectors	1		16.67%	1.83	300	.	1.83	1.83		300	300
Hairdresser/hair cutter	2		33.33%	1.25	365	0.59	0.83	1.67	173	120	365
Buy and sell poultry	1		16.67%	2.08	300	.	2.08	2.08	.	300	300
Agricultural wage labor	27	21%		4.63	18	0.90	2.50	6.25	13.88	3	50
Construction work	4	3%		4.32	109	0.52	3.85	5	128.54	25	300
Weaving or handicraft work	34	26%		1.38	181	0.72	0.50	3.50	81.65	50.00	365
Garment work	2	2%		1.33	225	0.47	1.00	1.67	191	90	360
Moto taxi	1	1%		2.50	350	.	2.50	2.50	.	350	350
Other non-farm activities	9	7%		4.74	60.56	2.99	0.50	10.00	73	2	180
Remittance USD/Year/person	15	11%		251.50		179.78	12.5	600			
Total people doing activities	**131**	100%									

Appendix – 14 Questionnaire for household survey

Questionnaire Socio-economic Survey

Integration of youth into smallholding agriculture. Challenges, impacts and prospects: perspectives from Cambodia

My name is……student from ……..I kindly ask you to participate in my questionnaire survey. Your answers will be kept anonymous and the results will be used to analyse the socio-economic impact of farming on your livelihood to fill the requirement of our academic study. Thank you for your participation.

Interviewed by :……

Code of questionnaire						
Date of interview	d	d	m	M	y	y
Province						
District						
Commune						
Village						
Telephone						

I. Information of respondent

1.1 Name:……**1.2** Sex : 1.☐Male 2.☐Female

1.3 Age:……years old

1.4 Observation of the interviewer, this household is 1.Rich, 2.Medium, 3.Poor, 4.Very poor

II. Settlement and migration profile

2.1 Is this your home village? 1.☐Yes 0.☐No If no,

2.2 When do you come to settle in the study area? Year:……

2.3 Where is your home village? Province……..District……

2.4 Where did you use to live? Province……..District……Year……..

(pls fill last three movement) Province……..District……Year……..

Province……..District……Year……..

2.5 On your marriage did you have any land shared from your parents? 1.☐Yes 0.☐No

2.6 If yes, from husband's parents

☐Residential…..ha ☐Rice…….ha ☐Chamka……ha ☐Forest……ha?

from wife's parents

☐Residential…..ha ☐Rice…….ha ☐Chamka……ha ☐Forest……ha?

2.7 Do your parents have land in the previous location? 1.☐Yes 0.☐No

2.8 Why do you come to settle here?

1.☐Seek for non-farm opportunities

2.☐Seek for land in agriculture

3.☐To work as wage labor in agriculture

4.☐To guard others` land

5.☐To begin new livelihood as previous location is not favorable (for young couple)

6.☐Because marriage with resident here

7.☐Did not have residential land in the previous location

8.☐To live with relative

9.☐Agricultural land is so small in the previous location

10.☐No land in the previous location

11.☐Other pls specify……

Qualitative explaination……

……

III. Household membership and migration

3.1 All members of household normally resident, including those away temporarily[40] at work or school/university

HH mem. ID	Name	Relation to HH	Marital status	Age	Sex	Ethnic	Level of Edu	Current Study?	Where?	Has migrated 2000-2011?		Where are they now?	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9) →	(10)	(11) Yes/No	(12) Where?	(13) Where, now?	(14) What they are doing?
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
3.2 In this household, how many married couples are there?							.....Couples						

Code:
(3): 1.HH head, 2.Husban/wife, 3.Son/Daughter, 4.Stepson, 5.Adopted son/daughter, 6.Father/mother, 7.Brother/sister, 8.Grandson/Granddaughter, 9.Niece/Nephew, 10.Son/daughter in law, 11.Brother/sister in law,
12.Father/mother in law, 13.Other relative, 14.Servant, 15.Other (please specified.....)
(4): 1.Single, 2.Married, 3. Widow, 4.Divorce, 5.Seperate
(6): 1.Male, 2.Female
(7): 1.Khmer, 2.Cham, 3.Chinese, 4.Vietnames, 5.Ethnic minority
(9): 0.No, 1.Yes
(10), (12) & (13): 1. Interview village, 2.In interview commune, 3. In interview district 4. In interview province, 5. In other province, 6. Abroad (Thailand, Korea, Malaysia)
(11): 0.no, 1. Seasonal, 2.short term, 3. long term, 4.permanant
(14) **Agricultural work:** 1. Rice farming, 2. Plantation (Chamcar), 3. Gardening, 4. Forestry/NTFP, 5. Forest workers, 6. Cattles care giver, 7. Fishing, 8. Processing fish product , 9. Aquaculture,
Non Agricultural work: 10. Fish trading, 11. Carpenter, 12. Construction worker, 13. Housewife, 14. Salaried employment, 15. Agricultural wage laborer, 16. Construction wage laborer, 17. Local petty trader(including petroleum street seller), 18. Food processing (including small scale food processing), 19. Shop keeper, 20. Rice mill, 21. Businessman, 22. Motodop taxi, 23. Driver, 24. Mechanic, 25. Urban services, 26. Factory worker, 27.Teacher, 28. Civil servant or LA, 29. Nurse/Dr/midwife, 30. Small industries, 31. Students/dependent, 32.Tailor, 33.Port worker, 34.Brick worker, 35.Junck collectors, 36.Other (please specify.....)

[40] Short term or long term is include if they are migrated for the purpose of securing household sustainability and contribute to improving the family lives, they have plan to come back to help the family.

3.3 When any member of your family out-migrated, what means did you support them for migration? 1.□Money 2.□Rice and food 3.□Transportation cost 4.□Call to your relative there 5.□Others please specify……

Qualitative explanation……
……

IV. Land access and land distribution

4.1 Land use	Land size (mxm) or ha	How far from your home? (m or km)	Mean getting access? (Code [1])	If buying or leasing, Price/ha/year	Previous land use? (Code [2])	How many ha fallow?	Indicate if land from leasing
Residential land	……m x……m or ….ha	……					
Agricultural land	Total:……ha					……ha	
Rice land	Plot 1……ha Plot 2……ha Plot 3……ha ……	…… …… …… ……				……ha ……ha ……ha ……	
Chamka land	Plot 1……ha Plot 2……ha Plot 3……ha ……	…… …… …… ……				……ha ……ha ……ha ……	
Forest land	Plot 1……ha Plot 2……ha Plot 3……ha ……	…… …… …… ……				……ha ……ha ……ha ……	
Pond	…..m x….m						

Code:

[1] 1.□Buying, 2.□Leasing, 3.□Inherence, 4.□Family share, 5.□State distribution, 6.□Local arrangement for distribution 7.□Forest clearance 8.Buy from other person who cleared the forestland, 7.□Other please specify……..

[2] 1.□Residential, 2.□Agriculture, 3.□Forest, 4.□Fallow land, 3.□Other pls specify……

4.2 Do you currently work on all this agricultural land? 1.□ Yes 0.□ No

4.3 If no, Why?

1.□Lack of labor
2.□Too old to work
3.□Sick or chronic illness
4.□No longer interested as there are another alternative beside farming
5.□Lack of capital
6.□No experience in agricultural work?

4.4 If no, how do you manage this land?

1.□Lease to someone
2.□Sell to someone
3.□Remain fallow (idle land)

4.5 Did you sell any plot of land for the past 10 years? 1.□ Yes 0.□ No

4.6 If yes, How many …..ha did you sell?

4.7 Why did you sell you land?

1.□ For children schooling 4.□ Organize wedding ceremony
2.□ For pay for previous debt 5.□ Health sock
3.□ No longer able to work on it 6.□ Other (pls specify)……

4.8 Did you buy any plot of land for the past 10 years? 1.□ Yes 0.□ No

4.9 If yes, what type of land you buy?

□Residential land…..mx……m □Rice land…….ha □Chamka……ha □Forest……ha

4.10 If yes, for what purpose did you buy?

1.□ Farming activities

2.□ For monetary value (land price increase)
3.□ For keeping for their children
4.□ Other please specify……

4.11 Are there any marriages in the household in the past 10 years? 1.□ Yes 0.□ No

4.12 If yes, did you give them some land? 1.□ Yes 0.□ No

4.13 If Yes (give), how many □Residential land…..mx……m □Rice…….ha □Chamka……ha □Forest……ha?

4.14 If no (give), why?

1.□Not enough land for sub-division
2.□Keep for other member
3.□They don't interest in farming
4.□They already have non-farming activities
5.□Other please specify……

4.15 Do you think that now it is become easy to get more land? 1.□ Yes 0.□ No

4.16 If yes, why? If no, why?

……
……..

V. Agricultural activities and income

5.1 What are crop productions do you cultivate?

No	Crops	Area (ha)	Productions (T/Kg)	Sold (T/Kg)	Price (Riel/Kg)	Income	Expenditure																				
							Seed		Chemical Fertilizer		Organic fertilizer		Pesticide	Soil preparation		Transplant		Harvest		Threshing		Transportation inputs and produce		Rental land	Rental equipment /animal	Gasoline/water pumping
							Kg	Price /kg	Kg	Price /kg	Kg	Price /kg	Riel	Labor input (day)	Hire (riel)	Labor input (day)	Hire (riel)	Labor input (day)	Hire (riel)	Labor input (day)	Hire (riel)	Labor input (day)	Hire (riel)			
1	Rainy season rice																										
2	Dry season rice																										
3	Floating rice																										
4	Water receding rice																										
5	Maize																										
6	Cassava																										
7	Sugarcane																										
8	Groundnut																										
9	Bean																										
10	Sesame																										
11	Fruit trees																										
12	Cucumber																										
13	Vegetable																										
14	Reed/lotus																										
15	Other…….																										

5.2 Animal productions

No	Animal	Nb	Nb or Kg sold	Price (Riel/Kg)	Income	Labor input (day or month/year)	Expenditure					
							Food	Forage	Vaccination	Treatment	Others	
1	Cattle											
2	Buffalo											
3	Sow/Piglet											
4	Fattening pig											
5	Chicken											
6	Duck											
7	Gees											
8	Fish											
9	Frock											
10	eels											
	Other….											

5.3 Access to common property resource

No	Item	Quantity	Nb or Kg sold	Price (Riel/Kg)	Income	Labor input (day or month/year)	How far from your home? (m or km)	Expenditure	
1	Fish								
2	Timber								
3	Firewood/Charcoal								
4	NTFPs								

5	Wild animals								
6	Snail, crabs and oysters								
7	Cricket and other insects								
8	Frocks								
9	Mice								
10	Resins								
	Others								

5.4 How do you access those common property resource?

□ 1. Strongly decrease □ 2. Somewhat decrease □ 3.The same □ 4. Somewhat increase □5. Increase

VI. Non-farm, off-farm activities and incomes

HH mem.ID	Activities	Labor input (day)	Price/day/month	Income/month year
	Palm juice/sugar production			
	Small business			
	Salary			
	Pension fund			
	Agricultural wage labor*			
	Handicraft			
	Moto taxi*			
	Construction worker*			
	Garment worker*			
	Other labor sale			
	Remittance from relatives			
	Other…(please specify)			

**Normally these activities are migration to the city, in this regards, this income from this activities can be consider as remittance.*

VII. Food security

8.1 Is your rice production is enough for the whole year consumption? 1.☐ Yes 0.☐ No
8.2 If no, how many……month/day?
8.3 If no, how many ……kg of rice do you buy more? **8.4** Price…….Riel/Kg
8.5 Have you borrowed someone to buy food? 1.☐ Yes 0.☐ No
8.6 If no, do you borrow some rice from your neighbor? 1.☐ Yes 0.☐ No

IIX. Household Capital

8.1 Do you have the following capital?	No	Yes	**if yes, how many**
1. Mobile phone	0	1 →	……
2. Radio	0	1	……
3. Television	0	1	……
4. Satelite receiver	0	1	……
5. Karaoke system	0	1	……
6. Casset Player	0	1	……
7. DVD or VCD Player	0	1	……
8. Fan	0	1	……
9. Air conditioner	0	1	……
10. Paraffin lamp	0	1	……
11. Torch	0	1	……
12. Recharge Battery Lamp	0	1	……
13. Bio Gass	0	1	……
14. Table	0	1	……
15. Chair	0	1	……
16. Bed	0	1	……
17. Bycicle	0	1	……
18. Pulling cart	0	1	……
19. Horse cart	0	1	……
20. Motor bike	0	1	……
21. Car (tourism)	0	1	……
22. Car (transport)	0	1	……
23. Remorque	0	1	……
24. Truck	0	1	……
25. Electricity generator	0	1	……
26. Small scale rice mill	0	1	……
27. Other……	0	1	……

8.2 Do you have the following agricultural equipment?	No	Yes	**if yes, how many**
1. Plow	0	1 →	……
2. Rake	0	1	……
3. Oxen chart	0	1	……
4. Motor-plow (Two wheels tractor)	0	1	……
5. Remorque.Motor.plow	0	1	……
6. Tractor	0	1	……
7. Water pump	0	1	……
8. Grass trimming marchine	0	1	……
9. Pesticide sprayer	0	1	……
10.Threshing machine	0	1	……
11. Harvest machine	0	1	……
12.Other……	0	1	……
			……

8.3 Do you least the following agricultural equipment from s.o?	No	Yes	if yes, Quant.	Exp
1. Plow	0	1 →	……	……
2. Rake	0	1	……	……
3. Oxen chart	0	1	……	……
4. Motor-plow (Two wheels tractor)	0	1	……	……
5. Remorque.Motor.plow	0	1	…….	……
6. Tractor	0	1	……	……
7. Water pump	0	1	……	……
8. Grass trimming marchine	0	1	……	……
9. Pesticide sprayer	0	1	……	……
10.Threshing machine	0	1	……	……
11. Harvest machine	0	1	……	……
12.Other……	0	1	……	……

8.4 Do you lend the following agricultural equipment to s.o?	No	Yes	if yes, Quant.	Income
1. Plow	0	1 →	……	……

2. Rake	0	1	.....	.....
3. Oxen chart	0	1	.....	.....
4. Motor-plow (Two wheels tractor)	0	1	.....	.....
5. Remorque.Motor.plow	0	1	.....	.....
6. Tractor	0	1	.....	.....
7. Water pump	0	1	.....	.....
8. Grass trimming marchine	0	1	.....	.....
9. Pesticide sprayer	0	1	.....	.....
10.Threshing machine	0	1	.....	.....
11. Harvest machine	0	1	.....	.....
12.Other.....	0	1	.....	.....

IX. Access to credit

9.1 Are you currently borrowing any money from someone? 1.□ Yes 0.□ No,
If yes, How much.....?

9.2 If yes, who do you currently borrow? 1.□ Family/relatives 2.□ your neighbor 3.□Tontin 4.□NGOs 5.□Trader/Employer/Agricultural firm 6.□MFI/Bank 7.□Ricebank/village bank 8.□Saving roup 9.□Others.....

9.3 If no, why?

1.□Do not need 2.□Cannot afford 3.□Too complicated to borrow 4.□To high interest 5.□Other pls explain.....

9.4 What means do you use for collateral?

1.□Land title/house 2.□Animals 3.□Motor/car 4.□Marchine 5.□Family assurance 6.□Self-help group assurance 7.□Local authority witness 8.□Other please specify.....

9.5 For what purpose do you borrow?

1.□ For agricultural work, buy agricultural tools/inputs 2.□ Investment
3.□to feed the family (buy more food) 4.□ to pay for the medical treatment
5.□pay for children go to school 6.□ married/festival
7.□for migration 8.□ to repay previous debt
9.□House building 9.□To cope with crop failure
10.□For young married couple starting business
11.□For help child to start agricultural work
12.□Other pls specify.....

9.6 What you do you with the remittance earning by your family member who migrate(s)?

1.□ For agricultural work, buy agricultural tools/inputs 2.□ Investment
3.□to feed the family (buy more food) 4.□ to pay for the medical treatment
5.□pay for children go to school 6.□ married/festival
7.□for migration 8.□ to repay previous debt
9.□House building 9.□To cope with crop failure
10.□For young married couple starting business
11.□For help child to start agricultural work
12.□Other pls specify.....

9.7 How much can you save from your revenue each month or year?.....Riels

9.8 What do you do with your saving from your revenue?

1.□ For agricultural work, buy agricultural tools/inputs 2.□ Investment
3.□To feed the family (buy more food) 4.□ To pay for the medical treatment
5.□To pay for children go to school 6.□ Married/festival
7.□For migration 8.□ To repay previous debt
9.□House building 9.□To cope with crop failure
10.□For young married couple starting business
11.□For help child to start agricultural work
12.□Other pls specify.....

Qualitative explanation.....
.....

X. Household consumption

Items	Quantity	Price	Amount (Riel/day or month)
Rice (kg)			
Daily food (food ingredients)			
Clothes			
Medical			
Electricity			
Water			
Cooking fuel (fuel wood, Chacoal, gas..)			
Land tax, Other tax			
Wedding party			
Social contribution			
Children schooling			
Telephone			
Transportation			
Entertainment (traveling …)			
Other (community member fee..etc)			

XI. Social capital

11.1 Do any member of your family used to be taking part in group or NGOs or CBOs projects?

1.☐ Yes 0.☐ No

11.2 If yes, pls list out name of groups in the table below:

HH mem. ID	*Name of group, CBOs or NGO 's projects*, Village/CC/district or school authority	Participation		Mode of participation[a]	How often, participation ?[b]	Nature of group, CBOs or NGO 's projects[c]
		Year	Now, still member? (1.Yes, 0.No)			
	1..... 2..... 3..... 4.....	....	....	....	....	....
	1..... 2..... 3..... 4.....	....	....	....	....	....

Code [a]	Code [b]	Code [c]
1. Leader 2. Member of committee 3. Member	1. Never participate 2. Part. Occasionally 3. Part. Frequently 4. Part. Very frequently	1. Agricultural Production and Extension or livelihood improvement 2. Production or trade 3. Community Forestry or Natural Resource Management 4. Finance, credit or saving 5. Health or education 6. Political 7. Religious 8. Other:.....

11.3 Do you think that this existing NGOs or Group where you family's member belong to is good for villager? 1.☐ Yes 0.☐ No

11.4 If yes, pls explain why?.....

11.5 If no, pls explain why?.....

.....

11.6 Do you think that this existing NGOs or Group where you family's member belong to is supportive enough accordingly to your need? 1.☐ Yes 0.☐ No

11.7 Why?.....
11.8 Do you think that this existing NGOs or Group where you family's member belong to is supportive enough to start agricultural work? 1.□ Yes 0.□ No, **11.9** why?.....
11.10 Access to information: What are your three main sources of information you get concerning the following issues in the table?

	Record appropriate codes below
Prices of goods or crops	
Agricultural extension	
Workfare	
Education	
Health and Family planning	
Other	

Code

1. Relatives, friends and neighbours
2. Community bulletin board
3. Local market
4. Community or local newspaper
5. National newspaper
6. Radio
7. Television
8. Groups or associations
9. Business or work associates
10. Political associates
11. Community leaders
12. An agent of the government
13. NGOs
14. Internet

Collective action and solidarity:

11.11 How do you assess the level of help in among your community member in the following case?

Issue	Before 1990	During 1990-2000	After 2000
Religious ceremony			
Wedding			
Funeral			
Serious illness			
Supporting family member			
Supporting other			
Deprivation			
Incident in the community such as natural disaster			

Code

1. Got better
2. Got worse
3. Stayed about the same
4. No idea

XII. Perception on agricultural work

Youth perception on agriculture from parents 'perspective

12.1 Do any of you children ever engage/help in farming activities? 1.□ Yes 0.□ No

12.2 If yes, which occasion they always assist you?
1.□School holiday 2. □Any day off 3.□Planting season 4.□Harvesting season

12.3 If yes, how often did you children help your farm work?
1.□More often 2.□Frequently 3.□Occasionally 4.□Rarely

12.4 Are they willing to help you or you ask them to help? 1.□ Willing 2.□Asking for help

12.5 During their help, are they showing their curiosity to ask you something about farming practice? □Yes □No

12.6 If no, please explain why?
1.□Busy with their study

2.□They are not interest
3.□Have already enough labor
4.□They are too small to work
5.□They are not in good condition to work such as handicap, chronic ill etc..
6.□They need to help household as parents are busy on farming
7.□Other (pls specify).....
.....
.....
.....

12.7 Do you have any intention to hand over your farm work to you children?
1.□Yes 0.□No

12.8 If yes, Pls explain why?
.....
.....
.....
.....

12.9 If no, pls explain why?
.....
.....

12.10 Have you ever ask you children what kind of job they want to do in the future?
1.□ Yes 0.□ No

12.11 If yes, what are their responses?
1.□Farmer 2.□Teacher 3.□Engineer 4.□Doctor 5.□Lawyer 6.□Scientist7. □Accountant
8.□NGOs 9.□Private Company 10.□Other pls specify.....

Parent perception on agriculture

12.12 What is your general opinion about agricultural work?
.....
.....
.....
.....

12.13 Is it easy to start farm work? 1.□ Yes 0.□ No If yes, why? If no, why?
.....
.....
.....
.....

12.14 Do you think that now it is easy to find job beside agriculture? 1.□ Yes 0.□ No
Pls explain why?.....
.....
.....

12.15 If yes/no, do you think that agriculture is good option? 1.□ Yes 0.□ No
Pls explain why?.....
.....
.....

12.16 What are need to start farm work? Pls explain from you experience.
.....
.....
.....

Thank you very much for participation, I really appreciate your time!

Appendix – 15 Questionnaire survey on youth perception on agriculture

Questionnaire Survey on Youth Perception in Agriculture

Integration of youth into smallholding agriculture. Challenges, impacts and prospects: perspectives from Cambodia

My name is……student from ……..I kindly ask you to participate in my questionnaire survey. Your answers will be kept anonymous and the results will be used to analyse the socio-economic impact of farming on your livelihood to fill the requirement of our academic study. Thank you for your participation.

Interviewed by :……

Code of questionnaire						
Date of interview	d	d	m	M	y	y
Province						
District						
Commune						
Village						
Telephone						

I. Information of respondent

1.1 Name:……1.2 Sex:1.□Male 2.□Female 1.3 Age:……..years old,
1.4 Marital status: 1.Single, 2.Married, 3. Widow, 4.Divorce, 5.Seperate
1.5 How many brother and sister do you have?……brother……sister.
1.6 How many of them getting married? ……..
1.7 How many of them still living with your parents? ……
1.8 At their marriage, Your parents give them some land? Yes, No
1.9 If yes, how many? □Residential…..ha □Rice…….ha □Chamka……ha □Forest……ha?
1.10 Are you the last child? Yes, No
1.11 If not, what is your order among your brother and sister? I am the ……..child

II. Education, Training and skill

2.1 What is your highest grade of education?……
2.2 Are you currently studying? Yes No
2.3 Have you ever attend any training course done by NGO or development program? 1 0
2.4 If yes, what kind of training?
1.Hygiene and health care 2.Farming technic pls specify…….
3.Animal production pls specify…….
4.Saving 5.Law D&D 6.Self-development 7.Hair cutter/hair dresser 8.Tailor
9.Construction
2.5 Have you ever taking part in community development activities? Yes No
2.6 If yes, pls explain……
2.7 Have you ever studied any foreign language? Yes No,
2.8 If yes, what are they? English……., Chinese……., Thai……, Vietnamese……. Other…….
What is your level?
1.Beginner, 2.Elementary, 3.Pre-intermediate, 4.Intermediate, 5.Advance

III. Settlement and migration profile

3.1 Is this your home village? 1.□Yes 0.□No If no,
3.2 When does your family come to settle in the study area? Year:……
3.3 Why do your family come to settle here?
1.□Seek for non-farm opportunities
2.□Seek for land in agriculture
3.□To work as wage labor in agriculture
4.□To guard others' land

5.□To begin new livelihood as previous location is not favorable (for young couple)
6.□Because marriage with resident here
7.□Did not have residential land in the previous location
8.□To live with relative
9.□Agricultural land is so small in the previous location
10.□No land in the previous location
11.□Other pls specify.....

Qualitative explanation.....
.....

IV. Youth Perception on agricultural work

4.1 What are main occupations of your family? 1.....2.....3.....

4.2 How many □Residential.....ha □Rice.....ha □Chamka.....ha □Forest.....ha does your family have?

4.3 Does your family sell any agricultural product? 1.Yes 0.No

4.4 Is rice yield from rice cultivation enough for consumption the whole year?
0.No 1.Yes 2.Don't know

4.5 If, no, how many month that your family have to buy more rice?.....

4.6 Does your family ever borrow others for agricultural productions? 1.Yes, 0.No

4.7 Do your parents ever discuss about livelihood situation with you? 1.Yes, 0.No

4.8 How do you feel when you hear about your family livelihood situation?.....
.....
.....

4.9 Do you ever help your parents doing farm work? 1.Yes 0.No

4.10 If yes, which occasion you always assist them?
1.□School holiday 2. □Any day off 3.□Planting season 4.□Harvesting season
5.□Any free time 6. □Everday

4.11 If yes, how often did you help your parents'farm work?
1.□More often 2.□Frequently 3.□Occasionally 4.□Rarely

4.12 Are you willing to help you or you were asked to help? 1.□ Willing 2.□Asking for help

4.13 During your help, are you showing your curiosity to ask your parents something about farming practice? □Yes □No

4.14 If yes, pls explain why?
.....
.....

4.15 If no, please explain why?
1.□Busy with their study
2.□I am not interested in
3.□Have already enough labor
4.□I am too young to work
5.□I am not in good condition to work such as handicap, chronic ill etc..
6.□I need to help household as parents are busy on farming
7.□Other (pls specify).....
.....
.....
.....

4.16 Do your parents intent to keep some land to give to you? 1.Yes 0.No 2.Maybe 3.Don't know

4.17 If yes, How many □Residential.....ha □Rice.....ha □Chamka.....ha □Forest.....ha

4.18 If no, why?

1.□Not enough land for sub-division
2.□Keep for other member
3.□I am not interested in farming
4.□My parent want me to do non-farming activities
5.□Other please specify.....
Qualitative explaination.....
.....
.....

4.19 What is your general opinion about agricultural work?
.....
.....
.....
.....

4.20 Is it easy to start farm work? 1.□ Yes 0.□ No If yes, why? If no, why?
.....
.....
.....
.....

4.21 Do you think that now it is easy to find job beside agriculture? 1.□ Yes 0.□ No
Pls explain why?.....
.....
.....

4.22 If yes/no, do you think that agriculture is good option for job? 1.□ Yes 0.□ No
Pls explain why?.....
.....
.....

4.23 What are needs for starting farm work? Pls explain from your opinion.
.....
.....

4.24 Do you have any intention to take over farm work from your parents?
1.□Yes 0.□No
If yes, Pls explain why?
.....
.....
.....
If no, pls explain why?
.....
.....

4.25 Do you have any idea what do you want to do in the future? 1.□ Yes 0.□ No

4.26 If yes, what are your aspirations?
1.□Farmer 2.□Teacher 3.□Engineer 4.□Doctor 5.□Lawyer 6.□Scientist7. □Accountant
8.□NGOs 9.□Private Company 10.□Other pls specify.....

4.27 What are means that could help you to achieve your aspiration?.....
.....
.....
(Family support, relative support, NGOs support….ect)

4.28 How likely do you think that your aspiration come true?
1. Pretty sure 2. Not so sure 3.Do not know 4. Other.....

Thank you very much for participation, I really appreciate your time!

Appendix – 16 Interview guide for key informants

Semi-structure interview guide for Key Informants

Person interviewed (including role):
Province:
District:
Commune:
Village:
Date & time of the interview:
Interviewer/s:
Note taker:
Write up by:

1. Information about interviewee:

Sex
Age
Role, how s/he come to settle in the village?
Occupation and background of leadership
Economic activities
Production
Land holding

2. Demography

Total household in the village
Total population of the village and number of female
Number of household who have member migration
Total population migration including female

3. Local land use policy

Youth installation policy, is there any policy related to this?
Is that any local land use policy?

4. Land use history

Could you please explain the history of the village? How the village is established? When people come to settle in this new village? (Accordingly to timeline)Why? Where is the origin of new settler? Where are they come from? Why do they come to settle here?

Land use change

When people start growing rice, vegetable and cassava? Before the year 2000, what kind of crops people cultivated? Now, are change?
Land share among family member? How? In what way? What are the rule? Is there any change about this rule?

5. Livelihood and copping strategies

What are main livelihood activities of people in the village?
What are challenge to livelihood?
Who do people deal with this challenge?

6. Youth situation and farming activities

Youth education: Do they all attend the school? What is the highest level of education available in the village? How many percent of them drop out? Those who drop out normally at what grade? And why they drop out?

What do they do after drop out? Farming? Migration? Or else?
From you own observation, do youth like farming activities?
From your point of view do you think that agriculture is good job? Why?
Do you have intension to keep you child working in farming activities?
If youth want to start agriculture, what are the needs?
What are the challenge and constraints for youth to start farm work?
What are need for young people to start farm work?

7.Social relation and social capital

What are name of those community or projects have been carry out in your village?
Could you please list out names of those project and their activities in brief?
What is your observation concerning the social relation among villager? Is it going better, the same or worse?

8. Youth perception on agriculture from parents 'perspective

Do any of you children ever engage/help in farming activities?
If yes, which occasion they always assist you?
Are they willing to help you or you ask them to help?
If no, please explain why?
Do you have any intention to take over farm work from your parent?
If yes, Pls explain why? If no, pls explain why?
Have you ever ask your children what kind of job they want to do in the future?
If yes, what are their responses?

9. Household head perception on agriculture

What is your general opinion about agricultural work?
Is it easy to start farm work?No If yes, why? If no, why?
Do you think that now it is easy to find job beside agriculture?
Pls explain why?
If yes/no, do you think that agriculture is good option?
Pls explain why?
What are need to start farm work? Pls explain from you experience.

Appendix – 17 Guideline for youth focus group discussion

Guideline for Youth Focus Group Discussion

Integration of youth into smallholding agriculture. Challenges, impacts and prospects: perspectives from Cambodia

Facilitate by:.....
Number of participant.....
Femal.....

Date	d	d	m	M	y	y
Province							
District							
Commune							
Village							

I. Information of Participant

-Icebreaking (warming up activities): playing 3 games in group 30.
-Participant introduce name, sex, education level
-After discussion in group (participant will ask to response to questionnaire individually)

II. Education and Training

What is your highest grade of education?
Are you currently studying?

III. Settlement and migration profile

Is this your home village?
When do your family come to settle in the study area?
Do your parents have land in the previous location?
Why do you come to settle here?
Any member of your household migrates for work/study? Where? Why?
How do your parents provide support for their migration?

IV. Perception on agricultural work

Do any of you family member ever engage/help in farming activities?
If yes, which occasion they always assist your parents?
If yes, how often did you help doing farm work?
Do you have any intention to hand over your farm work from your parents?
What do you want to be in the future? Why?
What is your general opinion about agricultural work?
Is it easy to start farm work?
Do you think that now it is easy to find job beside agriculture? Pls explain why?
Do you think that agriculture is good option?
Pls explain why?
What are need to start farm work? Pls explain from you experience.

Thank you very much for participation, I really appreciate your time!

Appendix – 18 Guideline for interview with YAE-CEDAC

Interview guide case study with YAE-CEDAC

Person interviewed (including role):
Province:
District:
Commune:
Village:
Date & time of the interview:
Interviewer/s:
Note taker:
Write up by:

1. **Information about interviewee:**

   - Sex, Age, Role, Occupation, education, background experience in attending with previous development projects, life story, migration, how end up with CEDA?
   -Why did you decided to join YAE project?

2. **Demography**
   -Household composition: how many household member, boy, girl, age, activities

3. **Farm and non-farm activities**

   - Farm size
   - Who doing what?
   - What non-farm activities that YAE combine?
   - Income and household expense

4. **Experience with CEDAC**

   -How did the project support you starting up farming?
   -What kind of training do you receive from YAE project?
   -Is the training important for you to start farm work?
   -What part of the project help you the most?
   -Why did other YAE quit farming?
   -Whey did the other keep continuing doing farm work?

5. **Future plan**
   - Do you intend to migrate? Why?
   - Why do you quit farming?
   - Do you intend to return to farming?
   - Do you plan to continue studying higher education? Why? To you plan to resume your farm work?