



The role of rural women in livestock management : socio-economic evidences from diverse geographical locations of Punjab (Pakistan)

Tusawar Iftikhar Ahmad

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Directeur(s) de Thèse :

Bernard CHARLERY DE LA MASSELIÈRE (Professeur, Université Toulouse 2 - Le Mirail)

Farooq TANWIR (Assistant Professor, University of Agriculture, Faisalabad-Pakistan)

Rapporteurs :

Abdul SABOOR (Professeur, PMAS Arid Agriculture University, Rawalpindi-Pakistan)

Kamala Marius GNANOU (MCF HDR Université Bordeaux 3)

Autre(s) membre(s) du jury :

Laurien UWIZEYIMANA (Professeur, Université Toulouse 2 - Le Mirail)

“No nation can rise to the height of glory unless your women are side by side with you. We are victims of evil customs. It is a crime against humanity that our women are shut up within the four walls of the houses as prisoners. There is no sanction anywhere for the deplorable condition in which our women have to live” **Muhammad Ali Jinnah**¹

¹ Father of the nation; the creator of Pakistan said during his speech at a meeting of the Muslim University Union, Aligarh-India (March 10, 1944)

Do You Understand Me²

*Do we understand each other?
Do you know me?
Do you realize my potentials?
Do you appreciate me?
For many centuries
You have oppressed me
Why have you denied me my rights?
I was created perfect,
Why do you then look down on me?
Why have you built a fortress around me?
I have a strong desire to learn, to grow,
to reach where others have reached;
support me, strengthen me.
Don't oppress me because of my gender,
Don't damage my feelings
using slanderous words.
Don't say, "girls are useless!"
Treat me as equal,
because I am equal.
Why am I treated different?
Do we understand each other?
Do you know me?
Who will understand my pains?
I'm part of you, don't hurt me!
Don't say that I am weak and look down on me.
Recognize me as your partner,
support me, let's hold hands.
Be wise and educate me,
if you give me a chance
I will be a cure to you, a remedy.
If we could only listen to each other
we could benefit one another.
Don't you see, don't you understand?
But my oppression is your oppression.
Why is this happening?
Open your eyes and see.
Educate me today,
I will help you tomorrow.
Be wise, don't be ignorant!
Education is useful and profitable,
it lifts up the oppressed.
All is found in education,
don't be weak, catch sight of it.
Leave your old ways,
let's grow together out of ignorance.
Let us enjoy the sweet test of life together,
Acknowledge me as one with a great value.
Educate me today,
I will help you tomorrow.*

² A poem written by Aliya Hawas: the first Kereyu girl to fully complete her secondary education at the Gudina Tumsa Foundation (an organization that has been supporting a boarding school for pastoral children for some years) and who is now training to be a lawyer in Addis Ababa (in Ethiopia). Cited in: Flintan, F. (2008) Women's Empowerment in Pastoral Societies, WISP, GEF, IUCN, UNDP. P-48.

**For
those Great Souls ...
Exhausted
their Own Selves
in
the Creation of Knowledge**

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I express my feelings of thankfulness to the women livestock raisers struggling for their families' welfare; whose eyes start sparkling by seeing someone listening their voiceless voices and hoping that perhaps their miseries are about to vanish. But they do not know that in the villages where they live, the interest of politicians is merely getting votes—which they can buy by giving one-carrot-a-person for securing their political career for the coming five years, and in those areas, a politician's real power and influence is the underdeveloped status of the poor dwellers. *Hats off to the politicians and the key influentials-you fill your ever empty stomachs first. Bravo!*

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Tusawar Iftikhar Ahmad

Abstract

Livestock is the backbone of the agriculture sector and livestock keeping is mostly women's job. Pakistan has a lot of potential in livestock sector to flourish. In milk production at small farms, 80% work is done by rural women in Punjab and the women with small holder farms have a huge role to play in realizing the potential that the country has in livestock sector. Enabling women to adapt the best farm practices at grass-root level will benefit them not only to raise their incomes but to the entire nation as well.

Keeping in view the prime role played by rural women in livestock management the study identify the socio-economic status of women livestock raisers, estimate the extent and nature of their participation, determine the impact of women's participation in livestock management on their families' welfare status, and analyze the factors affecting their participation in livestock management activities.

The present study is based on primary data collected from the women engaged in livestock management activities in three districts of Punjab province (Pakistan). The selected districts had diverse geographic locations and characteristics. Data collection process comprised of making field visits in the selected villages and filling a questionnaire through interview schedules. To testify the aptness of the devised hypotheses, suitable statistical techniques had been applied.

The results showed that at regional level, large family size had a negative effect on women's health. In her younger age a woman had better mobility status. Women from nuclear families were enjoying relatively better awareness status. As compared to the villages located remote from the cities, gender relation and women's mobility status were found better in the localities (villages) lying in close proximities to the cities. As compared to the less deprived districts, in more deprived districts the gender relations and women's health status were found relatively poor.

In determining the nature and level of participation of the family labor in livestock management activities, cultural norms, and practice of observing veil, theory of masculinity & femininity, availability of family labor, and physical condition of the participant seemed to

matter the most than the other factors, that is, agro-climatic and geographical/spatial variations.

At each of the three geographical levels (regional, sub regional, and local), women respondent's participation level was multiple of that of their husbands' level in livestock management activities. Wife-to-husband participation ratio was rising as the distance of a village from the nearest city was increasing. Women-to-men participation ratio measured for our study was ranging from the minimum 1.74 to the maximum 3.40. As per our expectations, the wider gap was recorded amongst gender participation in the villages located at far off distances from the cities. Our findings show that women's level of participation in livestock management activities empower rural women in terms of better gender relations or increased decision-making power on the matters relating to the livestock management.

In the villages situated at far off distances from the cities, as compared to the villages located near to the cities, more number of livestock keeping families was living below the poverty line. The higher (7.71%) poverty gap ratio was recorded in the villages located at far off distances from the cities, whereas the ratio was lower (3.50%) for the families living in the villages situated at close proximities to the cities. Similar trends were recorded while calculating the severity of poverty (SPGI) in the areas.

The participation of rural women in livestock management activities had great and diverse impacts on their household welfare in the study area but the family's welfare was not related with woman's level of participation in livestock management activities. Family size, herd size, own land size, distant location of the village from the city, and agro-climatic conditions of the area were found as the key determinants of the welfare or poverty status of a rural livestock keeping family in Punjab.

In the regression analyses, the identified main factors (in decreasing order in terms of variance explained by R^2) were respectively: *participation of family labor* (variance explained = 56.70%), *various aspects of women's status* (= 16.10%), *livestock related factors* (= 11.30%), and *economic factors* (= 10.50%).

The results signify the need for micro-level (targeting rural families) and gender analysis in livestock farming and indicate that women's participation in livestock management can be enhanced by using a gendered approach in the agricultural development programs. In

addition, increasing women's participation in livestock management and production is essential in improving overall family's health, education, and income. Policies reforms and/or development projects, to improve women's participation in livestock management by using any mean(s) and mechanism(s), must give attention to the cultural settings that are seen to have strong effects for a successful implementation.

CHAPTER 1 INTRODUCTION

Livestock is the backbone of the agriculture sector and livestock keeping is mostly women's job. This chapter determines the role of livestock in national (Pakistan's), provincial (Punjab's), and (small farmers') household economies. For making the women livestock raisers a choice of the project, the chapter gives reasons from country and global perspective and links the significance of the project with the dairy industrial sector. The chapter also justifies the selection of the terrain and various geographical zones.

Pakistan is an economy still largely based on agriculture where a major proportion of the population depends on farming and the collection, storage, processing, and distribution of agricultural commodities, and on the wages paid by farming and agribusiness to the household. The progress of the economy depends largely on major crops such as cotton, wheat, edible oil, sugar, milk and meat (Hanif, et al., 2004).

The agriculture sector continues to be an essential component of Pakistan's economy. This sector currently contributes 21 percent to GDP, generates productive employment opportunities for 45 percent of the labor force, and renders 60 percent of the rural population depending upon this sector for its livelihood. It has a vital role in ensuring food security, generating overall economic growth, reducing poverty and transforming towards industrialization. The present government is determined to improve the quality of life of the people and to banish hunger and malnutrition from the country by making agriculture an efficient, productive and profitable sector of the economy (GOP, 2012).

Because of changing consumption patterns of households towards high quality foods, production of meat and dairy items is rising globally. About 30-35 million people in Pakistan are engaged in livestock sector to earn their livelihoods. It is highly labor intensive sector but by giving proper attention to this sector, multiple objectives can be achieved including food security, rural workforce absorption and poverty alleviation (GOP, 2008).

Livestock has an important role in the economy of the country. The rising population growth as well as increase in per capita income and export revenue are fueling the demand of livestock and livestock products. Livestock sector contributed approximately 53.2 percent of the agriculture value added—much more than the combined contribution of major and minor crops (43.9%) and 11.4% to national GDP during 2009-10. While

other development sector experienced saturation and decline there has been an increase in livestock sector in 2009-10. Gross value addition of livestock at current factor cost remained Rs. 1537.5 billion in 2009-10. The major products of livestock are milk and meat (GOP, 2010).

According to Livestock Census (2006)³, there are 29.56 million cattle, 27.33 million buffaloes, 26.49 million sheep and 53.79 million goats in Pakistan. Hence, livestock is playing a crucial role in the fulfillment of basic subsistence requirements of the country's poor (Tibbo, *et al.*, 2009).

Punjab is the most populous and important province in the country in terms of agriculture and livestock. Out of 79.61 million hectare of total land area of Pakistan, 20.63 million hectare (about 26% of the total) area is of the Punjab province. According to the estimates of 2008-09, this province occupies the 59.3% and 72.0% of country's total cultivated and cropped area, respectively. Regarding the production of major crops of wheat, rice, cotton, and sugarcane, only Punjab's contribution in the overall production of these crops remained respectively, 76.9%, 53.9%, 66.2%, and 63.4% during the fiscal year 2009-10. During the same year, in Pakistan's total production of mango, guava, and citrus, respectively, 78.8%, 75.8%, and 94.3% production came from Punjab. Concerning production of major manufactured (agricultural) items, the province contributed 38.2% cotton yarn, 48.4% cotton cloth, 63.4% sugar, 56.7% vegetative ghee, 95.1% paper board, and 57.1% cigarette in country's total production of these items in the same fiscal year. According to livestock census of 2006, at country level population of animals, regarding the total number of cattle, buffaloes, sheep, and goats, the Punjab's share is respectively, 48.8%, 64.9%, 24.0%, and 36.9% (GOP, 2011).

Punjab is the major milk-producing province in the country. A quantity of over 20 million tonnes milk production was recorded in 2002 about 70% of which was derived from buffaloes. Most of the land in the Punjab province is irrigated and comes under cultivation of different crops like wheat, rice, cotton, pulses, sugar cane, fodder, etc. Over 70% of the farmers have small holdings (owning less than 2 hectares of land). Above 80% of the total dairy farming is operated by these small farmers at subsistence level (Garcia, *et al.*, 2003). These farmers

³ <http://www.statpak.gov.pk/depts/aco/publications/pakistan-livestock-census2006/lsc2006.html>

generally use traditional ways for livestock rearing and nearly 5 million families in Punjab are dependent on livestock sector for their livelihoods (Hashmi, et al., 2007).

Livestock sector is performing a vital role in the economies of many developing countries where it is a source of animal protein (food), income, employment and foreign exchange. For small income producers, it provides draught power and organic fertilizer for crop production; serves as store of wealth and means of transportation as well (Garcia, et al., 2003).

Livestock sector has an acknowledged importance in the rural economy. Apart from providing income to rural people, livestock provides animal protein of high biological value in the form of milk, meat and eggs which is a base for industrial raw materials like: wool, hides, skins—organic fertilizer for crops—security against crop failures—and financial support in hard times of the farmers. In this way, livestock development is the driving force for rural development. Since livestock is mostly raised by women, their participation is closely linked with economic empowerment and social well being of women folk (Hamdani, 2002).

By official statements, about 90% of livestock is owned by small farmers and landless rural households. These small holders, especially the landless livestock holders, are extensively dependent on income from the sale of milk and animals to meet their daily household expenses. Even in the mixed farming systems, livestock is the main source of cash income for rural households and a source of productive employment for the poor as well as women (Kakakhel, 2009).

Kurosaki (1995) by using household data from rural Punjab empirically investigated how agricultural households in Pakistan control their exposure to risk through enterprise selection and asset accumulation / decumulation. In the surveyed area, majority of agricultural households had both livestock keeping and crop production enterprises within a farm. It was found that livestock holding contributed to a reduction in income variability through the negative correlation of livestock income with crop income and through *ex post* decumulation of livestock assets contingent on a realized income in the crop sector. He is of the view that a shift in enterprise composition toward livestock products reduces household income variability. So, a reduction in income variability has a welfare improving effect. His empirical findings suggest that the rises in the share of the livestock subsector in agricultural value added in Pakistan should have improved the welfare position of households with substantial livestock holding. Moreover, because livestock have an additional welfare value as an

effective insurance measure, the farmers might have had a stronger incentive to accumulate livestock than those who maximize expected profit from agriculture.

Kurosaki (1995) has applied an empirical model to the case of mixed farming in the rice-wheat zone in Pakistan's Punjab, for which he has shown the importance of livestock as a consumption-smoothing measure under income and price risks. He has also found that the rises in the share of livestock subsector in agricultural value added in Pakistan should have improved welfare positions of poorer households in rural areas.

Women's Participation in Livestock Management in Pakistan

Along with agriculture, women also make a significant contribution towards the rearing of livestock. Livestock production requires substantial amounts of time, labour and specialized activities in which women participate considerably side by side with men. The intensive participation of women in livestock management activities is productive in terms of saving money that would otherwise be spent in hiring labour. Milk and milk products not only meet the household consumption needs but also help in income generation when the same are sold in the market for cash. Livestock rearing substantially increases the work load of women who not only have to shoulder the daily burden of housework but to provide meal for all those working in the field as well.

Evidences from micro studies show that rural women undertake a wide range of agriculture related activities both in the field and at home but their role in rural economy has never been appreciated and monetized to its fuller extent. Livestock management is largely a woman's job. According to a few available time allocation studies, the estimated time spent by a woman on livestock related activities ranges from 3 to 5 hours per day (Hamdani, 2002). It is widely acknowledged that among all the livestock production and management, women perform the most part of them (Tulachan & Karki, 2000).

In a study conducted by Hashmi, et al., (2007) in the rural areas of district T. T. Singh (Punjab), women have been found more conscious than that of men regarding animals' care. The probability of disease(s) to be found in animals was relatively lower and income generation was higher from the animals reared by women than that of managed by solely men. Highly significant results show positive impact of women's participation in the livestock management and thus there is very likely of poverty alleviation.

Several studies have documented that women participate more in livestock related activities than that of crop production. In rural areas of Punjab, women are in general, responsible for livestock rearing. It has been found that a rural woman in the province works about 15 hours a day and spends about 5.30 hours in caring of livestock. These women carry out wide range of tasks such as feeding, collecting fodder, grazing, cleaning animals and their sheds, making dung cakes (securing them properly for use as fuel), collecting manure, milking, milk processing and even marketing of animal products (like butter, butter oil or ghee etc.). Rural women have been observed to be heavily engaged in almost all activities regarding livestock production with a very few exceptions. In this perspective, women are an ideal choice for entrusting the task of raising livestock as an independent enterprise. Adding one or two animals in the household assets yields significant economic gains without causing hardships in the shape of physical inputs. The main challenges faced by the women folk in rural areas are multifold but not limited to low literacy level; poor health and dietary conditions; burden of multiple roles; and using non compatible tools/technology for crop and livestock management. Experiences of Rural Support Programmes (RSPs) provide sufficient evidence that women can effectively be involved in livestock enterprise which ultimately leads to realization of their potential and thereby improving their socio-economic status (Hamdani, 2002).

In a study conducted in northern areas of Pakistan, Afridi, *et al* (2009) have found that on an average, a rural woman is spending 5 to 6 hours daily in different livestock management activities 68% of which is spent on the activities of milking, farmyard manure collection, stall feeding and fodder cutting. They calculated that a woman from a household with small sized farm spends maximum time in fodder cutting (64.8 minutes) and shed cleaning (43 minutes) while managing livestock. Regarding their participation in different livestock management activities, the highest percentage (98.76%) was counted in shed cleaning followed by farmyard manure collection (87.34%), stall feeding (87.05%), and watering/hauling (85.78%).

Jehan, (2000) states that women's participation rate is very high in different sub-sectors of rural economy. In livestock sector, their contribution is more visible than in crop production. A rural woman in Punjab spends about one fifth to over a quarter of her daily working hours in livestock related activities and in the family, male's input outweighs that of female's in only four out of fourteen livestock production related activities.

Tibbo, *et al*. (2009), in a separate analysis on time-spent on specific activities, found that rural women are performing multiple roles in rural setup and hence, are over burdened. According to

their analysis, in Punjab, women remain busy, on average, for more than nine hours a day. Up to 13 major activities were performed daily by rural women. Besides taking care of different household activities, a considerable time (158 minutes, 25% of working time) was spent on livestock-related activities (fodder cutting, feeding, watering and animal care), which are largely accepted as a part of routine household activities. Afridi, *et al*, (2009) found that women's participation was in almost all livestock management related activities and they were spending about five to six hours daily to perform these activities.

Ibraz (1993) identified the distribution of activities in livestock-tending carried out exclusively, predominantly and jointly by both male and female genders in a village of Punjab. According to him—the activities of grazing and bathing animals are done exclusively by men while milking and selling livestock within or outside the village are predominantly males' activities—fodder chopping, preparation of cattle feed, and putting feed in manger are the activities performed jointly by male and female—fodder harvesting and milk or butter selling are done predominantly by women—the rest of the activities, relating to livestock tending, are carried out exclusively by the hands of women.

1.1 Significance of the Study

1.1.1 In Country Context

1. Livestock management and production related activities are mostly carried out by women. In spite of their heavy indulgence in this endeavor, their work done remains either unrecognized or under-recognized; unacknowledged; unproductive, and is considered as their routine responsibility like other household chores or housekeeping activities. This situation exists not only in the society at local levels but in national accounts as well.

2. Although their participation ratio (input) is much more than that of men, yet there is no or the least reward (outcome) of their labor in monetary terms and in-kind. They have nil to nominal access to the income earned from the sale of animals or animal products. After milking the animal(s), she is exclusively responsible for milk treatment, that include: heating, churning, and processing of milk to generally make butter, cheese, yoghurt, butter oil, or butter milk. For a majority of rural women, their diet is protein deficient and they are consuming low calorie based or less nutritive food. They either sell milk or milk products to earn money or sacrifice their part of food from milk for their family members, especially

children. Hence, they do not enjoy good health and carry on undertaking activities for production and management of livestock even in a serious ailment.

3. Her social status remains always lesser than that of man and she spends all of her life as a subordinate to and dependent on man for all the daily pursuits of her life. Observedly, they are victim of social exclusion. Gender disparities start since her birth and have a continuum in each and every aspect of her life; either it is nutrition/food, education attainment, getting proper medication and health care, or employment opportunities. Even the wage differentials are quite common for performing similar level of activity to that of men.

4. Such are the cultural, social, and economic factors that are responsible for keeping rural women in a miserable condition. All those factors and actors that are keeping women underdeveloped, unproductive, and curbing their progress needs to be curbed and condemned by devising and implementing policies, bringing behavioral changes in the minds of people, especially males, creating equal opportunities of gaining access to education, health, and employment to build, incorporate, and streamline the half of country's human resource into the national development process.

5. In traditional societies and where women's work is under recorded in national accounts, it becomes difficult to see the real magnitude of their work in different fields. So, they are targeted nominally or marginally by international, national, or local organizations in transferring technological innovations. A complete description and analysis of the situation regarding women's nature and extent of engagement in the production and management of livestock can attract development thinkers and thus orientate government and other institutions to organize women-focused programs or projects to train them and to build their capacities in better and more profitable livestock farming. That can raise family income and ultimately the national income. Cognizant to this, Hashmi (2008) found that in rural areas of Punjab, most of the livestock production problems are due to poor literacy rates and use of conventional practices. He recommends that government should increase formal and informal technical education of the farming community towards rearing of healthy animals and dairy farming, and for this, focus should be on women and school going children (farmers of the future). Both can play an important role in looking after the animals, if properly skilled and trained along with developing required competency.

1.1.2 In International Scenario

IFAD's reasons, given below, for focusing on women strengthen the justification of above mentioned rationales and signify the need and importance of the study.

The main reasons to focus on rural women (IFAD 1991c) are attributed to the fact that

1. Women represent a major part of the rural poor, especially where emigration, marital instability, economic stress and family status have left them as heads of households.
2. Women remain very much on the margin of access to and participation in public and private services to meet their own needs.
3. Women have acquired a tremendous store of knowledge about and efficient skills in agricultural production.
4. Women are prime movers, rather than welfare recipients, in the development process and vital agents, rather than passive bystanders, in the process of change (IFAD 1991c).

1.2 Why Focus on Women

This section answers to the fundamental reasons of focusing on women, shows the actual condition of rural women in the region, and constructs the rationale of the study.

Women are the back bone of the rural economy. In spite of the fact that women's participation in livestock management related activities is more critical as compared to men, their contribution and involvement is neither well documented nor considered as paid work (Hassan, et al 2007). Inaccurate and misleading statistics on female labor participation (even in official reports and documents) in livestock (and agriculture) often leads to gross underestimations of the magnitude and importance of women's work in this sector.

In India, generally women have lower per capita resource access than that of men. Gender inequalities prevail in access to the key resources of education and employment. The indicators that capture women's access to the other resources, including financial, health, and media resources, and women's access to spaces outside their homes, also highlight significant constraints on women's access to all types of resources. In India, women's freedom of movement is strictly confined: only one woman out of three is allowed to go alone to the market, the health centre, and outside the community. A majority of women, in India, do not have any money of their own that they can use as they wish. Less than 17 % women have a

bank or savings account that they can use (Kishore and Gupta, 2009). Historically and previously being a part of Indo-Pak sub continent, the socio cultural settings of Pakistan are not much different from those prevailing in India.

Gender discrimination starts from the early days of a female child. She has no power in decision making. All powers are vested with the males of the family. Such circumstances make her unaware of the complexities of the outside world and foster an ignorance of the laws of the country that govern her life. Women are expected to surrender their rights in favour of brothers or husbands for land resources. Rural women have internalized the lower status assigned to them. They are economically active but are also economically dependent. Women have neither ownership nor control over resources. Land is owned by men while the women work and produce on land they do not own. The harvest is sold by and through men, and men control income. Thus, men automatically become visible and who (women) actually worked in what way to produce the crops is not taken into account. The pervasive patriarchal ideology reinforces the economic subordination of women further (Habib, 2004).

The success of any livestock enterprise relies heavily on effective involvement of women, as they are closely involved in animal husbandry sort of activities. Women have to carry out their livestock production work in addition to their household commitments or duties, which include food preparation, child-care water collection, gathering firewood, milling grains, cleaning, sewing and embroidery. Traditional set up of a society, where families are male dominated, do not allow the women to go outside and work on commercial basis. The extent to which women have access to the benefits of livestock depends on men's approval. Poverty stricken families often require the contribution of women to keep the family out from a state of utter poverty. As a result, women from poorer households tend to play a greater role in livestock production than women from relatively well off families. The concept of women in agriculture development presupposes significance of women's contribution to the process of socio-economic development (Shafiq, 2008).

1.3 Inclusion of diverse agro-climatic zones in the study

The purpose of including the diverse agro ecological zones of Punjab in the study is to see that under a vast and an apparently homogeneous region (Punjab), how different contextual or sub-regional (districts) realities influence our research questions. Such investigations provide a useful tool to help assess the regional diversity, derive R&D implications, address

spatial scale issues, and helps link micro-level contextual realities across a vast and important region (Erenstein and Thorpe, 2011). Hence the inclusion of diverse agro ecological zones in the study is to investigate the influence of spatial locations. The following evidences from the previous studies validate the aptness of our standpoint on different agro ecological regions.

In general, the econometric studies on socio-economic inequalities think about regions as independent entities, ignoring the possibility of spatial interaction between them (Ahmed, 2011). Also, in terms of a particular feature, the apparent homogeneity of a vast region may mask the significant diversity existing at the meso-level(s). As Erenstein and Thorpe (2011) have confirmed in a study in five contiguous states in Indo-Gangetic Plains (IGP) region of India that the apparent homogeneity of vast irrigated plains masked the significant diversity in rural assets, livelihood strategies, livelihood outcomes, and underlying agro-ecological gradients. They also found that the livelihood strategies in the surveyed communities predominantly revolved around crop–livestock systems and agricultural labor, with crop production as the major activity for households having access to land.

According to Jamal et al (2003), spatial deprivations or endowments can be gauged by taking into account the situation of different geographical areas and by this way (of geographical targeting) the areas of specific needs can be identified, the efficiency of the scarce resources can be increased (and economic leakages can be substantially reduced) by allocating resources to the deprived areas only. They propose the practical application of this exercise to make decisions on regional priorities, targeting interventions and resources, and understanding the relationship between infrastructure, resource availability, and poverty.

Analysis of different geographical or agro-ecological areas in a particular perspective can expose their relative benefits or disadvantages and how different kind of advantages can be drawn from or interventions can be applied to address the problems of a particular area. Devendra and Thomas (2002) made a SWOT (strengths, weaknesses, opportunities, and threats) analysis of the main agro-ecological zones in the south and south East Asian countries where crop–animal systems with the multipurpose role of livestock are the backbone of Asian agriculture. Their analysis, along with the significant role, contribution, and interaction of livestock with crop production; reveals great diversity and complexity in the crops grown, the cropping patterns used and in the livestock species rose; and prescribes the ways to promote sustainable agriculture and to protect the environment. They also proposed improved productivity from animals in the future, in order to fulfill the increased

demands for animal products, alleviate poverty, and to improve the livelihoods of resource-poor farmers.

1.3.1 Agro-climatic Zones of Punjab

Based on the varying, cropping pattern, irrigation facilities, soil type, underground water table, and rainfall pattern in its different parts the province is divided into five agro-climatic or crop zones. These zones are named as rice/wheat Punjab, mixed cropping Punjab, cotton/wheat Punjab, low intensity Punjab, and rain-fed (barani) Punjab (Amjad, et al, 2008). Each zone comprises of a number of districts⁴. The districts of Punjab included in our study are: Bahawalnagar, Chakwal, and Faisalabad. These districts respectively, represent cotton/wheat, rain-fed (barani), and mixed Punjab. See table.

Table 1 : Agro-climatic Zones of Punjab

Indices	Rice-wheat	Mixed-crop	Cotton-wheat	Low-intensity	Rain-fed
Family Size	7.9	7.8	8.0	8.4	6.9
Dependency Ratio	0.93	0.94	0.99	1.14	0.79
Illiterate %	40.4	47.8	54.8	60.8	31.4
Av. Urban Pop. %	32.27	26.88	20.76	15.16	28.60
% HHs. Without Land ownership	58.1	52.4	57.5	37.9	50.0
% employed rural lab. Force in agri. Industry*	45.9	54.4	58.9	58.7	31.8
Districts	Sialkot, Gujrat, Gujranwala, Sheikhpura, Lahore, Kasur, Narowal, Mandi Bahauddin, Hafizabad	Sargodha, Khushab, Jhang, Faisalabad, Toba Tek Singh, Okara	Sahiwal, Bahawalnagar, Bahawalpur, Rahim Yar Khan, Multan, Vehari, Lodhran, Khanewal, Pakpattan	Dera Ghazi Khan, Rajanpur, Muzaffargarh, Layyah, Mianwali, Bhakkar	Rawalpindi, Jhleum, Chakwal, Attock

Source: Amjad, *et al.*, (2008) *including forestry and fishing

The main data source for the present study was a village-level survey of 12 communities from April to August 2010 in Punjab (Pakistan). “The concept of village surveys as such is not new. More than three decades ago, the use of village studies was promoted as an

⁴ Inherited from the British colonization, a district is a type of administrative division in Pakistan. The district is comprises of sub-districts which further comprise of towns/cities and villages at lower tiers.

empirically-based alternative to other economic analyses of rural situations” (Dasgupta, 1978; Lipton and Moore, 1972; Scoones, 2009, cited in Erenstein and Thorpe, 2011)

1.3.2 Distinct Characteristics of the Selected Districts

The districts are selected because of having various distinct characteristics from each other. These characteristics are indicated in the table below.

Table 2 : Distinct Characteristics of the Selected Districts

Characteristics	Bahawalnagar	Chakwal	Faisalabad
Agro-ecological region	Cotton	Barani	Mixed
Geographical location	Southern Punjab	Northern Punjab	Central Punjab
Land physiography	Plain/Desert	Plateau	Plain
Water Availability	Irrigated	Rain fed	Irrigated
Livestock Ownership	73%	54%	41%
Rural Deprivation Index ⁵	68.53 (23)	58.93 (11)	56.76 (7)

In 6th row the value in percentages show the district population having livestock as their own asset (Source: Punjab Development Statistics 2010). In 7th row the values in parentheses shows the rural deprivation rank order of the districts in Punjab. Greater the value, the more deprived the district is and vice versa.

1.4 Practical Implications of the Study

Many success stories have been emerged from pilot projects—engaged women livestock keepers by building their capacity to make value addition and providing them the market (industry) linkages—and it has been proposed that such women engendered projects are in favor of all stakeholders, especially the women to raise their own and families’ standard of livings. Examples from Pakistan’s two dairy industries are being presented here which signify the importance of this research in terms of its linkages to the industrial sector as well.

1.4.1 Women Livestock Raisers and Agro-food Industries

With an inventory of about 50 million cows and buffaloes, Pakistan has a lot of potential in livestock sector to flourish. A huge impact can be produced throughout the country on daily, weekly, or monthly basis, if the production is enhanced by a litre of milk per animal through best farm practices. Women with small holder farms have a huge role to play in realizing the potential that the country has in livestock sector. Enabling women to adapt the best farm practices at grass-root level will benefit them not only to raise their incomes but to the entire nation as well.

⁵ Rural Deprivation Index is an indicator of multiple deprivations of rural people at district level. Jamal, et al (2003) generated the index for each district of Pakistan using the national data on education, health, living standards, and access to other basic services by the rural people.

1) The dairy industry is one by which the women living in rural areas, who have limited opportunities for generating income and to to earn a decent livelihood from their homes for themselves, for their families, and for the society at large. In milk production at small farms, 80% work is done by rural women, in Punjab. In Punjab, MEDA's Pathways & Purse strings project is aimed to improve the livelihood of 4 to 5 thousand women engaged in livestock farming (in the areas of Bhai Pheru and Rahim Yar Khan), through the value chain approach. The project is providing rural women, who are involved in the dairy industry, with business linkages so that they can add value to their products at every step.

Haleeb Food Limited (HFL), a company engaged in dairy food processing, is one of the key facilitator partners (KFPs) in MEDA's project. Before the project, women were involved in the other livestock management related activities but were not acting as entrepreneurs. About the outcomes, the company was of the view that working with women resulted in better profits and an improvement in milk quality (for example, high SNF and fat contents) and that their future success was in working with women, whereas, in the past the company had experience of being provided with adulterated milk by male milkmen. According to the company, women were loyal by nature and were good business partners.

It is evident from the project that women's working with the food processing company is bringing an improvement in their standards of living. Those who used to face abuse at homes are now independent because they earn money, they have decision making powers in their homes, and they can make bold decisions for their children themselves. When women have power to control the money, its impact will be on the whole society. The project has many success stories and it needs to be modeled to apply because many women are waiting for a chance to enter the dairy industry, so they can improve their lives and the lives of their children.

2) Like MEDA, Engro-Foundation aspires to improve the economic and social health of primary milk producing communities across southern Punjab and northern Sind provinces of Pakistan. Partnered with USAID, Engro-Foundation devises a radical new initiative –Women Empowerment through Livestock Development (WELD) to build up the capacity of small-scale producers and to weave an institutional framework for quality. This initiative seeks to train a cadre of 300 Female Livestock Extension Workers (FLEW) and 300 Female Village Milk Collectors (FVMC) who would deliver services at doorstep to livestock owners for increasing production and linking their produce with relevant business providers. By

engaging indigenous women in training and implementation, this initiative would have a stake in local economy and production and would be able to rise to new levels. The project is estimated to increase household income by 50% for 15,000 dairy farmers, predominantly women, across the region and will provide products, marketing and income generating opportunities (Engro-Foundation, 2011).

1.4.2 Livestock Sub-sector for Promoting Gender Balanced Development in Rural Areas

Bravo-Baumann (2000) is of the view that in relation to the promotion of gender aspects in rural areas of developing countries, the livestock sector offers advantages over other agriculture sectors. In this way, livestock sub-sector is a privileged entry point to promote gender balanced development in rural areas. Some of the main advantages livestock sector has over other sectors and why this sector is a privileged entry point to promote gender related issues are attributed to the fact that

1. In all livestock keeping communities, women are the most important labor force, engaged in multiple ways in animal production and management related joint activities.
2. All household members (men, women and children) have access to livestock, while access to land is often restricted to men. Livestock are a main source of household income and have a defined ownership.
3. Livestock production is not subjected to seasonal restrictions. Livestock activities are a daily occupation and animal products such as eggs and milk are produced, processed and marketed during the whole year.
4. In livestock systems, it is easy to show how gender imbalances affect productivity and the possibilities of change (e.g., behavioral) are often more evident than in other sectors.
5. All household members, men, women and children have responsibilities in livestock production.
6. Livestock projects are related to subjects as processing, market, environment and nutrition. These subjects are interrelated and to promote gender aspects is an overarching issue for a project.

1.5 Theoretical Bases of the study

The present study is mainly based upon the social role theory. Men and women play different roles in different cultures. Cultural expectations give birth to gender specific roles. It is the culture, which imposes the expectation of working of women at a place where they should not interact or communicate with unfamiliar men (segregation and seclusion). In such situations the majority of the roles performed by women are related to household chores whereas the main part of the roles performed by men is related to out of home activities such as on-farm agricultural work etc. The social role theory claims that gender roles are socially constructed and follow social and behavioral norms of the society. Gender roles in education, agriculture, decision making, home management, and other areas of work are segregated and heavily influenced by cultural, social, and economic characteristics of the community. In advanced societies there is less segregation of gender roles where as in less developed societies there is more segregation of such roles. The gender role theory helps understand and analyze the factors of gender inequality.

The division of household labour varies according to culturally based constructions of gender rather than on the basis of biological sexes. Different theoretical approaches have been adopted to predict the division of family work. After the well established finding that women—even when they are employed full time—perform the bulk of routine household work and child care, the *functionalist theory* that presented the idea that women are primarily responsible for the expressive/emotional tasks whereas men are expected to perform instrumental/breadwinner tasks has been broadly criticized. The *theory of relative resources* proposes that greater a person's economic dependence, the more family work s/he will perform. *Time constraints approach* theorizes that more the number of hours one spends in paid employment, the less family work one will perform. According to the *gender ideology theory*, traditional attitudes determine the division of family work between men and women. Hence, holding a traditional gender ideology will be associated with wives performing more family work. A more recent, approach based on *gender construction theory* suggest the division of family work based on that how the male and female have constructed a gendered sense of selves. It is a shift in attention from gendered tasks to the gendered selves. The theory assumes that the individuals who construct their gendered selves in more feminine terms are more likely to attribute positive meanings to family work tasks that traditionally have been performed by women. One approach suggests that a combination of *relative individual resources*, *time constraints*, and

gender ideology could count for much of the variation in who performs domestic labor (Erickson, 2011).

Women being economically productive are resource poor and have economic dependence on men. Only a small fragment of rural women folk is engaged in paid employment and the majority of the tasks they perform are not considered economic activities. At the same time, women's participation in the activities relating to the production and management of livestock are generally considered a part of their daily performed household activities. Traditional attitudes also load a heavy burden of responsibilities on the shoulder of a woman, especially being as a wife and a mother. In a traditional patriarchal or male dominating society, where masculinity is always more empowered sense of self, a male can never construct and express the conception of his gendered self as somewhat like a feminine. So, in such a cultural setting (of Punjab), women remain seriously disadvantaged in terms of division of family labor. Subsequently, the theories of division of family labor do not put the rural women at privileged position.

1.6 Distinctive Features of the Study

By generating detailed information about, various aspects of rural women's status, in how many ways their participation in livestock management activities contribute to their families' welfare, and how socio economic and geographic/spatial characteristics are influencing their participation levels in livestock management activities, we have gone farther than just determining the participation of rural women in livestock management activities. Once the women's levels of participation (as effect) were gauged the next step was to find a relationship between women's various participation levels and socio economic and geographic/spatial characteristics of the farm families and the rural communities/villages (as causes). We attempted to analyze this in terms of a large number of variables at the primary level.

Distinctive features of the study are: presenting the different types/ways of participations in livestock management activities, determining the role of other family members in managing livestock, finding association of women's participation levels with their families' welfare [in cash (income from livestock) and in kind (provision of milk and bio fuel for families' consumption)], and the inclusion of different agro climatic zones to see their impact on women's levels of participation.

1.7 Organizational Plan of the Study

The present study is broadly divided into three parts. Each part further comprises of chapters. The main theme of the first part is to investigate into the role of rural women in livestock management in the province of Punjab-Pakistan. Each in a separate chapter, this part presents, why there was the need of the project, how the previous literature put our study objectives into the answerable questions, and which kind of methods and research protocols we are going to use to generate results and testify our hypotheses. Comprising of two chapters, the second part presents the various aspects of women's status and the nature and extent of their participation in livestock management activities. Along with the concluding remarks, the third and the last part tries to notice: the cause & effect relationship between various socio economic & geographical variables and women's levels of participation in livestock management activities, and how the rural families' welfare statuses are influenced by women's levels of participation in livestock management activities.

After this introductory chapter 1, the coming chapter 2 presents the country profile of Pakistan, the land, geography, various demographic indicators, the situation of agriculture and livestock, the administrative divisions, irrigation system, cropping seasons of Pakistan and the agro climatic zones of Punjab.

The review of literature, at first, validates the aptness of constructing a list of questions and then favors to answer those questions. Chapter 3 presents the literature reviewed on: various aspects of women's status, gendered division of labor in livestock farming, and the factors affecting women's participation in income generating activities. Bearing the empirical findings on the above said themes, the chapter presents not only the country (Pakistan) specific evidences but a global snapshot as well.

Chapter 4 provides information about sampled area, sampling, sample size, and data collection procedure etc. It also presents the conceptualization of the theoretical framework of the study, gives details of the research analyses, and the mathematical presentation of the models used in the study.

Chapter 5 presents the current status of our respondent rural women who were engaged in managing and producing livestock. Various aspects of women's status: socio economic, health, gender relation, mobility, awareness statuses are gauged in the context of rural

Punjab. Descriptive or uni-variate and multivariate regression analyses are made to see the relative influence of socio-economic, family, and geographical area related characteristics on these aspects of women's status.

Chapter 6 presents the participation of family labor in livestock management activities at each of the three geographical levels: regional, sub regional, and local. For a list of seven livestock management related activities, a typology of six different kinds of participations is presented. The main focus of the chapter is on gender participation in livestock management activities and the nature of each analysis is descriptive.

Chapter 7 presents the current poverty/welfare profile of the livestock keeping families and determines the impact of women's level of participation in livestock management related activities on their families' welfare. Internationally known three FGT measures of poverty were applied as poverty indicators. The further exploration of the poor and non poor categories was done through devising the poverty bands. Socio-economic characteristics of poor and non poor families were also presented. Binary logistic regression was applied to identify the determinants of poverty/welfare.

Chapter 8 concentrates on the factors which are affecting or can affect the scope of women's partaking in handling livestock in the social, economic, and geographic context of Punjab. To determine the factors the sets of hypotheses under particular themes were devised. Regression and factor analyses were applied as statistical tools to see the validity of the devised hypotheses.

CHAPTER 2

PAKISTAN-COUNTRY PROFILE

This chapter presents the geography, various demographic indicators, the situation of agriculture and livestock, the administrative divisions, irrigation system, cropping seasons of Pakistan, the agro climatic divisions of Punjab, and main characteristics of the study area.

Section A – Pakistan – Country Profile

2.1 Geography

The Islamic Republic of Pakistan is located in a strategic position at the crossroads of South Asia, Central Asia and the Middle East. It shares a border with India to the east, China to the north-east, Afghanistan to the north and west, and Iran to the south-west. See the figure 1.

Pakistan has a land area of 796,095 square kilometres and according to the 1998 census, a population of 131.51 million. Its population in 2005 is estimated at 153.45 million, with a population growth rate of 1.9 per cent per year and an average total fertility rate of 5.1(GOP, 2005). At the current growth rate Pakistan's population will double in the next 37 years.

2.2 State Administration

Pakistan is a federation of four provinces: Sindh, Punjab, North-West Frontier Province (NWFP) and Balochistan. In addition, there are three federally administrated territories: the Federally Administered Northern and Tribal Areas; the Islamabad Territory; and the State of the Azad Jammu and Kashmir. Each of the provinces has its own elected assembly as well as being represented, in proportion to its population, in Pakistan's national assembly. In addition, there is a senate, in which the four provinces are represented in proportion to their populations as well.

Each province is divided into *zilas* or districts, which in turn are divided into *tehsils* or subdistricts. The *tehsils* are further divided into union councils (UCs) which are the lowest administrative tier. The average population of a UC is between 20,000 and 70,000. The larger cities, which include the provincial capitals, are run as city districts and are sub-divided into

towns, and the towns into UCs. The *zilas*, *tehsils*, towns and the UCs are headed by *nazims* and *naib nazims* (mayors and deputy mayors) elected indirectly by elected councillors. Thirty-three per cent of seats of elected representatives are reserved for women and five per cent for workers and peasants. There are 103 *zila* (district) governments in Pakistan, 335 *tehsil* (sub-district) administrations and 6,022 UCs.



Figure 1: the map of Pakistan

2.3 Geographical Divisions

Pakistan can be divided into four broad geographical areas: the northern mountains, the western highlands, the Indus plains and the eastern desert. Seventy-seven per cent of Pakistan's population lives in the Indus plains, which are mostly located in the Punjab and Sindh provinces. There are major differences between the provinces in terms of demography and population density. For example, Balochistan has the largest land area (43.6 per cent of Pakistan) but contains only 4 per cent of Pakistan's population, with a density of 18.8 people per square kilometre. The Punjab province covers 25.8 per cent of Pakistan's surface area and has 55.58 per cent of its population, with a population density of 353.5 people per square

kilometre. The other two provinces fall between Balochistan and the Punjab with regard to population density.

2.4 Development Indices of Pakistan

Human Development Index (HDI), Human Poverty Index (HPI), and Gender-related Development Index (GDI) are the indices devised by United Nations development Programme (UNDP) that respectively measure a country's average *achievements*, *deprivations*, and *inequalities(between men and women)* in three basic dimensions of human development: a long and healthy life; knowledge; and a decent standard of living. In HDI ranking of countries, Pakistan stands at 136th (in a group of 177 countries) indicating that 135 countries are better off than Pakistan in terms of life expectancy (at birth is 64.6 years), education gaining (adult literacy rate is 49.9 %), and per capita income in purchasing power parity (US\$ 2370). Even within South Asia, countries like Maldives, Sri Lanka, and India have HDI rankings as 100th, 99th, and 128th respectively. In HPI ranking, Pakistan finds 77th place among the group of countries with HPI value 36.2 which means that 36.2 per cent of the population in Pakistan is deprived of the basic facilities considered essential for people to be above the poverty line. Hence, again far below Maldives, Sri Lanka, and India having their HPI values 17.0, 17.8, and 31.3. Likewise in GDI value and ranking, Pakistan's position is not good (UNDP, 2007). Pakistan's gender-related development index is minus 4, one of the lowest in the world (Pervaiz, *et al*, 2008). A brief description of the education, health, and employment sectors along with other demographic aspects of population are given in the coming sections.

2.4.1 Education

Education through improving the quality of human capital affects mortality and fertility rates. Not only the population size but the age composition is also altered by education. Female education can foster a strictly voluntary fertility decline. Pakistan's standing on education has historically been poor and continues to rank at the bottom end of global rankings, with literacy rate of 57.0%. According to the latest Pakistan Social and Living Standards Measurement (PSLM) Survey 2008-09, the overall literacy rate (age 10 years and above) is 57%. The data shows that literacy remains higher in urban areas (74%) than in rural areas (48%), and is more prevalent for men (69%) compared to women (45%). However, it is evident from the data that overall female literacy is rising overtime, but progress is uneven

across the provinces. When analyzed provincially, literacy rate in Punjab and Sindh stood at 59 % for each, Khyber Pakhtunkhwa (KPK) 50% and Balochistan at 45%.

According to the data, the overall school attendance, as measured by the Net Enrolment Rate (NER), for 2008-09 remained 57% and the Gross Enrolment Rate (GER) remained at 91%. The Gender Parity Index (GPI) for Pakistan as a whole in 2008-09 remained 0.65. Province-wise GPI is high in Punjab (0.72) followed by Sindh (0.63), Khyber Pakhtunkhwa (0.45) and Balochistan (0.37).

Public Expenditure on Education as percentage to GDP is lowest in Pakistan as compared to other countries of the South Asian region. According to official data, Pakistan allocated 2.10% of GDP during 2008-9. According to UNESCO's EFA Global Monitoring Report 2009, the Public Sector expenditure on Education as percentage of GDP, in other countries of the region was 2.6% in Bangladesh, 3.2% in Nepal, 3.3% in India, 5.2% in Iran and 8.3% of GDP in Maldives.

2.4.1 Health

In Pakistan, health status of the population at large has improved considerably over time. However, by international comparison, the status is mixed. The overall population growth at 2.1% is the highest in the south Asian region. Similarly, other indicators show that a lot of progress will have to be made to meaningfully improve the health status of the population.

Despite a nearly threefold increase in public sector expenditure since 2001, spending on health remains abysmally low –and has declined as a percentage of GDP. Total public sector expenditure on health, for both the federal as well as provincial governments combined, in the current fiscal year is projected to be 0.54 percent of GDP, which is amongst the lowest of all other countries at a similar income level.

While Pakistan enjoys a vast network of healthcare facilities, coverage, accessibility, cost and quality of health care remain critical issues. The human resource available for health care registered till December 2009 in the country included 139,555 doctors, 9,822 dentists and 69,313 nurses (manpower). The current population- doctor ratio is 1,183 persons per doctor and 16,914 persons per dentist. Health care is also provided to the public through a vast health infrastructure facilities now consisting of 968 hospitals, 4,813 dispensaries, 5,345

Basic Health Units, 572 Rural Health Centres and 293 TB Centres (physical infrastructure) etc. However, the health care system as a whole needs to be strengthened further at all levels.

Nutrition adequacy is one of the key determinants of the quality of human resource. Adequate diet provides good nutrition for healthy life and human development. Millions of people around the world face malnutrition due to inadequate dietary intake and illness. Malnutrition persists in Pakistan especially among young children and women in the childbearing age groups. It affects physical and mental health, thus resulting in poor education performance, low labor productivity and poverty. Apart, about 50% infant and child deaths relate to malnutrition. The factors involved in malnutrition are food security, infant and child feeding practices, health care, water supply & sanitation and education etc.

2.4.3 Demography

Pakistan's last population census was conducted in 1998 and working on 2011 census is in process. In the inter-census period, the population for each year is estimated on the basis of demographic and fertility studies. According to this estimate, Pakistan's population in mid-2011 is estimated at 177.10 million of which 111.8 million (63.12 per cent) lives in rural areas and 65.3 million (36.88 per cent) resides in the cities and Pakistan is the world's sixth most populous country (GOP, 2011).

Total Fertility Rate (TFR) is a demographic (population planning) indicator that provides direct measure of the level of fertility by referring to average number of children that would be born per woman if all women lived to the end of their childbearing years and bore children according to a given fertility rate at each age. Shortly, it refers to births per woman. In 2011, Pakistan's Total Fertility Rate (TFR) was estimated 3.5 which is poorly comparable with its neighboring or some Muslim countries, like India (2.8), Sri Lanka (1.9), Iran (2.0), and Malaysia (2.6) (GOP, 2011).

A way of looking at the changes in population's age structure is to examine dependency ratios, i.e., the ratio of persons under 15 and over 64 to persons between 15 and 64. This ratio is an indication of how much of the young population is increasing and that of old is decreasing. Pakistan is also experiencing a dwindling dependency ratio. Reduced dependency ratios mean that the proportion of the population in working ages (15-64) continues to

increase while those in the younger ages (0-14) decrease. The proportion of working age population (15–64 years) in Pakistan has reached almost 59 percent in 2006.

Pakistan is the most urbanized nation in South Asia with city dwellers making up 36% of its population, (2008). The urbanization rate is 3% (2005-10). More than half of the total urban population of Pakistan (2005) lived in eight urban areas: Karachi, Lahore, Faisalabad, Rawalpindi, Multan, Hyderabad, Gujranwala and Peshawar. Between 2000 and 2005, these cities grew at the rate of around 3 percent per year, and it is projected that this growth rate will continue for the next decade.

2.4.4 Labor Force and Employment

Pakistan is the 10th largest country in the world according to the size of the labor force. On the basis of a participation rate of 32.8 percent, as per the latest Labor Force Survey 2008-09, the labor force is estimated at 53.72 million. Out of total 53.72 million civilian labor force 50.79 million are employed and 2.93 million are unemployed in 2008-09, resulting in an unemployment rate of 5.5 percent. The good news though is that youth unemployment is below the global average in our country.

There has been a decline in unemployment rate since 2003-04 accompanied by a substantial rise in the unpaid family helpers particularly females.

In 2008-09, the estimated labor force grew by 3.7%. The growth in female labor force was greater than male labor force and consequently the increase in female employment was greater. Employment comprises all persons ten years of age and above who worked at least one hour during the reference period and were either “paid-employed” or “self employed”.

In 2008-09, of the total 49.94 million labor force, 14.86 million was employed in urban areas while 35.08 million in rural areas. Labor force engaged as unpaid family helper in urban and rural areas is 1.75 and 12.70 million respectively.

According to 2008-09’s statistics, out of total (100%) employed male labor force only 20.2% were engaged as unpaid family helpers whereas females constitute 65.0% of the total (100%) employed female labor force as unpaid family helpers. Unpaid family worker is a person who works without pay in cash or in kind on and enterprise operated by a member of his /her

household or other related persons. This category also increased showing that this portion of the workforce is just like the unemployed only worse-off.

Agriculture is still the largest sector of the economy. By 2008-09, 45.1% of the total labor force is employed in agriculture with proportionate participation of the male and female as 37.3% and 74.0% respectively of the total male labor force and female labor force.

2.5 Rural Communities of Pakistan

In spite of being home to some of the world's ancient cities, Pakistan is standing with rural population as the majority even at the beginning of twenty first century. Although its share in the national population has decreased to 67.5 percent yet rural population have been central of Pakistani society and is changing year by year demographically as well as culturally.

What does mean by the term “rural” in Pakistan could be better understand after finding what does connote by the term “urban”? Pakistan census defines “urban” as localities that have some form of municipal government, be it metropolitan corporation or incorporated city or town committee⁶. “Rural” is defined as a residual category that includes villages, clusters of homesteads, encampments, towns supporting agriculture, fishing or mining activities (Qadeer, 2006).

By population, a rural locality can be within a range of smaller village of 200 inhabitants to a larger town of 5000 or more persons, in Pakistan. According to the officially conducted numeric, Balochistan has the least village population value with an average population of 340 persons. Sindh lies at the opposite end of the scale with the highest average value of village population of 2,060. Punjab and NWFP are enjoying the intermediate status with their average village populations 1,300 and 840 respectively. Population Census Organization (1998) states that there exist an aggregate of about 48,400 rural localities (villages and towns) in Pakistan. About 53 percent of these localities are situated in Punjab followed by NWFP (15 percent), Balochistan (14 percent), Sindh (12 percent) and Federal areas (6 percent).

⁶ Though the municipal designation is assigned on the basis of population size, existence of commercial and manufacturing or administrative activities and/or political standing.

2.6 Rural Quality of Life

Regarding social change and development rural areas have transformed and progressed toward modern ways of life. But all unimpressive while comparing with urban areas and other countries of the region, like Sri Lanka, India, and Myanmar. Indicators of quality of life of an area include life expectancy, infant mortality, literacy, and housing conditions. An analysis of rural living conditions is usually presented in the form of rural-urban comparison to allow normative assessments. So, to approach the examination of rural life, it would be better to consider it in a comparative manner with urban course of life.

2.6.1 Sex Ratio

Sex ratio is an indicator that reveals life expectancies by gender and the status of women. It is determined in terms of number of males per hundred females. According to the official figures, in the rural areas of Pakistan sex ratio was 106.7 in 1998 comparing with urban as 112.2 over the same period. Among the provinces, Balochistan [urban (118.1) and rural (113.6)] and NWFP [urban (113.2) and rural (103.4)] were dominating having the highest and the lowest ratios respectively. Pakistan's high sex ratios indicate greater survivability of males as compared to females and also denote the discrimination by gender while caring a child.

2.6.2 Rural Literacy

While stating country's overall literacy rate, by 1998, there was a big gap in rural –urban rates with 63 percent literate in urban and 34 percent in rural areas. In rural literacy situation is relatively better in Punjab and NWFP than Sindh and Balochistan. Female literacy is an indicator of gender equality and social status of women also considered important by human development theorists for socio-economic progress. In this matter, in rural areas female literacy rate is 20 percent and urban areas have secured 55 percent literacy rate in 1998. Among the provinces, Punjab registered the highest yield and Balochistan the least. Out of others, one reason that curbed female literacy in the rural areas was the absence of schools in the native village and hence unwillingness of parents to allow their daughters to travel long distances to attend the schools. In the 1990s, a girl child had 24 percent less probability to be enrolled in a school than a boy child.

2.6.3 Health Conditions

Infant mortality rate (IMR) and life expectancy are two facile indices to manifest the health conditions of a population. By 1981, this rate was 116 deaths for urban and 124 deaths of children under one year of age per thousand live births, for rural areas. Life expectancy in Pakistan was 63 years for males and 65 for females in 2001.

2.6.4 Housing Conditions

Regarding examining the housing conditions in rural as well as urban areas, we will present data on three indicators: availability of indoor water supply for domestic use, provision of electricity, and conversion of mud houses to *pacca*⁷. By 1998, though the situation is much better than 1950s regarding water supply when even urban houses were without piped water or a hand pump while in rural areas, there were one or two wells for a whole village yet 11 percent of urban and 32 percent of rural houses in the whole country are living without indoor sources of water supply. Majority of the 68 percent of rural population has this service in the form of hand pumps. Punjab and Sindh provinces are ahead of NWFP and Balochistan on this indicator. NWFP province was at the top in this matter, by 1998, with provision of this service to 96 percent of its urban and 68 percent of rural houses. Over the country situation is much better in urban areas as compared to rural where about 40 percent of rural homes still lacking this facility. In 1998, 88 percent of urban and only 46 percent of rural houses had *pacca* walls. While about 80 percent of urban and only 30 percent of rural houses had *pacca* roofs. Though the villages of central Punjab and irrigated parts of Sindh and NWFP have been improving the housing conditions but almost one-half to two-thirds of rural houses are still made of mud.

Hence, in short, what social development indices show is that in Pakistan, regarding quality of life, basic provisions and facilities, rural –urban differences are wide. Living conditions have although been relatively improved in the post-independence period but unevenly.

2.7 Agriculture and Livestock Sectors in Pakistan

Agriculture has remained the mainstay of the Pakistan economy as it provides employment to 45 percent population and provides input for agro-based industry. Agriculture income has

⁷ The word *pacca* is used in local language for a house constructed with brick or stone- walls along with concrete or brick-lined roof(s). Contrary to *pacca* is a word *katcha* used for a house constructed of mud.

created demand for industrial products. Agriculture provided main impetus to economic growth by creating additional demand of goods and services as a result of higher prices of agricultural produce (GOP, 2011).

Livestock sector has emerged as a priority sector only recently on policy formulation. Historically, Livestock has been subsistence sector dominated by small holders to meet their needs of milk, food and cash income on daily basis. In the rural areas, livestock is considered as a more secure source of income for the small farmer's and landless poor's. It has become important source of employment generation in rural areas. The sector is mitigating income variability in the rural areas as crop sector is more dependent on uncertain vagaries of mother-nature. The poverty incidence in Pakistan is determined by income variability and thus livestock is the best hope for poverty alleviation as it can uplift the socioeconomic conditions of our rural masses. The livestock accounts for approximately 55.1 percent of the agriculture value added and 11.5 percent to GDP during 2010-11. The major products of livestock are milk and meat. The export of meat (beef, mutton & camel meat) & live animals have increased from \$ 74.4 million in 2008-09 to \$ 137.5 million 2009-10 showing an increase of 85 percent. During July-March 2010-11, exports of meat (mutton, beef, camel meat) is increased by 44.4 % in quantitative and 53.4 % in value terms and stood at \$108.7 million. The Livestock sector having 55.1 percent stake in the agriculture sector was also impacted by the massive floods and witnessed marked slowdown recorded growth at 3.7 percent in 2010-11 as against 4.3 percent last year. The sector is immune from weather related problems and thus offers prospects for consistent growth (GOP, 2011).

The population growth, increase in per capita income, remittances and export proceeds is fueling the demand for livestock products. In order to speed up the pace of development in livestock sector, the overall thrust of government's livestock policy is to foster "private sector-led development with public sector providing enabling environment through policy interventions and capacity building for improved livestock husbandry practices". The emphasis will be on improving per unit animal productivity and moving from subsistence to market oriented and then commercial livestock farming in the country to meet the domestic demand and surplus for export. The objective is to exploit the potentials of our livestock sector and use it as engine for economic growth and food security for the country leading to rural population empowerment and rural socioeconomic development /uplift. Livestock

sector's prospective role towards rural economic development may well be recognized from the fact that 35-40 million rural populations are dependent on livestock (GOP, 2011).

2.8 Irrigation Facilities in Pakistan

The major agricultural areas of Pakistan comprises of Indus Plains (lie in the Indus basin) that are supplying more than 80 percent of agricultural production. Most parts of the Indus Plains do not receive enough rainfall to support agriculture. They are exceptionally flat, however, providing some of the best land for gravity-fed irrigation in the world. During the last 130 years, more than 40,000 miles of canals have been built. More than 200,000 private and public tube wells have begun to supplement canal irrigation (Pinckney, 1989).

2.9 Main cropping seasons in Pakistan

There are two main cropping seasons in most of Pakistan: *kharif* and *rabi*. Continuing from April, kharif season lasts up till November with cotton, rice, maize, millets, sorghum, and sugarcane as the major kharif crops. Rabi season starts from November and ends in April. Wheat, oilseeds, gram, and barley are the major rabi crops. Of the total cropped area, 55 percent is planted in the rabi season and the rest in the kharif season. (Pinckney, 1989)

2.10 Agro-climatic Zones of Pakistan

The initial classification/division of districts into different agro-climatic zones was initially done by Pinckney (1989). Recently the same classification including additional districts in the different agro-climatic zones is used by Amjad, et al (2008).

Pinckney's methodology to divide the country into agro-climatic zones was based on the varying, cropping pattern, irrigation facilities, soil type, underground water table, and rainfall pattern in different parts of the country. As he determines that cropping patterns and rotations vary in different parts of the Indus Plains. Therefore, it is useful for purposes of this study to divide the country into agro-climatic zones. Since wheat is the predominant crop in the rabi season in virtually all areas, the primary kharif season crop becomes the basis for differentiating the zones. In the irrigated areas the two most important kharif crops are rice and cotton. In areas of high water table, heavy soils, and greater rainfall, rice tends to dominate, while in the drier areas cotton is generally planted. Thus, one major division is between areas suited to rice and areas suited to cotton. There is one zone centered around

Faisalabad in which conditions are suitable for a number of kharif crops, with no single crop dominating. This will be termed the “mixed zone”. The barani areas are considered distinct because of their dependence on rainfall. Finally, the area close to the left bank of the Indus in the Punjab, which has relatively less-developed irrigation facilities and thus low cropping intensities, is considered a separate zone (Pinckney, 1989).

SECTION – B

2.11 Agro-climatic Zones of Punjab

Different approaches can be used for the classification of Punjab districts into regions, such as dividing Punjab into three regions, north, central and south, or disintegrating rural Punjab into north and south. In a recent study, Amjad et al, (2008) used the methodology of Pinckney (1989) to classify rural areas of Punjab province into five agro-climatic or crop zones (figure 2). These zones are named as rice-wheat Punjab, mixed-crop Punjab, cotton-wheat Punjab, low-intensity Punjab, and rain-fed Punjab.

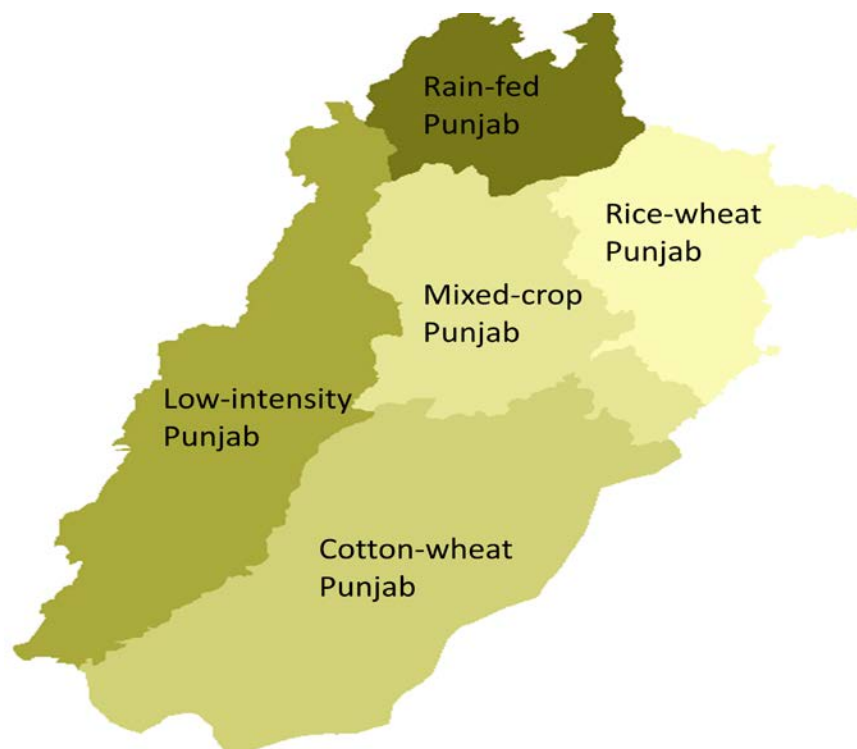


Figure 2: Agro-climatic zones of Punjab (Pakistan)

Classification of Districts into Different Agro-climatic Zones

Rice-wheat Punjab consists of nine eastern districts namely, Sialkot, Gujrat, Gujranwala, Sheikhupura, Lahore, Kasur, Narowal, Mandi Bahauddin, and Hafizabad. Six central districts of the province namely, Sargodha, Khushab, Jhang, Faisalabad, Toba Tek Singh, and Okara constitute the mixed-crop Punjab. Concerning the other zones, cotton-wheat Punjab consists of nine southern districts of the province, namely Sahiwal, Bahawalnagar, Bahawalpur, Rahim Yar Khan, Multan, Vehari, Lodhran, Khanewal, and Pakpattan. Low-intensity Punjab consists of six western districts of the province, which are Dera Ghazi Khan, Rajanpur, Muzaffargarh, Layyah, Mianwali, and Bhakkar. Rain-fed Punjab is consisting of currently four northern districts of the province, Rawalpindi, Jhelum, Chakwal, and Attock.

2.12 Administrative Divisions of Punjab Province

A district is a type of administrative division. Pakistan's districts are local administrative units inherited from the British colonization. They comprise villages, towns and cities. In Pakistan, districts are the third order of administrative divisions, below "divisions" and "provinces". That is, the districts are generally grouped into administrative divisions, which in turn grouped into administrative provinces. A higher administrative entity exercises certain administrative power over the lower administrative units within its jurisdiction. Districts are administratively composed of sub-districts (locally called tehsils) that are further comprised of union councils. Generally, a tehsil consists of a city or town that serves as its headquarters. Union councils are the fifth tier of government in Pakistan. A union council is either rural (also called village council) or urban (called urban union council). A village council usually comprises of small villages and an urban union council consists of localities that are part of cities.

2.13 Development Inequalities in Rural Areas of Punjab

Historical back ground, endowment of natural resources, strategic location of a geographical area determine its socio-cultural, economical, and political importance. In a particular area, available natural and human resources, climatic conditions, physical features of land determine the structure of employment of the population.

From the ancient times, Punjab remained the passage or place of many invaders, rulers, migrants, and settlers. Some areas or cities, flourished during different eras of different rulers amongst those Mughal, Sikh, and British were the more known ruling eras. In those eras, some areas became the chief cities, headquarters, capital or main centers of political, economical, and cultural activities. People were settled in the villages, located near those centers, to encourage cultivation, and prosperity was brought. Total length and presence of the physical infrastructure, that is, the metallic roads, railway tracks/lines passing through the district; development status of the neighboring districts; linkages with the big cities; distance from the federal or provincial capital all matters in the development status of a district.

The districts of northern Punjab, as compared to those situated in the southern Punjab, have been remaining more important from ancient times. They were the old and earlier settlements of the people who came from different neighboring areas. Most of the districts are located near the sides of the rivers that originate from the north and flow southward. So, the soils are more fertile and canal irrigation water is available for cultivation of different crops. Many of the districts in the northern Punjab are newly created and were previously the part (sub-district) of other districts. Migration of people from rural settlements towards urban settings, as an outcome of industrialization and modernization, raised the population of large urban centers. Then to administer and manage the large population creation of the new district was the best option.

The rural areas of Punjab are not homogeneous in cropping patterns, households' access to land, provision of health and education services, proximity to cities and the structure of employment including access to overseas labor markets, particularly in the Middle East. This diversity in the rural areas shows that the structure of employment and other socio-economic channels through which economic growth trickles down to improve the living standard of the poor varies across the regions. More than half of the rural population is landless. In those rural regions, where poverty is high such as southern Punjab, employment prospects in industry and the services sector are lower than the regions that are better connected to major centers of growth (cities) (Amjad et al, 2008).

Since its creation in 1947, Pakistan is moving on from a purely agricultural based economy to part industrialization. In spite of the fact, the country still has an agricultural based economy where agricultural products occupy the bulk of the exports. The majority of the country's population resides in the rural areas. A divide exists between urban-rural, rural-rural, and

urban-urban populations in terms of provision of civic amenities, access to education, health, employment opportunities, and other developmental activities. The irrigated areas, where the British had introduced the canal irrigation system have shown considerable change both in agriculture sector as well as the life style of the people, whereas the rain fed areas remained marginalized and not much attention was paid to them. Similarly, after independence, the urban centers of Karachi, Lahore, Faisalabad, and Sialkot became, by and large, industrialized and continued to develop and expand their populations by attracting labor from far-flung areas in search of work. Hence, urbanization and subsequent migration began to recognize certain sectors of society (Ali, 2003).

According to the World Bank Survey data from rural areas of Punjab there is large variation in the observance of Purdah across districts. The sharpest differences are found between northern Punjab, and southern Punjab. While overall observance is recorded higher (about 81 per cent) in southern Punjab and lower in the northern Punjab (about 51 per cent), the severity of Purdah (i.e., the proportion of observers with full body/face covering) conditional on observance is found substantially higher in northern Punjab (World Bank, 2005).

The level of exposure of the rural communities to the world outside, which affects attitudes and relative openness to modern ideas, also varied considerably. The extent of exposure depends on a number of factors including road access and proximity to large cities, employment in urban centers, as well as access to sources of mass media, particularly radio and television. In their study, Sathar and Kazi (2000) found that the barani villages were particularly disadvantaged because they were not connected by a proper road, transport facilities were inadequate and irregular, and travel time to the nearest city took as long as 3 hours. The proportion of respondents in these villages who had watched television in the last week was also below the average for the total sample. This may be offset by employment of male residents in urban areas, and was more commonly found in these villages, which would be expected to lead to greater receptiveness to urban values and lifestyles. Exposure to television was found the highest in the peri-urban areas, followed by Central Punjab.

Numeric Naming for Villages in Irrigated Punjab

Most of the villages in the districts of Punjab are named as “chak” which is a word of Urdu language and it denotes “village”. In irrigated Punjab, instead of a nominal (wordy) identification/name, a particular number is used for denominating a village. All the names

are prefixed as “chak” followed by a number and one or two letters from English alphabets which are usually the abbreviation of the canal’s name that irrigates the village for agriculture. For example, the names of the villages are Chak 58-4R and Chak 190-RB where 58 and 190 are the numbers assigned to the villages, and 4R and RB denotes the names of canals. Many of the villages were planned and established by British engineers during the colonial period. These villages were established mostly alongside the canal banks to distribute the population evenly.

SECTION – C The Study Area

Punjab province in Pakistan is the most developed in the country in terms of agricultural productivity, road structure, sanitation, communications, and availability of facilities. However, the rural areas of the province are by no means homogeneous in terms of communication, links with the outside world, educational levels, and exposure to media or income. All these factors are likely to vary across the rural communities located in different administrative districts of Punjab. Varying agro-ecological conditions have varying impact on farming systems and employment patterns, which have direct impact on family and gender systems (Sathar and Kazi, 2000). On the basis of agro-ecological conditions and geographic locations, our selected rural communities cover three major regions: Southern (cotton-wheat) Punjab, Northern (Rain-fed) Punjab, and Central (mix-crop) Punjab (figure 3).

Southern Punjab

Southern Punjab is the least ‘developed’ and most agricultural region. Cotton is the main Kharif crop while wheat is the main rabi crop grown in the villages of Southern Punjab. District Bahawalnagar is one of the districts of southern Punjab. Comprising of an area of 8,878 square kilometres administratively the district is divided into five sub-districts. According to Punjab Development Statistics (2008), only 19.16 (477 thousand) percent of the total population lives in the urban areas and remaining 80.84 percent (2018 thousand) resides in rural areas. As per Punjab Development Statistics (2008), there are 544 thousand cattle, 758 thousand buffaloes, 196 thousand sheep, and 957 thousand goats in the district. Physio-graphically, the district can be divided into three areas. These are, riverain area, the canal irrigated plain, and the desert area. Basically people are agriculturists. There exist many tribes and sub tribes in the district. Arain, Jatt, and Wattoo are the most progressive castes in the district.

Northern Punjab

Northern Punjab is mountainous and rocky region, covered with scrub forest, interspaced with flat lying plains; the north and north-east consist of softly undulating plain areas along with some rocky patches. The region Chakwal is the third most populated district of this region. Like other districts of Pakistan, all livestock species are reared in this region including Chakwal district. Among total livestock population in the district, the decreasing order of species began with goats followed by cattle, sheep, buffaloes, asses, camels, horses and mules (Nosheen, et al., 2010).

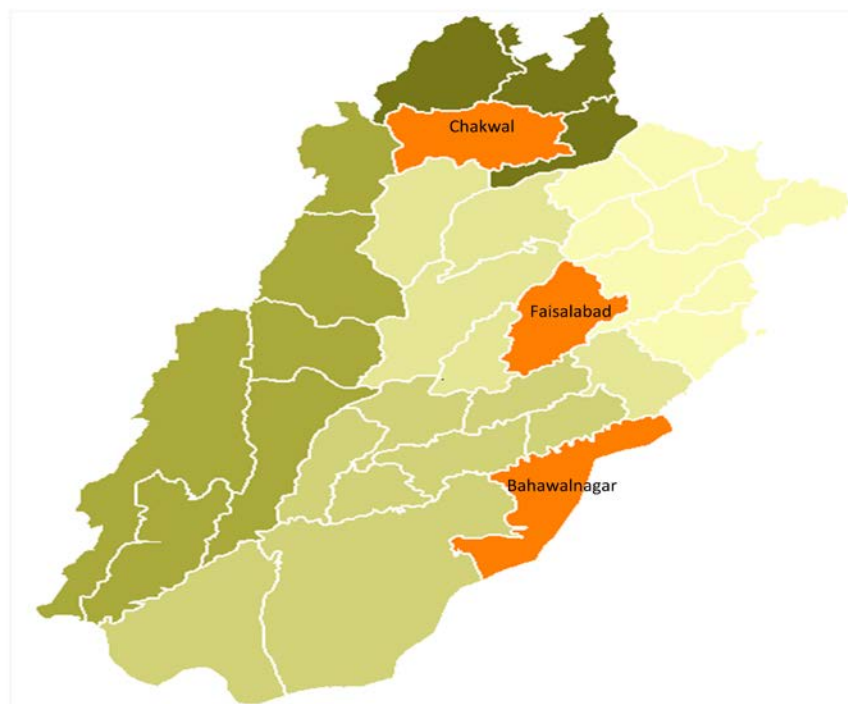


Figure 3: The sampled districts from agro-climatic zones of Punjab (Pakistan)

In the absence of canal irrigation system, agriculture depends on the rainfall. The rain fed areas, as compared to the irrigated areas, do not have very productive crop yields. Hence, due to low return from the land, instead of cash crops, food crops (wheat, maize, vegetables, peanuts, etc.) are mostly grown for home consumption and agriculture seems to be only one component of living. Less productivity of land does not make agriculture the main source of livelihood and people tend to adopt other means of livelihood. Proximity of Islamabad (federal capital) and Rawalpindi, in the region, has facilitated job opportunities, particularly for males. They either migrate out in search of appropriate job within the country or abroad

or set their own small scale business enterprise locally. Shifting of the capital city previously from Karachi to now Islamabad has brought in much economical and agricultural development in the area that has consequences of changes in rural society as well. But in spite of the element of change, the clan system, religious morals, and traditional value system still have a strong hold among the rural people of the region (Ali, 2003)⁸. The region is famous for recruitment of the soldiers in armed forces of Pakistan and providing man power for overseas jobs. The maximum migration from this region takes place to Middle Eastern and European countries. Though the phenomenon of out migration (national or international) has brought about economic prosperity for some people due to the remittances sent home in certain areas of this region. The absence of males, due to out-migration, in some households has also increased the overall responsibilities of females in the domestic, as well as the agricultural and socio-economic spheres of life (Ali, 2003).

Central Punjab

The employment and income pattern of inhabitants in the canal-irrigated areas located in Central Punjab is quite different from that of rain-fed areas. Farming is market-oriented and cash crops, including sugarcane are grown in the region. While agriculture is a lucrative source of income, access to land varies across the sites. The landless residents of the irrigated regions are mainly employed as laborers in factories or as casual workers in the agriculture and construction sectors. (Sathar and Kazi, 2000). Faisalabad is one of the districts of central Punjab. Administratively the district is divided into five sub-districts (tehsils), out of which one sub-district “Faisalabad” was selected as the study area. The selection of tehsil Faisalabad is based on the fact that agriculture is the main occupation of many people residing in its rural areas. Almost all the important crops like Wheat, Sugarcane, Maize, Rice and Vegetables are successfully grown in the area (GoP, 2000; cited in Javed et al., 2006). Moreover, approximately half of the population residing in rural areas consists of females, who are engaged in a wide range of activities related to crop production, livestock management and poultry husbandry (Javed et al., 2006).

⁸ Ali, M. Z. (2003) *Agrarian Society in Transition: Modernization, Development and Change – A Case Study of the Potwar*, Ph D Thesis, The Taxila Institute of Asian Civilization, Quaid-i-Azam University, Islamabad Pakistan.

Part 1: An investigation into the role of rural women in livestock management in Punjab-Pakistan.

CHAPTER 3

DEFINING THE PROBLEM THROUGH REVIEWING THE CONTEXT INTO ANSWERABLE QUESTIONS

The review of literature, at first, validates the aptness of constructing a list of questions and then favors to answer those questions. This chapter presents the literature reviewed on: various aspects of women's status, gendered division of labor in livestock farming, and the factors affecting women's participation in income generating activities. Bearing the empirical findings on the above said themes, the chapter presents not only the country (Pakistan) specific evidences but a global snapshot as well.

3.1 Literature Review on Women's Status

According to Roy and Niranjana (2004) women's status, women's empowerment, gender equality, and women's autonomy are the related terms. Due to its context specific nature, there is no universally approved way of gauging women empowerment for it can be perceived differently in different cultures therefore, empowerment is commonly gauged by using slightly different measures in different settings (Beegle *et al.*, 2001). Furthermore, some of the studies were conducted by considering women's empowerment as a multi-dimensional concept and a variety of dimensions was used to measure women's empowerment. The description of those studies along with the multiple dimensions of women empowerment is given below:

Steele *et al.* (1998), in their study divided the multidimensional construct of women's empowerment into four dimensions, which were: women's mobility, role in household decision making, husband's attitude, her attitude regarding her children education and age at marriage.

In another qualitative study conducted in rural India, Jejeebhoy (2002) used women's mobility (freedom to visit different places), access to economic resources and decision making authority as three dimensions of women's autonomy.

Roy and Niranjana (2002) by using a quantitative approach, developed indices to measure the each dimension of women empowerment separately. They indicated women's involvement in decision making, their freedom of movement, and access to money as three dimensions of women empowerment. Similarly, for their study conducted in India and Pakistan, Jejeebhoy and Sathar (2001) took women's economic decision making ability, spatial mobility, freedom from threat, and control over economic resources as aspects of women empowerment.

In an analysis of survey on State of Women Reproductive Health and Family Planning conducted in October 2003 by Pakistan National Institute of Population Studies (NIPS), Ahmad and Sultan (2004) used empowerment, mobility and communication with husband as dependent variables by preparing separate index for each of the variables. In line with the existing flow of research, Parveen (2005) in rural Bangladesh, introduced a composite index of women empowerment comprising six dimensions: economic contribution to household, access to resources, ownership of assets, participation in household decision making, perception of gender awareness, and capacity to cope with household shocks, to measure rural women's empowerment status.

Different dimensions of women empowerment have been used in different study settings however, women's spatial mobility, their involvement in household decision making, and control over resources remained the most commonly used dimensions of women empowerment (Khan, 2010).

In the following paragraphs we are presenting how different socio economic, demographic, geographic and other factors relate with different aspects of women's status.

Women's Education: Furuta and Salway (2006) found a significant association between women's level of education and their decision making ability. In a parallel study conducted in two districts of Bangladesh, Rahman et al. (2008) revealed the existence of a significant relationship between education of women and their empowerment.

Woman's Age: Age of a woman is considered as one of the important determinant of her empowerment (Ahmad and Sultan, 2004; Elizabeth and Thomas, 2001; and Jejeebhoy, 2000). In their study about the power transformation amongst the women in rural Nigeria, Solomon and Adekoya (2006) found that relative to her younger age a woman in her older age had greater participation in decision making within the family. Mostofa et al. (2008) in their study

revealed that in Bangladesh as compared to those having their ages between 40 and 44, women below the age of 20 years had less empowerment. The more empowerment of older women was related to have better understanding and closer relationship of older women with their husband and because they had more chances to communicate with their husband on various issues as their age progressed. Tareque et al. (2007) stated that in Bangladesh, as compared to elder wives younger wives were kept under strict control of their husbands. The tight control of husbands over their young wives eventually restricts women's (wives') freedom of movement and thereby confines their freedom of choices.

Women's Involvement in Paid Job: In Nicaragua, women's employment status was found as the most important variable in promoting women's autonomy (Heaton et al., 2005). Enhanced female economic productivity was proposed by Blumberg (2005) as the basic factor in reducing gender inequality.

Family Type: In India, Roy and Niranjana (2004) indicated noticeable difference between empowerment statuses of women of reproductive age (15-49) who belonged to nuclear families and those who belonged to non nuclear families. They concluded that presence of in-laws in a family lower down the level of married women's autonomy. Similarly, Sridevi (2005) explained that in joint families, most of the decisions were made by older family members; income was usually shared by numerous individuals; and for young women, a lot of restrictions hindered their mobility, control over income, and participation in decision making.

Husband's Attitude: Husbands' cooperation is assumed putting supportive atmosphere for wives to achieve good status in household. In prevailing culture of Pakistan without proper cooperation of husband, it is difficult for a woman to achieve desired status in the family (Khan, 2010). Because of regular quarrel with their husbands, women suffer from mental diseases (BRAC, 1998). Susilastuti (2003) quoted that in Middle Eastern culture, discussion on husband-wife relation is limited and women in these societies are depicted as oppressed. Parveen (2005) in her study in Bangladesh, explored that disharmony in marital life of a couple reduces five units of women's empowerment index. In Japan, husband's cordial relation with and provision of freedom of expression to her wife were seen as relating to greater women's empowerment status (Sarafat et al., 2007).

Family's Resource Base: Women from richer families gain better education, media exposure, and control over resources; whereas, women from the families with lower socio-economic status have fewer opportunities to enhance knowledge, skill and resources that could provide them confidence and self esteem (Khan, 2010). Nawar *et al.* (1995) reported that spousal bargaining power within household changes with the change in social status. In a study conducted by Parveen (2007) in Bangladesh, it was found that landless and marginalized women had little power to identify gender based discrimination than the women of richer household.

In an ethnographical study, Mumtaz and Salway (2005) confirmed the wider impact of mobility restrictions on women's reproductive health. They found that women's mobility was confined, had complex nature, and was patterned by the interaction of the class and gender hierarchies. They described the two types of women's mobility: accompanied and unaccompanied. Women of different classes i.e., the poor and the rich, were being differently influenced by these sets of mobility. For a poor woman, higher unaccompanied mobility was associated with a loss of prestige and susceptibility to sexual violence. Whereas, for a richer woman, such mobility neither did constitute a legitimate target for male exploitation, nor did it lead to a loss of status (prestige) on the part of their families.

Purdah and Women's Mobility Status: Purdah in Muslim countries is considered as a social, economic and physical seclusion of women and also called as the reason for backwardness of women in the developing world (Ghuman, 2003). Norms restricting women's mobility are closely linked to issues of Purdah (veil) and Izzat (honor). And the relationship between the practice of Purdah and women's mobility is highly complex. Purdah has the potential to constrain women's mobility, such as in rural areas, where it can interfere with a woman's ability to perform manual labor (World Bank, 2005). In a study on women's empowerment conducted in five Asian countries (Thailand and Philippines with India, Pakistan and Malaysia), Mason and Smith (2003) concluded that women without Purdah had considerable freedom of movement and job opportunities as compared to those women who were observing Purdah. Since, living in an Islamic society, men are conscious about the Purdah of their women. A relatively greater freedom and mobility of women was identified in the communities where women had less cultural constraints, like Purdah (Shafiq, 2008). By Kishore and Gupta, (2009) a confined mobility of women was observed in India, where only one woman out of three was allowed to go alone to the market, to the health centre, and

outside the community. With reference to Pakistan, Jones *et al.* (2006) reported that Purdah restricts most of the women to their home, segregates them from the outside world, hence reduces the chances of women's links with market and their income generating opportunities. In their study in Nepal, Furuta and Salway (2006) stated that the practice of Purdah (seclusion of women) was common among the newly married women from higher castes and rich families as well as in families where sexual purity was highly valued.

Media Exposure and Women's Awareness Status: The media is an important source of information and exposure to the world outside the home. It opens new ways of thinking and doing things reasonably. In addition, radio listening, television viewing, and reading newspapers or magazines are important leisure activities. Both of these characteristics of the media are assumed to make access to media an important indicator of women's empowerment. Time spent enjoying the media, further reflects access to leisure time, typically available to the more empowered who have greater control over their own time use. Mass media does enter into demographic analyses in studies of various outcome measures, but generally through data on household goods (Basu and Koolwal, 2005; Kishore and Gupta, 2009). In India, according to Kishore and Gupta, (2009) women's access to media was notably lower than men's, in every age group. Exposure to media has significant influence on women's empowerment (Parveen, 2005). Mass media, like radio and television can bring social change by creating awareness amongst women about their rights and bring gender equality through dramas and other interesting programs (Ali and Sultan, 1999).

Geographical Context and Women's Status: Context or locality explains variation in women autonomy (Kabeer, 2001). Urban women enjoy more freedom than the rural women (Roy and Niranjana, 2004). In a study conducted in Nepal, the indicators of women's position in the household have shown significant difference with respect to locality (Furuta and Salway, 2006). Socio-cultural set up of the region also determines women's status. In their study both in Pakistan and India, Jejeebhoy and Sathar (2002), indicated that women's autonomy was greatly influenced by region. To them, women residing in the southern part of the sub-continent were more empowered as compared to those residing in the north. In a study conducted by Mason and Smith (2003) on women's empowerment and social context, the results from five Asian countries, suggested highly significant differences in women's empowerment levels within those communities. They also considered that empowerment was the property of socio-cultural system. In a study based on Pakistan, Mahmood (2002)

correlated women's decision making authority with their locality *i.e.* the study explored that women living in urban areas had greater say in household decision making as compared to those of the rural areas.

In a study conducted in different geographical areas of Pakistan, Sathar and Kazi (2000) found the considerably varied levels of exposure of the rural communities to the world outside. They related the varied extents of exposure of rural communities to a number of factors including road access, proximity to large cities, employment in urban centers, and access to sources of mass media (particularly radio and television). In their study, the rural communities of barani villages were found particularly disadvantaged because of non connectedness by a proper road, inadequate and irregular transport facilities, and long travel time to reach the nearest city. The proportion of respondents in rain-fed villages who had watched television in the last week was also found below the average for the total sample, while the exposure to television was found the highest in the peri-urban areas, followed by Central Punjab.

Findings of Jejeebhoy and Sathar (2001) suggest that women's autonomy, in terms of decision-making, mobility, freedom from threatening relations with husband, and access to and control over economic resources, is constrained in all three settings (Pakistani Punjab, Uttar Pradesh, and Tamil Nadu in India) in the Indian sub-continent. Furthermore, their findings suggest that in the northern portion of the subcontinent where the patriarchal and gender-stratified structures governing the society, women's control over their lives is more constrained than in the southern region.

Pakistan is mostly generalized and assumed as a homogeneous country, such an assumption may lead to the homogeneous treatment of the whole society and the women folk as well. At various geographical (regional, sub-regional, village/community) levels and in terms of personal traits, rural women in Pakistan have heterogeneous status. The reason behind selecting agro-ecologically different sites for data collection was based on the hypothesis that the diverse features of the sites will construct their own and different gender norms (Sathar and Kazi, 2000).

3.2 Literature Scanning on Gender and Family Labor's Participation in Livestock Management

FAO (1997) defines the term gender not as a biological expression for distinguishing men and women but as a social construct to determine the perceptual and material relationships between the both sexes. Gender is considered a central organizing principle of societies that often governs the processes of production and reproduction, consumption and distribution. Gender roles assign men and women their social definitions and vary among different societies, cultures, classes, ages, and in different point of times in the history. Gender roles are often determined by household structure, access to resources, specific impacts of the global economy, and other local factors (like, ecological conditions).

In the words of IFID (1999) “Gender analysis defines the socio-economic and evolving roles and functions of men and women as they relate to and complement each other within a specific socio-cultural and economic context”. FAO (1997) states that gender analysis seek answers to fundamental questions such as who does or uses what, how and why. Despite such a definition, gender is often misunderstood as being the promotion of women only. However, gender issues focus not only on women, but on the relationship between men and women, their roles, access to and control over resources, and division of labor and needs. Gender relations determine household security, well-being of the family, planning, production and many other aspects of life (Bravo-Baumann, 2000).

In most farming systems, there is a division of labor. This determines the different tasks for which men and women are responsible. Generally, women have an important role in the production, processing, preservation, preparation and sale of staple crops. Men tend to focus on market-oriented or cash crop production. Often we find a division in crop and livestock management practices. Weeding is often a women's task, while spraying or fertilizer application is mainly carried out by men. Women and children often look after the smaller livestock species and men are often in charge of cattle (FAO, 2005).

An existence of differences in the livestock production by male producers and female producers signifies the importance of gender consideration in livestock production. Gender related aspects in livestock production, as determined by Bravo-Baumann (2000) are given below. These aspects determine the importance of gender consideration in livestock production.

1. Generally, men and women tend to own different animal species. In many societies, handling of large livestock is usually controlled by men while women are responsible for smaller animals.
2. In a household, husband and wife may have either shared or separate objectives or interests in dairy production, and each one tries to work toward achieving them.
3. With increasing migration and off-farm work by men, the workload of women becomes greater as they become involved in activities carried out by men before. Also in situations of war, women often take over the work traditionally handled by men.
4. Patterns of gender division of labor are location-specific and change over time. Although the most typical pattern of gender division of labor is that women are responsible for animals kept at the homestead, there are many variations to this pattern from non-involvement in livestock to the management and herding of large stock.
5. In general, women tend to spend the money they earn from livestock activities on the welfare of their families. In many societies, the little income derived from daily milk sales is sometimes used by men for drinking. This continues to be an intractable issue in many societies (IFAD, 1999). Due to differences in men's and women's use of income, increases in men's earnings from livestock-related activities may not be necessarily translated into improved household nutrition, where as women tend to first increase household well-being.
6. In a general rule, men have easier access to government provided credit than women. Women are rarely considered creditworthy because they have no collateral. In addition, they often cannot read and write, and are not used to frequent governmental or official institutions without their husbands consent and being accompanied.
7. In livestock production as compared to women, men have easier and greater access to technology and training. In most countries, research and planning activities in the livestock sector are largely dominated by men. Official livestock services, extension programs, and educational materials are mainly controlled, designed, and extended by and oriented towards men. At present, in many societies, women's access to information and training in modern livestock management and dairying continues to be limited and even indirect.

Because of these above-mentioned tendencies, it is important for us to recognize that gender considerations in agriculture and livestock management always need to take into account both men's and women's roles, responsibilities, interests and needs. Furthermore, within these two groups, we need to be aware of other differences that need to be taken into consideration:

those of age, ethnicity and social status. Failure to consider these differences, between men and women, leads to unsuccessful project activities. It may also lead to the marginalization of a major sector of society and a large part of the agricultural workforce. Thus, understanding gender relationships, and adjusting methods and messages, is crucial for the full participation of all sectors of the community (FAO, 2005).

Concerning livestock development, there is a high level of agreement in the literature that socio-economic and institutional frameworks play an important role in determining who does what, and who gets what. Social and cultural norms dictate the division of labor. The intra-household division of labor depends on household labor availability, the number and type of livestock, economic development of the household and estimated income out of the new activity (Bravo-Baumann, 2000).

Valdivia (2001) stated that in livestock economy/research, the allocation of labor is included in the resource management. There are gender differences in the management of livestock. Markets play a role in the allocation of labor resources. She further explains that increasing the competition of female labor between the household activities, management of her own enterprises, household reproductive chores, working off farm activities, and others may increase the use of child labor as a strategy to address female's constraints.

The view that the division of household labor varies according to culturally based constructions of gender rather than on the basis of biological sexes. The functionalist theory that gave the idea that women are primarily responsible for the expressive/emotional tasks while men are expected to perform instrumental/breadwinner ones has been broadly criticized due to the well established finding that women, even when they are employed full time, perform the bulk of routine household work and child care. Over the years, family scholars have adopted different theoretical approaches to predicting the division of family work. One approach suggests that a combination of relative individual resources, time constraints, and gender ideology could count for much of the variation in who performs domestic labor. Another, more recent, approach based on gender construction theory suggest that supposes actively construct the allocation of family work tasks in ways that affirm and reproduce their gendered conceptions of self (Erickson, 2011). So, the different theories determining division of family labor between husband and wife, as determined by Erickson, (2011) are given below.

Theory of Relative Resources: this model/theory proposes that greater one's economic dependence, the more family work one will perform.

Time Constraints Theory: this approach theorizes that the more number of hours one spends in paid employment, the less family work one will perform.

Gender Ideology Theory: in this approach, traditional attitudes determine the division of family work between men and women. Men and women perform work traditionally associated with them being males and females. Holding a traditional gender ideology will be associated with wives performing more family work.

Gender Construction Theory: this theory determines that the division of family work based on that how the male and female have constructed a gendered sense of selves. It is a shift in attention from gendered tasks to the gendered selves. The theory assumes that the individuals who construct their gendered selves in more feminine terms are more likely to attribute positive meanings to family work tasks that traditionally have been performed by women.

There are increasing concerns that the vital contribution of women to the management of biological resources, and to economic production generally, has been misunderstood, ignored, or underestimated. Recent decades have witnessed substantial gains in agricultural productivity and rapid advances in agricultural technology. These advances have often bypassed women farmers and reduced their productivity. Frequently the changes were linked to credit requirements that were either inaccessible to women, or were not tailored to their needs and demands. Therefore, women face a variety of gender-based constraints as farmers and managers of natural resources. In order to meet the challenges of food production for the increasing population, countries must find ways to overcome this gap in productivity (FAO, 2005).

Paudel, et al., (2009) reported the very low participation of women in publically launched livestock programs in Nepal. Regarding the gender participation in farmers' groups/organizations, high variation was found between men and women. Men's participation was found more in large animal, such as cattle and buffaloes, related groups, which are perceived as the prestigious animals in the society, whereas women's participation was higher in small ruminants and poultry farming groups only. Women were supposed to work in most of the difficult and non-cashable livestock activities, like forage collection and

transportation, cleaning the gutter and sheds and feeding animals whereas men's involvement was more in the relatively easier and (attractive) cashable livestock activities, like milking of the animals and selling of the milk. Women's participation in the process of decision making was also found negligible.

Okitoi, et. al., (2007) noted the involvement of the family members i.e women, men and children in rural poultry production system in western Kenya. It was found that the ownership of rural poultry shared among the family members was predominantly kept by the women (63%) and children (18%). All family members were providing labor to poultry production enterprise but more demand for time and labor was from women than that of men. Men and children mainly did construction of poultry sheds as women did cleaning, feeding and treatment of rural poultry. Most of the daily routine activities regarding poultry management were being performed by women and the children, whereas men were doing the cash requiring occasional jobs such as purchase of inputs and treatment of poultry using conventional drugs. Women dominated the access and control of food and gifts to guests while men dominated cash and cultural benefits arising from poultry. Decision-making by women in the rural poultry production system was limited to non-cash related decisions while cash related decisions were made mostly by men.

In Bangladesh, rural women were responsible in raising poultry and serving feed to the animals (Paul and Saadullah, 1991 and Chatterjee, 1988). Whereas, in India some other kinds of livestock management activities for females were cutting and bringing grass from fields and taking care of animals. Processing of milk was entirely performed by the rural female to produce the different products of milk. However, the marketing of these products was not controlled by them. As the animals are readily available cash was raised by the rural women. They were engaged in different husbandry practices from dawn to dusk every day. Women were involved more than 71% in milking. The women were responsible for barn cleaning, feeding animals ranged 25% to 28%, respectively (Pal, 2001). Several studies have reported that females in the rural area were performing activities like cutting and bringing grass from fields and taking care of animals (Sharma, 1980; Shaleesha and Stanley, 2000; Reddi, 2003; Harshipender and Gupta, 2006; Sharma et al., 2007; Anonymous, 2001; Damisa and Yohanna, 2007; Nnonyelu and Gadzama, 1991; GOM, 2000 and Diano, 2006).

In Afghanistan women often were involved in grazing of sheep and goat along with serving feed and water to the animals. Along with the livestock, women were also engaged in poultry

husbandry for egg and meat production. These livestock was not owned by those women who were involved in their production. Due to education level women were unable to get the services for their stocks (Grace, 2005).

3.3 Literature on Women's Participation in Livestock Management in Pakistan

Along with agriculture, women also make a significant contribution towards the rearing of livestock. Livestock production requires substantial amounts of time, labor and specialized activities in which women participate considerably alongside men. The intensive participation of women in livestock management activities is productive in the way that it saves money that would otherwise be spent in hiring labor. Milk and milk products not only meet the household consumption needs but are also income generating when sold in the market for cash. Livestock rearing substantially increases the work load of women who not only have to shoulder the daily burden of housework but also have to provide meal for all those working in the field.

Evidences form micro studies show that rural women undertake a wide range of agriculture related activities both in the field and at home but their role in rural economy has never been appreciated to its fuller extent. Livestock management is largely a woman's job. According to a few available time allocation studies, the estimated time spent by a woman on livestock related activities ranges from 3 to 5 hours per day (Hamdani, 2002). It is widely acknowledged that among all the livestock production and management, women perform the most of all (Tulachan & Karki, 2000).

In a study conducted by Hashmi, et al. (2007) in the rural areas of district T.T.Singh (Punjab), women have been found more conscious than that of men regarding animals' care. The probability of disease(s) to be found in animals was relatively lower and income generation was higher from the animals reared by women than that of managed by men. Highly significant results show positive impact of women's participation in the livestock management and thus in poverty alleviation.

Several studies has documented that women participate more in livestock related activities than that of crop production. In rural areas of Punjab, women are, in general, responsible for livestock rearing. It has been found that a rural woman in Punjab works about 15 hours a day

and spends about 5.30 hours in caring of livestock. These women carry out wide range of tasks such as feeding, collecting fodder, grazing, cleaning animals and their sheds, making dung cakes (securing them properly for use as fuel), collecting manure, milking, milk processing and even marketing of animal products (like butter, butter oil or ghee etc.). Rural women have been observed to be heavily engaged in almost all activities regarding livestock production with a few exceptions. Women are an ideal choice for entrusting the task of raising livestock as an individual enterprise. Adding one or two animals in the household assets yields significant economic gains without causing hardships in the shape of physical inputs. The main challenges faced by the women folk in rural areas include low literacy level; poor health and dietary conditions; burden of multiple roles; and the use of non compatible tools/technology for crop and livestock management. Experiences of Rural Support Programmes (RSPs) provide sufficient evidence that women can effectively be involved in livestock enterprise and it will help realize their potential and improve their socio-economic status (Hamdani, 2002).

In a study conducted in northern areas of Pakistan, Afridi, *et al* (2009) have found that on an average, a rural woman is spending 5 to 6 hours daily in different livestock management activities where 68% of that time is spent on the activities of milking, farmyard manure collection, stall feeding and fodder cutting. They calculated that a woman from a household with small sized farm spends maximum time in fodder cutting (64.8 minutes) and shed cleaning (43 minutes) while managing livestock. Regarding their participation in different livestock management activities, the highest percentage (98.76%) was counted in shed cleaning followed by farmyard manure collection (87.34%), stall feeding (87.05%), and watering/hauling (85.78%).

Jehan, (2000) states that women's participation rate is very high in different sub-sectors of rural economy. In livestock sector, their contribution is more visible than in crop production. A rural woman in Punjab spends about one fifth to over a quarter of their daily working hours in livestock related activities and the family male's input outweighs that of female's in only four out of fourteen livestock production related activities.

In Pakistan a large part of women's work related to the farm, poultry and animal husbandry practices is considered as part of their routine home work and their contribution is not considered as economically productive (Riaz, 1994). It was reported (PARC, 2004) that majority of the rural females were engaged in fodder cutting, milking the animals and its allied functions. Manure collection, maintenance of animal sheds and preparing dung cakes

were the special activities of rural women. Except grazing, women were involved in all animal husbandry activities from feeding, housing milking etc. However, the level of taking part diversified from one task to other. Women carried out certainly most of the caring activities of livestock. All the animal husbandry practices were considered the basic responsibility of rural women. The male took the herds to the pastures and brought them back to their sheds (Khushk and Hisbani, 2004 and Ranjha et al., 2009). In a few micro studies, the gendered division of labor in livestock production was studied in selected operations and out of total in only small number of livestock management activities male participation outnumbered that of females (Ishaq, 1995; Ijaz and Davidson, 1997; Farooq et al., 2007).

3.4 Gender Participation in Crop & Livestock Farming in Punjab

A comparative study, between both genders regarding their level of participation in different livestock management related activities, was conducted by Nosheen, et al., (2011) in Chakwal district (Rain-fed Punjab). It was found in the study that in livestock farming, more frequently carried out activities by females were concerning management of animals, while for men their maximum participation was seen in the activities relating to animal protection.

At a 3-point likert scale, women's participation level in production and management of crops and livestock was determined by Butt and Luqman (2012) in Bahawalpur (Southern Punjab; cotton producing region). They found that regarding production and management of crops women's participation was maximum in cotton-picking and was minimum in seed/fertilizer broadcasting. But regarding livestock production and management, respectively, women's participation was maximum and minimum in animal shed cleaning and grazing of animals.

In another comparative study, between husbands and wives regarding their contribution in different livestock management related activities, conducted in Muzaffargarh district of Punjab, Hassan, et al., (2007) found that as compared to husbands, majority of activities were well performed by wives. For husbands, fodder cutting and selling milk & milk products were found respectively, first and last order activities; whereas for wives, serving water to the animals and poultry raising were first order and selling milk & milk products were last order activities.

A study was designed by Javed, et al., (2006) to explore the extent of women's participation in crop and livestock production activities in Faisalabad (central Punjab; mixed cropping

zone). Regarding crop production, rural women's participation was found high in harvesting of vegetables and in storage of cereals. Among livestock and poultry management activities, rural women's involvement was maximum in cleaning of animal's sheds.

With a particular focus on women's role, in a study conducted by Amin, et al., (2009) examined the gendered participation in crop and vegetable production activities in central Punjab. With a remarkable contribution of wives (especially in seed cleaning and picking of vegetables), women's role was recorded significantly lower than their husbands in crop and vegetable production activities. The results (gender's role differentials) were attributed to social and cultural set up, economic resources, and were in line with the masculinity and femininity theories.

In Attock district (rain-fed; arid zone) of Punjab, Saghir, et al., (2005) investigated the involvement of rural women in crop production activities. They found that on their family farms, rural women were extensively involved in food production activities such as wheat and vegetable production, whereas maize and fruit production were least participated by women. They were also actively involved in food storage and security related activities such as cleaning of wheat for milling, cleaning of store rooms etc.

With the objective of recognizing the gender role regarding the post harvest activities in the targeted rural area, Amin, et al., (2009a) found that in Faisalabad district of Punjab, men were mostly involved in the activities related to take the crop to the market and mills, whereas, with their little participation in marketing activities, the women were significantly and highly involved in storage, preservation, and processing of agricultural produce. Gender's participation in post harvest activities was attributed to their occurrence in- and out-side the home boundary. Activities taking place out-side the home and involving power/traveling (like, transportation and marketing) were performed by the males (husband), while activities which could be carried out inside home were mostly women's (wives) job.

Ibraz (1993) found the distribution of activities in livestock-tending carried out exclusively, predominantly and jointly by both male and female genders in a village of Punjab. According to him—the activities of grazing and bathing animals are done exclusively by men while milking and selling livestock within or outside the village are predominantly males' activities—fodder chopping, preparation of cattle feed, and putting feed in manger are the activities performed jointly by male and female—fodder harvesting and milk or butter selling

are done predominantly by women—the rest of the activities, relating to livestock tending, are carried out exclusively by the hands of women.

Gender roles in the rain-fed agriculture of the Pothwar plateau (in districts of Rawalpindi, Attock, Jehlum) were highlighted by Taj, et al., (2007). Women participation in most of the activities of crop production and livestock management was found significant. However, their contribution was noted bit higher in livestock management activities as compared to crops related activities. In livestock management activities, only in grazing activity, males were contributing their maximum participation while in other activities (as compared to females) their role was either passive or supplementary.

Amin, et al., (2010) compared the participation of both gender in livestock production in central Punjab. According to the findings of their study, respectively, 37%, 17%, 9%, and 37% activities were performed by wives, husbands, both, and none of them. Cutting and carrying of fodder were the activities mostly performed by husband, whereas, other all activities were performed by women. They also noticed that more number of activities related to livestock production was being performed by (wives) as compared to men (husbands). However, the natures of activities performed by women were of soft nature and the activities performed by men were very hard and related to out of home tasks.

The extent of women's participation in agricultural (crop and animal) and household activities was investigated by Luqman, et. al. (2006) in Bahawalnagar district (in Southern Punjab; cotton-zone). They studied that amongst farming, livestock, and household related activities, women's participation was the highest in cotton picking, animals 'sheds cleaning, and in looking after the family members, respectively.

Tibbo, et. al., (2009) got sex disaggregated information on men's and women's participation in activities relating to crop and livestock, access to and control over agriculture-derived income, gender difference in decision making, in rural Punjab. They found that as compared to males, in general, females had greater involvement in livestock-related activities. Males were more involved in crop-related activities than females and had more access and control over agriculture-derived incomes and decision-making.

A study, conducted by Saghir, et al., (2005a) probe into the participation of rural women in livestock production activities in rural areas of district Attock. They found that amongst a list

of 13 livestock production related activities, 90% respondents were involved (as “always”) in fodder cutting, poultry raising, and milk processing activities, and above 87% were involved in activities of serving and mixing of fodder.

Bravo-Baumann (2000) states that gender and gender related aspects are often given lip-service by politicians and briefly noted in policy papers. Values, norms and moral codes embedded in culture and tradition have very strong influence on gender issues as they determine attitudes and the organizational set-up of the whole community system. Economic problems are often the result of poor gender relations. He is further of the view that even if income is not the only factor that determines the socio-economic position of women, it greatly influences their status and well-being. Increasing women's income through improved livestock production would, therefore, also increase their status.

3.5 Literature Review on Factors Affecting Women’s Participation in Livestock Management

Rural women in Punjab are taking part in almost every livestock management and production related activities. They work more than men. There are many socio-economic and cultural factors that are hindering them to utilize their full potential in this endeavor. The purpose of this section is to highlight those factors and to describe how significantly these factors are affecting women’s level of participation in livestock management activities. These factors are the determinants that can increase or decrease the probability of women’s participation in livestock management or in other words can affect women’s participation either positively or negatively.

Age of the Respondent: Aging is associated with a progressive decrement in various components of physical work capacity, including aerobic power and capacity, muscular strength and endurance, and the tolerance of thermal stress (Shephard, 1999). It has been observed that in the rural areas of Pakistan the women after the middle age are not in the good health condition (Azid, et al 2001).

Education: Existence of a relationship has been found between the level of education and women’s participation in extra- and intra-household activities by Alderman and Chishti (1991).

Marital Status: The marital status of a woman matters in determining her level of participation in the income generating activities. Social and economic status of the widowed women coupled with the family's headship status put them in a condition where they have to work hard to meet the subsistence needs of the family. It is evident from the previous many researches on poverty and women's vulnerabilities that the poor families or households with the female head are more likely to be economically vulnerable than male-headed households (Kishore and Gupta, 2009), because of having less education and availability of employment opportunities. In rural Pakistan, over the last two decades, 9 percent rural households are being headed by females and it is considered financially difficult for a woman to run a household alone (NIPS and Marco, 2008).

Health Status: Condition of health is an indicator of a person's working abilities and efficiencies. A woman with a condition of good health will be more energetic and will have comparative advantage in performing effort-intensive activities. For married women, child care and housework are the effort intensive and tiring activities, woman with these responsibilities would have less energy available for economic activities (Becker, 1985).

In rural areas of Pakistan, women have low educational, health, and nutritional status. A girl is treated by her parents as inferior to a boy; hence, as compared to boy, she has to face discrimination in education, food, and other facilities or necessities of life (Jehan, 2000). In rural Punjab, women were suffering from nutritional deficiency both in terms of quantity and quality. Fodder cutting, poultry raising and milk processing are the activities largely done by women but in spite of spending much of their time for animal care and management their diet remained protein deficit, hence they remain malnourished (Saghir, et al. 2005a). In another study, it was found that regarding caloric intake, the most malnourished aged groups were 15-29 years and 30-44 years, while the least deficient age group was 45-59 years. The diet of an overwhelming majority of respondents (72.34%) was protein (egg, milk, yogurt, and meat) deficient (Saghir, et al. 2005b).

Family Type: Familial system, that is, living in a joint or nucleus family has its own social impact on rural women's participation in work (Azid, et al 2001). In a study conducted by (Amin, et al., 2010) data regarding the family system revealed that in Punjab, most of the respondents were living in the joint family system (70.6%).

Family Composition (Dependency Ratio): In rural areas, the families with large sizes, increase women's responsibilities as housewives and mothers so affect and limit their number of hours' allocation to economic activities (Azid, et al 2001).

In Pakistan, officially working age is from 15 to 64 years. People between these ranges of age are potentially more active and efficient regarding their working abilities. They can better contribute and participate in the economic activities to serve their families and ultimately to serve the nation. Non-working age population comprises of the individuals having their ages below 15 and above 64 years. This part of population is physically and mentally not in a condition to serve their families and the nation as efficiently and actively as can do the working-age segment of the population.

Size of Landholding: It is not cost effective for smallholders to hire paid labor for agriculture. So, the smaller the size of the landholding, the more intense, active and efficient the role of the women becomes in order to make agriculture economically affordable (Habib, 2004).

Average Annual Income of the Family: Poverty stricken families often require the contribution of women to keep the family out from a state of utter poverty. As a result, women from poorer households tend to play a greater role in livestock production than women from relatively well off families (Shafiq, 2008).

Purdah: Observing Purdah (veil) is also amongst the factors that have their own social impact on women's participation in work (Azid, et al 2001). Purdah is not just the hiding of body and face from the unknown males rather it can have many forms like, not facing, talking with, or seeing at an unknown male is also purdah.

Level of Participation in Decision Making in Family Matters: In the patriarchal family system, men are mostly involved in formal economic and social affairs and decision making processes in the community and their family. However, in Punjab province of Pakistan women have significant role in the decision making process regarding family affairs, farm and livestock management activities (Tibbo, et al. 2009).

Husband's Consultation in Decision Making in Livestock Management Related Matters: According to a study conducted by Arshad, et. al., (2010) it was found that about 56% of the respondents were in favor that their family heads should give them the right in decision

making. However, about 66% of the respondents were satisfied with their existing involvement in decision making. Ranking order of the identified factors affecting the respondents' participation in decision-making process related to livestock management, from top to down were: rural women's age, male dominance, traditional belief system, misinterpretation of religious teachings, cultural norms, resistance from family members, control over resources, rural women's education, and lack of awareness about their social rights.

Herd Size: As it is evident from the work of Afridi, et al (2009) that while managing small, medium and large sized herd, women's time allocations toward livestock management activities were 2.76 hours, 4.12 hours and 3.23 hours respectively.

Cultural settings: Jehan (2000) is of the view that women's participation rate in agriculture is very high in rural areas and due to strong cultural norms they work predominantly on their own land holdings. The cultural norms in the conservative societies of the two countries (Pakistan and Afghanistan), particularly in Afghanistan, do not allow women to move out of their home without their guardian, limiting hired agricultural jobs for women (Tibbo, et al., 2009). Women are mostly responsible for animals kept at the homestead (Bravo-Baumann, 2000).

3.6 Synthesis of Reviewed Literature

Women's status, women's empowerment, gender equality, and women's autonomy are considered as the related terms. The concept of women's status is multidimensional and context specific in nature. There is no universally approved way of measuring the status of women. In different study settings, different aspects of women's status have been used however, the dimensions or aspects, like women's mobility, their role in the decision making, gender relations between husband and wife, and their access to economic resources remained the most commonly used dimensions of women's status. Different socio economic, demographic, geographic and other factors have relationship with different aspects of women's status.

A woman's decision making ability and her education are found significantly associated. With an increase in the conjugal age, gender relations between husband and wife improve by having better understanding of each other and by developing closer interaction with each

other. A relatively tight control of husbands over their young wives restricts their freedom of choices. Enhanced women's employment status has been proposed as the basic factor in reducing gender inequality and in promoting women's autonomy.

In prevailing culture of Pakistan without proper cooperation of husband, it is difficult for a woman to achieve desired status in the family. Husband's cordial relation with and provision of freedom of expression to her wife have been seen as relating to greater women's empowerment status. Presence of in-laws in a family lowers the level of married women's autonomy. In joint families most of the decisions are made by older family members; income is usually shared by numerous individuals; and for a young woman a lot of restrictions are there that hinder their mobility, control over income, and participation in decision making.

Exposure to media has significant influence on women's awareness status. Women from richer families gain better education, media exposure, and control over resources; whereas, women from lower socio-economic status have fewer such opportunities to enhance knowledge, skill and resources that could provide them confidence and self esteem. Landless and marginalized women had little power to identify gender based discrimination than the women of richer household. In the cultural context of Pakistan, there exist two types of women's mobility: accompanied and unaccompanied. Women of different classes, that is, the poor and the rich, are differently influenced by these types of mobility. For a poor woman, higher unaccompanied mobility is associated with a loss of prestige and susceptibility to sexual violence whereas, for a richer woman, such mobility neither constitutes a legitimate target for male exploitation, nor it leads to a loss of status (prestige) on the part of their families.

Purdah is considered as a cultural constraint that causes social, economic and physical seclusion of women and also called a reason for women's backwardness. It has been observed that as compared to those women who observe purdah, women without observing purdah have greater freedom of movement and job opportunities. Purdah restricts most of the women to their home, segregates them from the outside world, and hence reduces the chances of women's links with market and their income generating opportunities. The practice of purdah is common among the newly married women from higher castes and rich families as well as in families where sexual purity is highly valued.

Context or locality explains variation in women autonomy, in terms of decision-making, mobility, freedom from threatening relations with husband, and access to and control over economic resources. Women's position in the household has shown significant difference with respect to locality. Socio-cultural set up of the region also determines women's status. It has been largely considered that women empowerment is the property of socio-cultural system and women's decision making authority has been correlated with their locality (rural/urban context).

Pakistan is mostly generalized and assumed as a homogeneous country, such an assumption may lead to the homogeneous treatment of the whole society and the women folk as well. At various geographical (regional, sub-regional, community) levels and in terms of personal traits, rural women in Pakistan have heterogeneous status.

Gender is a central organizing principle of societies. Gender analysis defines the socio-economic and evolving roles and functions of men and women as they relate to and complement each other within a specific socio-cultural and economic context. Gender issues focus on the relationship between men and women, their roles, access to and control over resources, and division of labor and needs. Gender relations determine well-being of the family and many other aspects of life. Economic problems are often the result of poor gender relations. In most farming systems, there is a gendered division of labor. Generally, women have an important role in the production, processing, preservation, preparation and sale of staple crops. Men tend to focus on market-oriented or cash crop production. A division of labor exists in livestock management practices, women and children often look after the smaller livestock species and men are often in charge of cattle. The division of household labor varies according to culturally based constructions of gender rather than on the basis of biological sexes. Different theoretical approaches have also been adopted to predict the division of family work.

An existence of differences in the livestock production by male producers and female producers signifies the importance of gender consideration in livestock production. This paragraph presents some of the gender related aspects in livestock production. With increasing migration and off-farm work by men, the workload of women becomes greater as they become involved in activities carried out by men before. Also in situations of war, women often take over the work traditionally handled by men. Patterns of gender division of labor are location-specific and change over time. Although the most typical pattern of gender

division of labor is that women are responsible for animals kept at the homestead, there are many variations to this pattern from non-involvement in livestock to the management and herding of large stock. In general, women tend to spend the money they earn from livestock activities on the welfare of their families. In many societies, the little income derived from daily milk sales is sometimes used by men for drinking. Due to differences in men's and women's use of income, increases in men's earnings from livestock-related activities may not be necessarily translated into improved household nutrition, where as women tend to first increase household well-being. In a general rule, men have easier access to government provided credit than women. Women are rarely considered creditworthy because they have no collateral. In addition, they often cannot read and write, and are not used to frequent governmental or official institutions without their husbands consent and being accompanied. In livestock production as compared to women, men have easier and greater access to technology and training. In most countries, research and planning activities in the livestock sector are largely dominated by men. Official livestock services, extension programs, and educational materials are mainly controlled, designed, and extended by and oriented towards men. At present, in many societies, women's access to information and training in modern livestock management and dairying continues to be limited and even indirect.

Because of these above-mentioned tendencies, it is important for us to recognize that gender considerations in agriculture and livestock management always need to take into account both men's and women's roles, responsibilities, interests and needs. Furthermore, within these two groups, we need to be aware of other differences that need to be taken into consideration: those of age, ethnicity and social status. Failure to consider these differences, between men and women, leads to unsuccessful project activities. It may also lead to the marginalization of a major sector of society and a large part of the agricultural workforce. Thus, understanding gender relationships, and adjusting methods and messages, is crucial for the full participation of all sectors of the community.

All family members, that is, women, men and children involve and providing labor to livestock production enterprise but more demand for time and labor comes from women than from the men. Generally men tend to participate more in managing large animals, such as cattle and buffaloes related groups, because these are perceived as the prestigious animals in the society, whereas women's high level of participation is more likely in the production and management of small ruminants, like goat, sheep, and poultry. Women are generally

supposed to work in most of the non-cashable livestock activities, like feeding animals, cleaning their sheds, and treating & caring the sick and young animals, whereas men's involvement, in general, is more in the cashable livestock activities, such as purchase of inputs, milking of the animals, selling of the milk, and selling of the animals. Men and children mainly do the activities considered hard or tough to perform, like fodder cutting, transporting fodder, and bathing the animals etc. Most of the daily routines activities regarding livestock management are performed by women. Women dominate the access and control of food and gifts to guests while men dominate cash and cultural benefits arising from livestock. Decision-making by women in the rural livestock production system is limited to non-cash related decisions while cash related decisions are made mostly by men.

In rural areas of Punjab women are, in general, responsible for livestock rearing. Rural women have been observed to be heavily engaged in almost all activities regarding livestock production with a few exceptions and they are an ideal choice for entrusting the task of raising livestock as an individual enterprise. Generally male are seen contributing their maximum participation only in particular and small number of activities, whereas, other all activities are performed by women. Except the activities, like grazing of animals, cutting and carrying of fodder, selling animals and their products, male's role as compared to females is either passive or supplementary. In livestock farming, women's participation is the highest in cleaning the animals 'sheds, collecting the dung, serving the fodder and water to the animals, poultry raising, milk processing, and caring the young stock. Hence, more number of activities related to livestock production is being performed by women as compared to men. However, the natures of activities performed by women are usually of soft nature and the activities performed by men are generally very hard and related to out of home tasks.

Gender's participation in livestock management and production related activities can be attributed to their occurrence in- and out-side the home boundary. Activities taking place outside the home and involving power/travelling (like, transportation and marketing) are performed by the males (husband), while activities which could be carried out inside home are mostly women's (wives) job. The gender's role differentials follow the masculinity and femininity theories and can be attributed to socio-cultural set up and economic resources. With slight variations, different agro climatic zones of Punjab show almost the similar trends in terms of gendered participation in livestock management activities. By their nature, the

causes of the observed variations seem more the socio economic or cultural than the climatic and it is widely acknowledged that livestock management is largely a woman's job.

Concerning livestock development, there is a high level of agreement in the literature that socio-economic structure, institutional framework, and cultural norms play an important role in determining the division of labor. The intra-household division of labor depends on household labor availability, the number and type of livestock, economic development of the household and estimated income out of the new activity. In livestock economy, the allocation of labor is included in the resource management and the markets play a role in the allocation of labor resources. Increasing the competition of female labor between the household activities, management of her own enterprises, household reproductive chores, working off farm activities, and others may increase the use of child labor as a strategy to address female's constraints.

The probability of income generation has been found higher from the animals reared by women than that of managed by men. Evidences suggest positive impact of women's participation in the livestock management on their family's improved socio economic status and thus in poverty alleviation. Success stories from rural development programs provide sufficient evidence that women can effectively be involved in livestock enterprise and it will help realize their potential and improve their socio-economic status. Engaging poor rural women into improved livestock production would increase women's income and thus will provide them economic autonomy resulting into their greater role in the household decision making. Disposable income in the hands of women mostly spent on the welfare of their children or families. Even if income is not the only factor that determines the socio-economic position of women, it greatly influences their status and well-being.

As identified in a previously conducted study, the ranking order of the factors affecting the women s' participation in decision-making process related to livestock management, from top to down were: rural women's age, male dominance, traditional belief system, misinterpretation of religious teachings, cultural norms, resistance from family members, control over resources, rural women's education, and lack of awareness about their social rights. Aging is associated with a progressive decrease in the physical work capacity of a person. In the rural areas of Pakistan, usually a woman after her middle age is not in the good health condition. There has been also found a relationship between women's level of education and their participation in extra- and intra-household activities. Social and economic

status of the widowed women coupled with the family's headship status put them in a condition where they have to work hard to meet the subsistence needs of the family. Condition of health is another indicator of a person's working abilities and efficiencies. A woman with a condition of good health will be more energetic and will have comparative advantage in performing effort-intensive activities. Child care and housework are the effort intensive and tiring activities, woman with these responsibilities would have less energy available for economic activities. Familial system, that is, living in a joint or nucleus family has its own social impact on rural women's participation in work. In rural areas, the families with large sizes, increase women's responsibilities as housewives and mothers so affect and limit their number of hours' allocation to economic activities. It is not cost effective for smallholders to hire paid labor for agriculture. So, the smaller the size of the landholding, the more intense, active and efficient the role of the women becomes in order to make agriculture economically affordable. Poverty stricken families often require the contribution of women to keep the family out from a state of utter poverty. As a result, women from poorer households tend to play a greater role in livestock production than women from relatively well off families. Observing veil (*purdah*) is also amongst the factors that have their own social impact on women's participation in work. For managing small, medium and large sized herd, a woman's time allocations toward livestock management activities will respectively increase. So, herd size matters in determining women's level of participation in livestock management activities. Women's participation rate in agriculture is very high in rural areas and due to strong cultural norms they work predominantly on their own land holdings. The cultural norms in the conservative societies do not allow women to move out of their home without their guardian, hence limiting their potential to participate efficiently. So, women are mostly responsible for animals kept at the homestead. So these are all the factors that can have a potential to influence our respondent rural women's level of participation in the activities relating to the livestock management.

3.7 Research Questions

The conducted research tries to answer the following research questions:

What is the role and status of women engaged in livestock management in rural Punjab? With what capacity and potential women participate, i.e., their level of participation in different livestock related activities. How these activities are shared with other family members

especially with males; what is the general pattern of division of work and time allocation to a list of activities performed in a day? How does participation of women contribute to their families' welfare? What are the constraints that prevent women from fulfilling their potential in livestock management and production?

3.8 Objectives of the Study

The following are the objectives of the current study:

1. To identify the socio-economic status of rural women engaged in livestock management activities (chapter 5).
2. To estimate the extent and nature of women's participation in the activities concerning the management and production of livestock (chapter 6).
3. To determine the impact of women's participation in livestock management on families' welfare status (chapter 7).
4. To analyze the factors affecting participation of rural women in livestock management and production activities (chapter 8).
5. To design some framework as policy input to make the role of women dynamic. "Lessons learnt in undertaking gender-sensitive research in such challenging cultural settings and man-made problems would be an asset in setting-up important action research for development benefiting the poor women and their families in other parts of the developing world" (Tibbo, *et al.* 2009).

3.9 Research Hypotheses

Keeping in view the research objectives, the study intends to testify the following sets of hypotheses.

Hypotheses tested in chapter 5 are:

1. Majority of rural women have their health status as average or below the average
2. In rural settings of Punjab, gender relations are not good
3. Rural women have restricted freedom of mobility
4. Rural women are least aware of the world outside their villages

Hypotheses tested in chapter 6 are:

1. In each kind of livestock management activity, women's participation outnumbers that of men's participation
2. Women are generally not consulted while making decisions on the matters relating to livestock management
3. Participation of family labor in livestock management lowers women's level of participation

Hypotheses tested in chapter 7 are:

1. There exists an association between women's level of participation in livestock management activities and the annual income earned from animals
2. There exists an association between women's level of participation in livestock management activities and the availability of milk for family's consumption
3. There exists an association between women's level of participation in livestock management activities and the availability/utilization of bio-fuel (dung cakes) for domestic consumption

3.10 Diagrammatic Plan of the Study

A plan about the study (figure 4 to 8) determining the *what*, *how*, and *where* of the research is presented in the coming pages in the form of diagrams.

Methodology

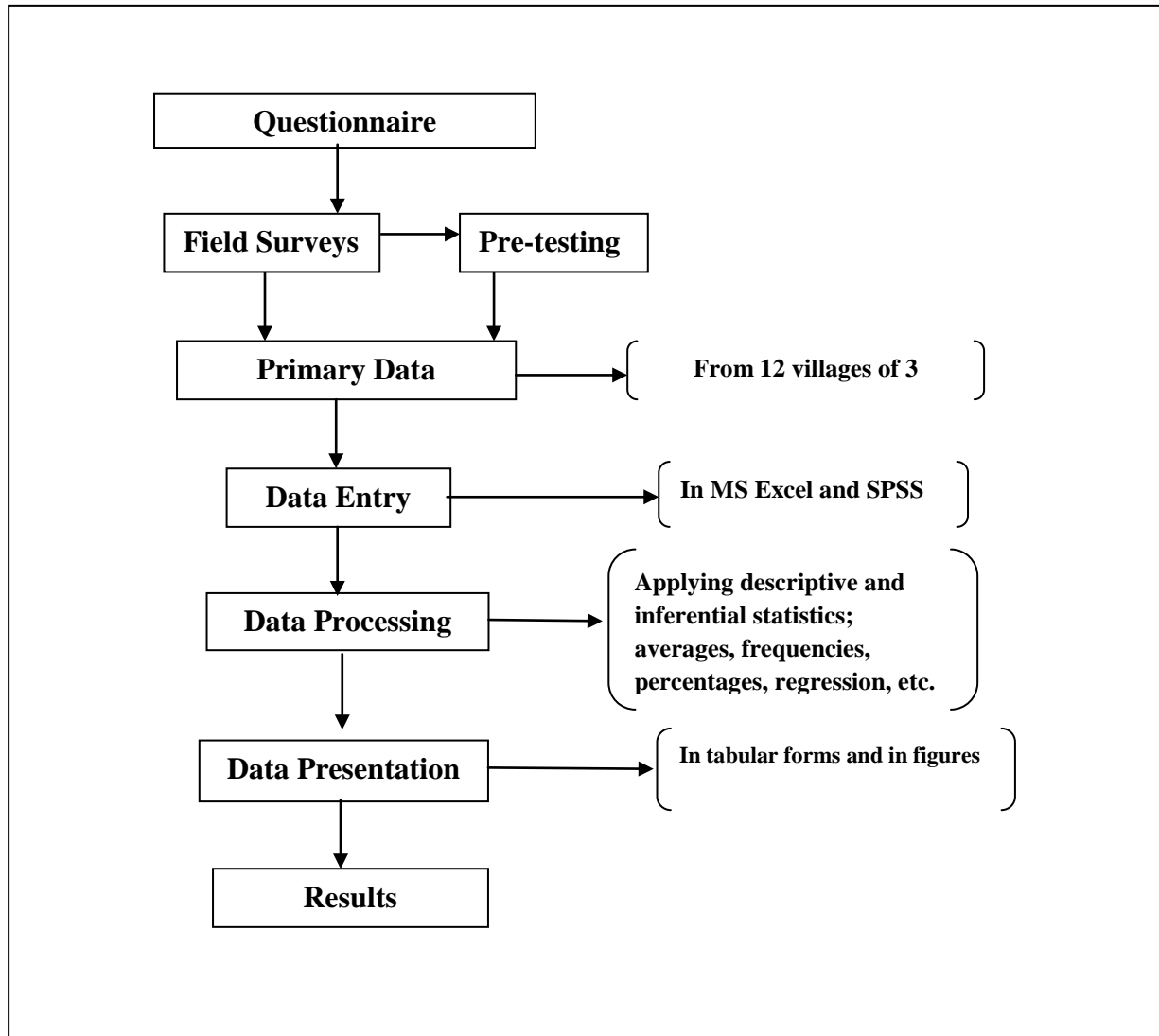


Figure 4: Methodology: Data from Collection to the final presentation

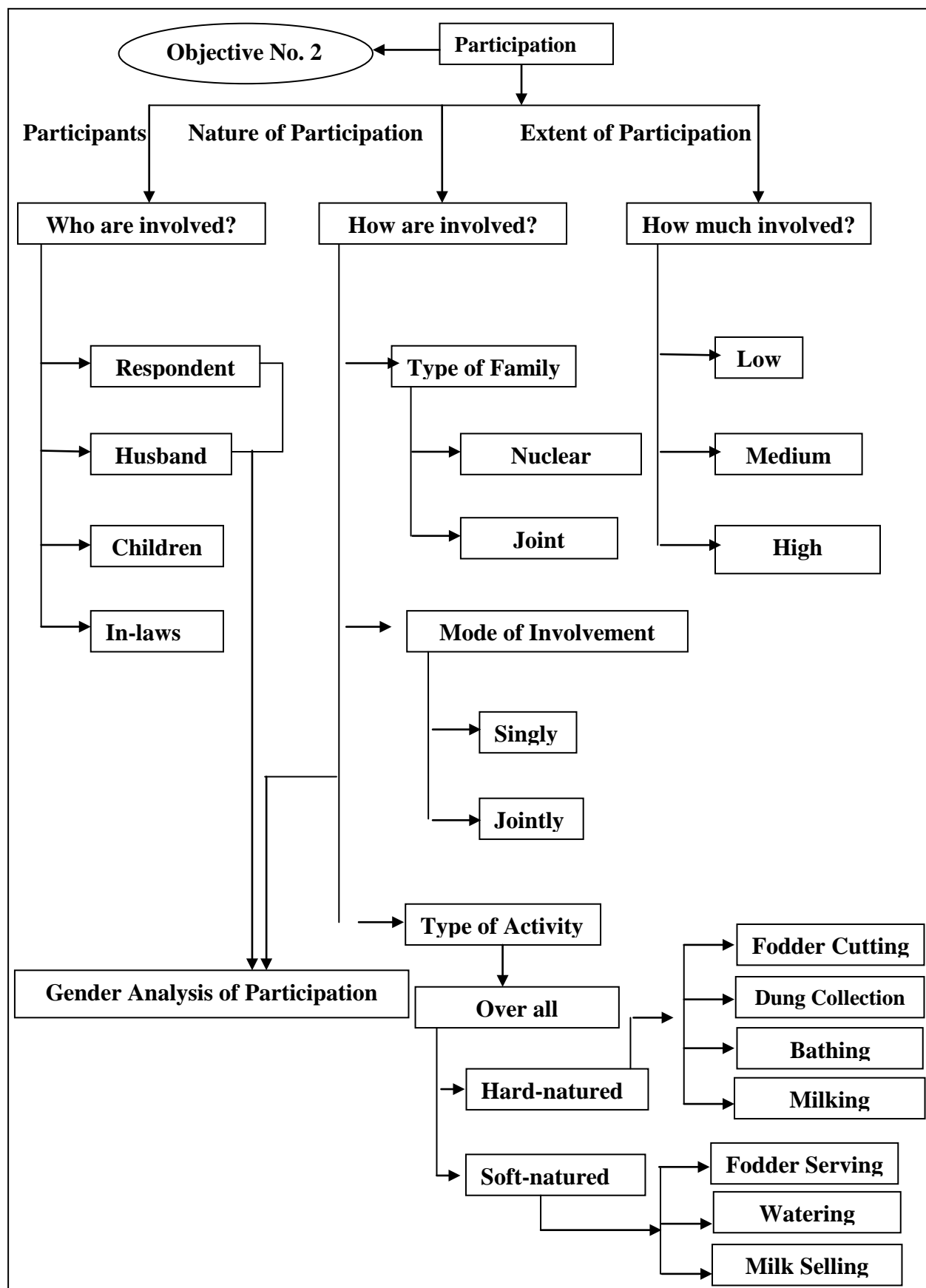


Figure 5: Family labour, Gender roles, and participation types

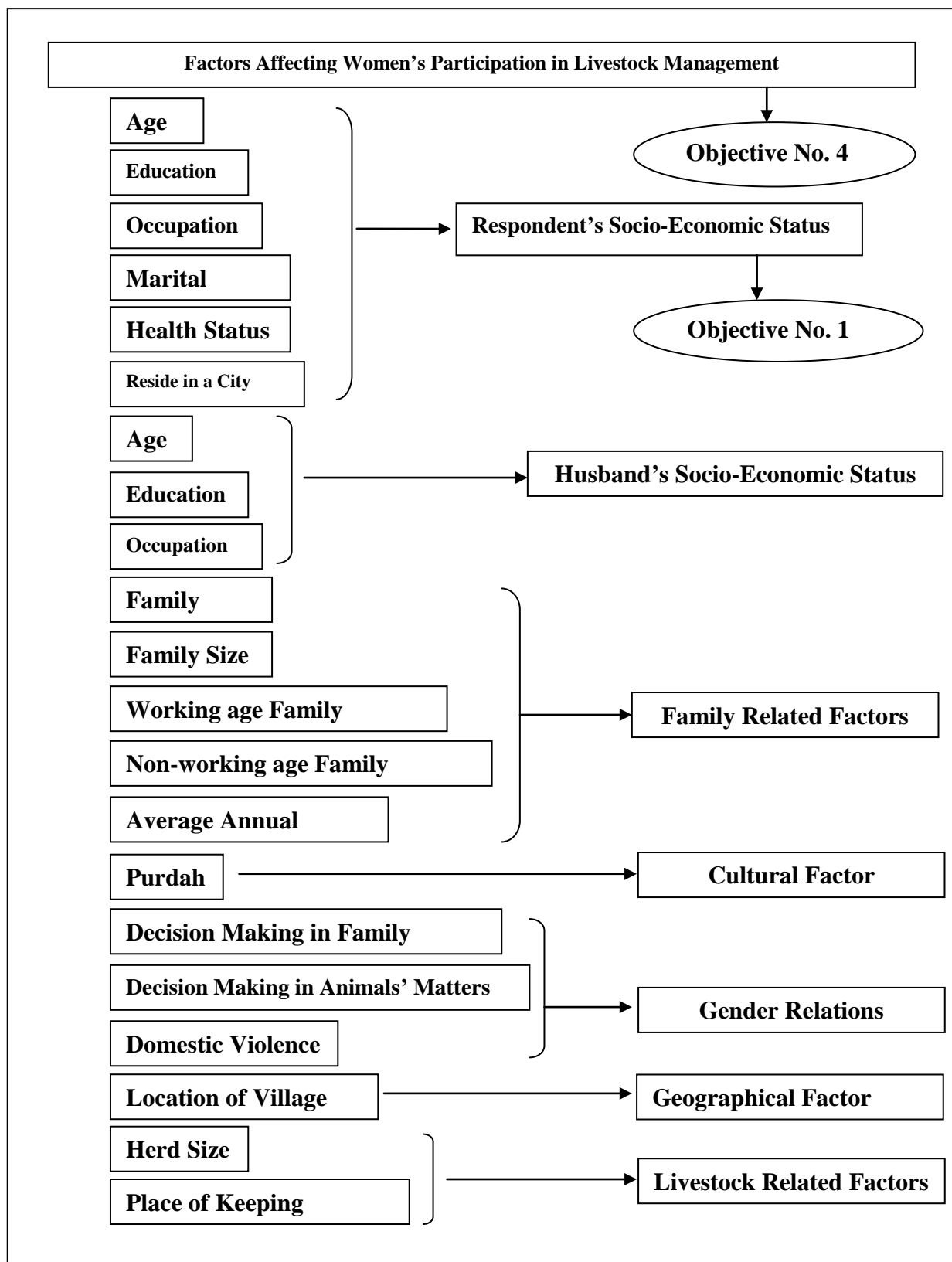
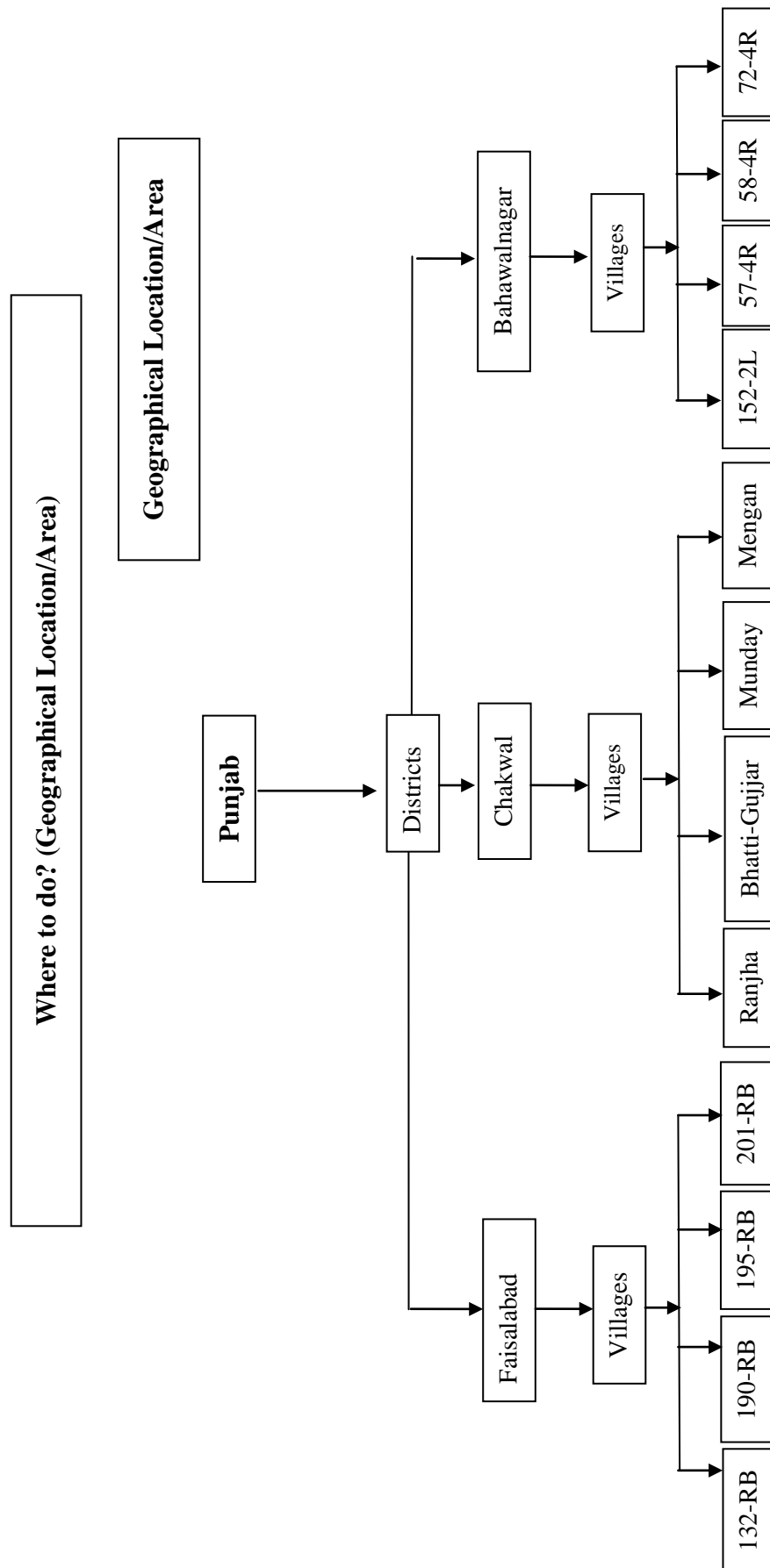


Figure 6: Factors Affecting Women's Participation in livestock management

Figure 7: Geographical Location/Areas



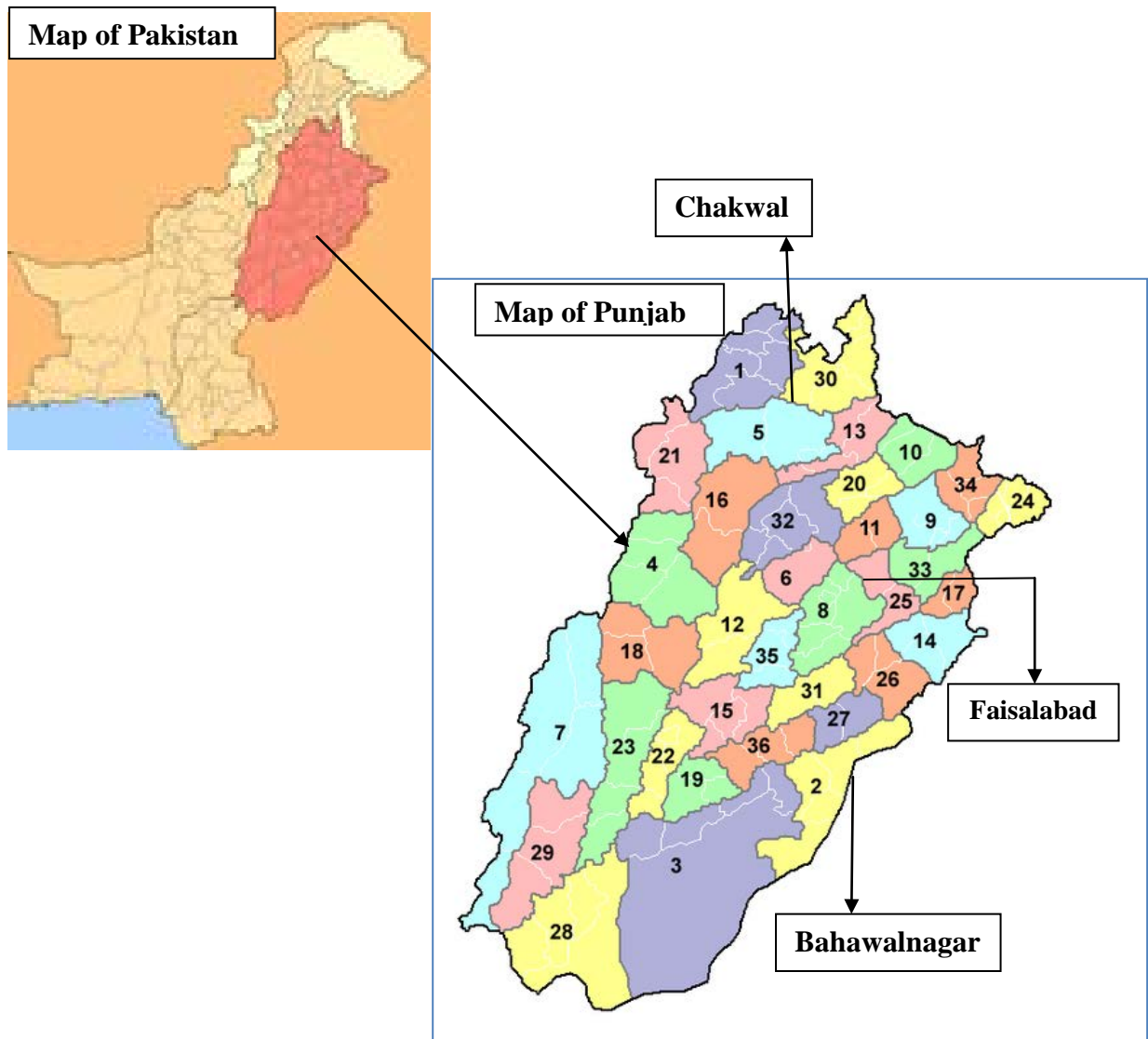


Figure 8: Concerned Geographical Area's map

CHAPTER 4

REVIEWING THE METHODS AND RESEARCH PROTOCOLS

This chapter provides information about sampled area, sampling, sample size, and data collection procedure etc. It also presents the conceptualization of the theoretical framework of the study, gives details of the research analyses, and the mathematical presentation of the models used in the study.

4.1 About the Data

This section provides information regarding data. Here we determine how the information was collected, from where and whom. The diagrammatic plan of sampling (size and distribution is evident from figures 9 and 10.

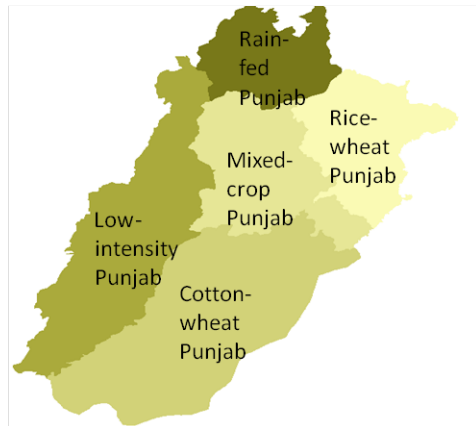
4.1.1 Area and Sample Selection

For the present study, the data was collected from three districts of Punjab province. These districts have diverse geographic locations, characteristics, and were randomly selected. From each district, four villages were selected randomly. The criterion of selection of the villages was their distances from the main cities. From each village, a sample of 30 respondents was selected. Our respondents were married females who were keeping animals and engaged in at least one of the livestock management related activities. Selected respondents were interviewed for about 40 minutes each. The data were collected and used to draw the valid information on different pre-determined parameters and objectives of the study.

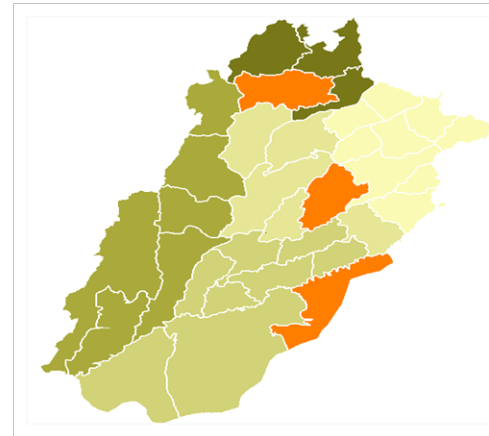
4.1.2 Sampling Procedure

A multi-stage sampling procedure, comprising of three stages/steps was adopted to collect the information from the respondents. At first stage, a total sample of 360 respondents was allocated to 3 districts of Punjab and it was decided to take an equal number of, that is, 120 respondents from each district. At second stage, in each district, the allocated sample of 120 respondents was decided to collect from 4 villages (2 villages located near to the city and 2 villages located far away from the city), thus an equal number of, that is, 30 respondents were

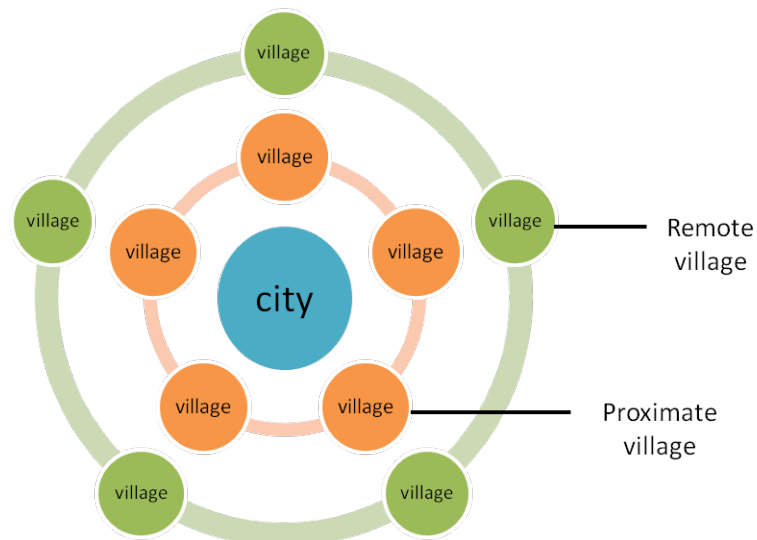
chosen from each selected village in the district. In the final stage, at village level, only those female respondents were interviewed who were married and were participating in at least one activity relating to the management and production of livestock.



Punjab: the region



Agro-climatic zones & Districts : the sub-regions



Villages at distant locations from the city

Figure 9: Multi-stage sampling at three geographical levels

4.1.3 Data Collection Procedure

Data collection process comprised of making field visits in the selected villages and filling a questionnaire---prepared to record information on our required variables from the targeted

respondents by interviewing them at their homes. The surveys and interview schedules in three districts (geographical regions) provided the valuable and necessary inputs to our study.

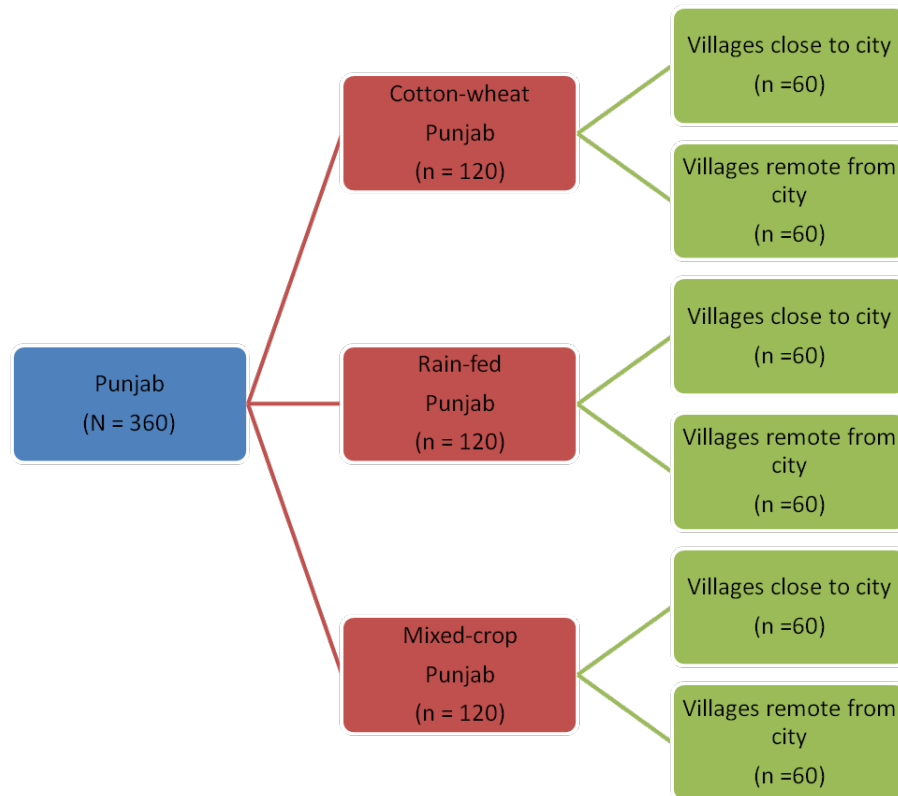


Figure 10: Sample size allocated to each of the geographical level

4.2 Conceptualization of the Theoretical Framework

4.2.1 Description of Livestock Management Activities

In our study/survey, we collected information on seven different kinds of activities regarding livestock production and management, in which mostly women participate. Those activities were fodder cutting, fodder serving, serving water to the animals, collecting dung, bathing animals, milking of animals, and selling milk (figure 11).

Fodder cutting denotes to the activity of harvesting or mowing grass or plants grown for hay or forage to serve the animals as their feed. Fodder cutting is usually done manually by using the hand tools, like sickle, spade etc.

The activity of fodder serving denotes to provide the animals with chopped fodder in their mangers or feed containers.

The activity of water serving refers to providing drinking water to the animals. It can be done either by serving them water at their living place or by leading them to the drinking water source, for example, to a pond, canal, or water channel.

Dung collection is an activity of accumulating the excrement of animals and cleaning their living place. Animals' fecal matters are collected either to make farmyard manure to apply into the agricultural fields as organic fertilizer or to make dung-cakes to use as fuel in order to lower the household expenditures on energy. This activity is done manually and/or by using hand implements.



FODDER CUTTING



FODDER SERVING



WATER SERVING



DUNG COLLECTION



BATHING



MILKING



MILK SELLING

Figure 11: Women's participation in different livestock management related activities

Bathing—refers to the act of cleaning of animals by washing their bodies. That was done either by carrying the animals to the water sources, like, pond, canal, water channel etc. and washing their bodies there or by bathing them at the places where they were kept.

Milking—this activity represents the manual drawing out or extracting milk from the teats/udder of a dairy animal (a female mammal), like, cow, buffalo, goat, or sheep.

Milk selling is an activity or method of delivering milk to a buyer, in exchange for money, as one's business or livelihood. In our sampled data, some families were not selling the milk,

while a large majority of the families was selling the milk either in the village or to the milkman.

Fodder cutting, dung collection, bathing, and milking of the animals are considered as the activities relatively hard in nature. Activities like, fodder serving, water serving, and milk selling are considered as relatively soft in nature.

4.2.2 Measuring Women's Level of Participation in Livestock Management Activities

In order to gauge women's level of participation in those activities, we classified the participation levels as low, and high. Women's levels of participation are evident from the figure 12 below.

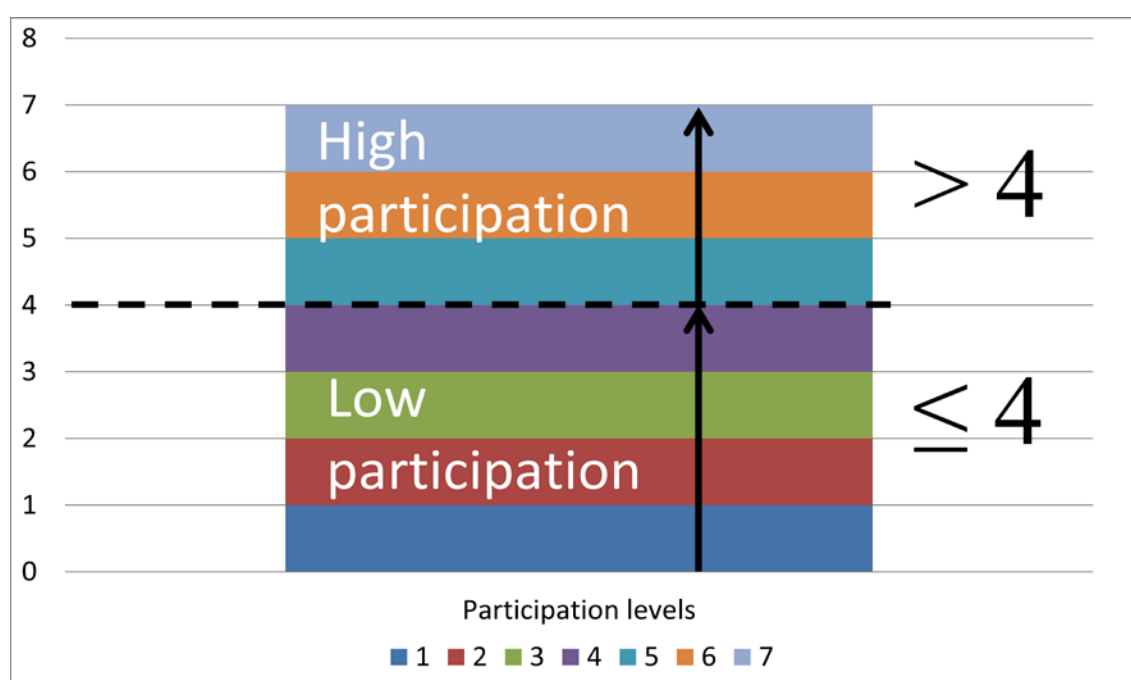


Figure 12: Women's level of participation in livestock management activities

Low Participation Level: The level of participation of a woman is considered low if she is performing up to four livestock management activities.

High Participation Level: Level of participation is regarded as high if she is undertaking more than four livestock management related activities.

4.2.3 Family labor involved in livestock management activities

The categories of family labor involved in livestock management activities (figure 13) are:

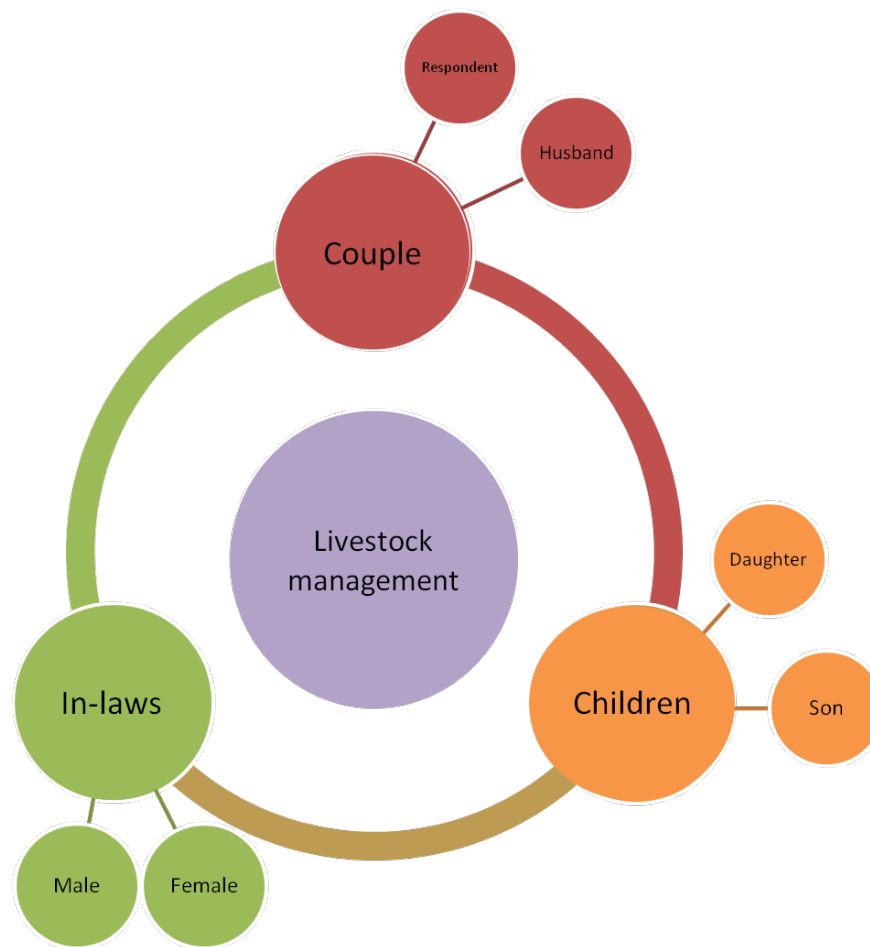


Figure 13: Family labour involved in livestock management activities

Couple: It includes respondent woman and her husband.

Children: It denotes to the male (son) and female (daughter) children of the respondent.

In laws: This category imply towards parents (her mother in-law, father in-law) and other relatives (her sister in-law, brother in-law, daughter in-law) of our respondent's husband.

4.2.4 Typology of Participation

The different types of participations we are going to use here are;

Qualitative Participation: It is concerned to take into account the type or nature of activities undertaken by the participants.

Quantitative Participation: It focuses on the extent or level of participation of the participants in terms of number of activities undertaken.

Gender-based Participation: Under this type of participation, we are going to know that what percentages of total activities were performed by females and males separately, and by both of them jointly.

Mode of Involvement based Participation: Mode of involvement in an activity implies toward an activity carried out either by a single person or by two persons.

Family Structure based Participation: This type of participation can be defined in terms of the relatives of a nuclear family which include husband, wife, and their children. And the relatives of a joint family are mainly (regarding our study) respondents' in-laws.

Non-physical Participation: This can also be called mental participation. In this type of participation, we are going to consider the participation of our respondent women in the decision making regarding different matters relating to livestock management.

4.2.5 Measuring various aspects of women's status

Various aspects of women's status are treated separately as dependent variables determined by a combination of individual-, household-level, and spatial factors. In the South Asian context, it would seem to be important to measure women's mobility, their access to resources, their access to paid employment, and most importantly, their ability to make decisions within the household and those concerning critical aspects of their life (Sathar and Kazi, 2000). Some crucial aspects of women's status considered in the study include health status, gender relations, mobility-, and awareness-status. These statuses are compiled as sums of scores of the constituent elements on each (aspect) of the status. The various aspects of women's status along with their constituents, and score assigned to each constituent are given below (figure 14):

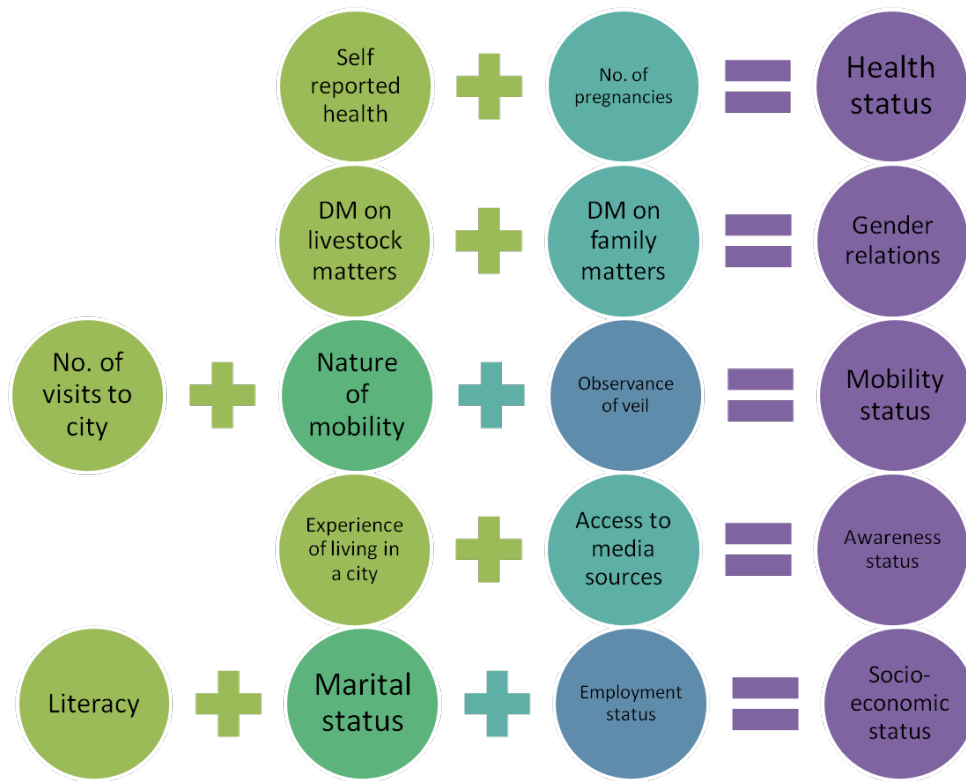


Figure 14: Various aspects of women's status and their constituents

I Health Status: This aspect carries score from one to seven and comprises of the following elements:

Overall health condition (Poor = 0, Average = 1, Good = 2, Very good = 3)

Number of pregnancies (Above 6 = 0, 5 to 6 =1, 3 to 4 = 2, 0 to 2 =3)

II Gender Relations: The score on this aspect varies from one to five and it consists of the following components:

Participation in the decision making on livestock management related matters (Never = 0, Sometime = 1, Often = 2, Always = 3)

Participation in the decision making on family related matters (Yes = 1, No = 0)

III. Mobility Status: Starting from one, this aspect reaches up to five as a maximum score point. Constituents of this aspect are given below:

Number of visits made to the nearest city in a month (Less than 1 = 0, 1 to 2 = 1, 3 to 5 = 2, above 5 = 3)

Nature of mobility (Accompanied = 0, Unaccompanied = 1)

Observance of Purdah (Yes = 0, No = 1)

IV. Awareness Status: For this aspect of women's status, the score point scale varies from one to three. Basic ingredients of this aspect are:

Experience of living in a city (No = 0, Yes = 1)

Access to the mass media (No = 0, Yes = 1)

V. Socio Economic Status: this aspect of women's status comprises of score points from one to four. Main constituents of this aspect are:

Literacy (Illiterate = 0, Literate = 1)

Marital Status (Widow = 0, Married = 1)

Employment Status (Not doing job = 0, Doing job = 1)

4.3 Research Analyses

For this study, we have made the following analyses: preliminary, factor, and regression analyses.

4.3.1 Preliminary Analysis

This type of analysis comprises of descriptive(s) analysis (Percentages, Averages). Descriptive analysis was used to summarize the profile of the respondents and information related to women's participation in livestock management. It comprised of the frequency distributions and percentages of the socio-economic and demographic variables relating to the respondent, her husband, and her family. The calculations for determining averages and percentages are given below.

p % of a number $N = N \times \left(\frac{p}{100}\right)$, where p and N are numbers

Arithmetic mean A for n number of observations $[a_1, a_2, a_3, \dots \dots \dots a_n]$ will be

mathematically as: $A \frac{1}{n} \sum_{i=1}^n a_i$, where $\sum_{i=1}^n a_i$ is the sum of all observations

4.3.2 Factor Analysis

Factor analysis (as used by Coulibaly-Lingani, et al., 2011) was employed to identify latent dimensions underlying indicators that measured women's participation (Table 1). This statistical approach involves finding a way to condense information about a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information. Each factor is interpreted according to its loadings, i.e. the strength of the correlations between the factor and the original variables. Creating a small set of factors can reveal latent patterns of relationships among the variables. In this respect, a factor can be regarded as a single (unobserved) variable that reflects the variations in a set of variables with high loadings. Principal Component Analysis (PCA) was used to extract factors using Varimax rotation to ensure that the extracted factors were independent and unrelated to each other, and to maximize the loading on each variable and to minimize the loading on other factors (Coulibaly-Lingani, et al., 2011).

4.3.3 Regression Analyses

I Multiple Linear Regression Analysis

Multiple linear regression analysis (as used by Coulibaly-Lingani, et al., 2011) was performed to evaluate the associations between participation indicators and respondents' socioeconomic and demographic characteristics. To estimate the subject score for each factor, the Anderson-Rubin approach (Tabachnick and Fidell, 1996) was applied. This is a method for estimating factor score coefficients, which ensures orthogonality of the estimated factors. The following exemplary model was developed using Ordinary Least Squares (OLS) regression whereas the detailed description of the regression models used is given in the chapter 8.

Let,

$$Factor_i = \beta_0 + \beta_1(X_1) + \beta_2(X_2) + \beta_3(X_3) + \beta_4(X_4) + \beta_5(X_5) + \beta_6(X_6) + \beta_7(X_7) + \beta_8(X_8) + \varepsilon$$

..... Eq. (1)

Where $Factor_i$ are the factors found from factor analysis, β_i is the coefficient of the socio-economic and demographic variables, and ε is the error term. SPSS software version 20 was used for all statistical analyses.

4.4 Measures of Poverty

The *poverty manual* of World Bank Institute (2005) explains the following measures of poverty.

4.4.1 Headcount index

By far the most widely-used measure is the *headcount index*, which simply measures the proportion of the population that is counted as poor, often denoted by P_0 . Formally,

$$\mathbb{P}P_0 = \frac{N_P}{N}$$

where N_P is the number of poor and N is the total population (or sample). If 60 people are poor in a survey that samples 300 people, then $P_0 = 60/300 = 0.2 = 20\%$. For reasons that will be clearer below, it is often helpful to rewrite (4.1) as

$$\mathbb{P}P_0 = \frac{1}{N} \sum_{i=1}^N I(y_i < z)$$

Here, $I(\cdot)$ is an indicator function that takes on a value of 1 if the bracketed expression is true, and 0 otherwise. So if expenditure (y_i) is less than the poverty line (z), then $I(\cdot)$ equals to 1 and the household would be counted as poor. N_P is the total number of the poor.

4.4.2 Poverty gap index

A moderately popular measure of poverty is the *poverty gap index*, which adds up the extent to which individuals on average fall below the poverty line, and expresses it as a percentage of the poverty line. More specifically, define the poverty gap (G_i) as the poverty line (z) less

actual income (y_i) for poor individuals; the gap is considered to be zero for everyone else. Using the index function, we have

$$G_i = (z - y_i) \cdot I(y_i < z)$$

Then the poverty gap index (P_I) may be written as

$$P_I = \frac{1}{N} \sum_{i=1}^N \frac{G_i}{z} (y_i < z)$$

This table shows how the poverty gap is computed, divided by the poverty line, and averaged to give P_I , the poverty gap index.

4.4.3 Squared poverty gap (“poverty severity”) index

To construct a measure of poverty that takes into account inequality among the poor, some researchers use the squared poverty gap index. This is simply a weighted sum of poverty gaps (as a proportion of the poverty line), where the weights are the proportionate poverty gaps themselves; a poverty gap of (say) 10% of the poverty line is given a weight of 10% while one of 50% is given a weight of 50%; this is in contrast with the poverty gap index, where they are weighted equally. Hence, by squaring the poverty gap index, the measure implicitly puts more weight on observations that fall well below the poverty line. Formally:

$$P_2 = \frac{1}{N} \sum_{i=1}^N \left(\frac{G_i}{z} \right)^2$$

4.4.4 FGT Measures of Poverty

The measure lacks intuitive appeal, and because it is not easy to interpret it is not used very widely. It may be thought of as one of a family of measures proposed by Foster, Greer and Thorbecke (1984), which may be written, quite generally, as

$$P_\alpha = \frac{1}{N} \sum_{i=1}^N \left(\frac{G_i}{z} \right)^\alpha (\alpha \geq 0)$$

where α is a measure of the sensitivity of the index to poverty and the poverty line is z , the value of expenditure per capita for the i -th person’s household is x_i , and the poverty gap for individual i is $G_i = z - x_i$ (with $G_i = 0$ when $x_i > z$) When parameter $\alpha = 0$, P_0 is simply the

head-count index. When $\alpha = 1$, the index is the poverty gap index P_1 , and when α is set equal to 2, P_2 is the poverty severity index. For all $\alpha > 0$, the measure is strictly decreasing in the living standard of the poor (the lower your standard of living, the poorer you are deemed to be). Furthermore, for $\alpha > 1$ it also has the property that the increase in measured poverty due to a fall in one's standard of living will be deemed greater the poorer one is. The measure is then said to be "strictly convex" in incomes (and "weakly convex" for $\alpha = 1$). Another convenient feature of the FGT class of poverty measures is that they can be disaggregated for population sub-groups and the contribution of each sub-group to national poverty can be calculated. Although the Foster, Greer and Thorbecke measure provides an elegant unifying framework for measures of poverty, it leaves unanswered the question of what is the best value of α . Moreover some of these measures also lack emotional appeal.

4.5 Poverty Bands: The Divides of Poverty

The condition called poverty is not confined to the population below poverty line, but goes beyond it and includes the people residing above the poverty line with high probability of falling below it. Following the classification of McCulloch and Baulch (1999), the population is distributed into six groups by consumption-expenditure quartiles around the poverty line and analyzed the poverty dynamics by comparing salient characteristics of these quartile bands for the period under consideration.

4.5.1 The Absolute Poor Household Band

The per capita per month consumption-expenditure/income of the household is less than 75 percent of the poverty line, it is declared as absolute poor household which is further subdivided into extremely and chronically poor bands.

- I Extremely Poor Band:** household's income is less than 50 percent of the poverty line
- II Chronically Poor Band:** income of household is equal to or above 50 percent but below 75 percent of the poverty line

4.5.2 The Transitorily Poor Household Band

If the per capita per month income/consumption-expenditure of the household is less than 1.25 percent of the poverty line and more than or equal to 75 percent of the poverty line, it is

termed as transitorily poor household which is further subdivided into transitory poor and transitory vulnerable bands.

I Transitory Poor Band: income of household is equal to or above 75 percent but below 100 percent of the poverty line

II Vulnerable Poor Band: household's income is equal to or above 100 percent but below 125 percent of the poverty line

4.5.3 The Non Poor Household Band

If the per capita per month consumption-expenditure of the household is more than or equal to 125 percent of the poverty line, it is categorized as a non poor household which is further subdivided into transitory non poor and non poor bands.

I Transitory Non Poor Band: household's income is equal to or above 125 percent but below 200 percent of the poverty line

II Non Poor Band: household's income is equal to or above 200 percent of the poverty line

Table 3 : Poverty Bands: The Divides of Poverty

Broad Divides	Intermediate Divides	Poverty Bands	Criteria
Poor (below poverty line)	The Absolute Poor	Extremely Poor	$Y^* < 50\% Z^\dagger$
		Chronically Poor/Ultra Poor	$50\% Z - < 75\% Z$
Non Poor (above poverty line)	The Transitorily Poor	Transient Poor/Poor	$75\% Z - < 100\% Z$
		Transient Vulnerable/Vulnerable	$100\% Z - < 125\% Z$
	The Non Poor	Transient Non Poor/Quasi Non Poor	$125\% Z - < 200\% Z$
		Non poor	$> 200\% Z$

* Y = per capita income per month $\dagger Z$ = poverty line (Rs. 1418)

4.6 Field Surveys/Visits

4.6.1 Interviewers

For data collection and to get maximum certainty of information, female interviewers were hired. The reasons for hiring female interviewers were the cultural and religious norms or the traditional society, which do not permit an unknown male interviewer to have a direct contact with females to collect the information, as our targeted respondents were the women. Tibbo, *et al.* (2009) well presents the situation: "In the tribal regions of Afghanistan and Pakistan,

women are allowed for interview by female interviewers only by a strict approval of the husband of the interviewee..... in Punjab province of Pakistan where the women's restriction to move is a bit relaxed and level of literacy is better, resistance to gender analysis was overcome by the use of trained women to interview women and trained men to interview men separately". In our case, the hired female interviewees were the educated and government employees, who were serving in the local Rural Health Centers (RHCs) as Lady Health Visitors (LHVs). An LHV is a female para- medical staff having her qualifications in basic health of women and infants along with information relating maternity, gynecology, and health of neo-natal circumstances.

4.6.2 LHVs: The Interviewers

As our target respondents were the females and being a male member of the society, access to the female respondents was almost impossible. In rural areas, traditionally, a woman has no right to talk with an unknown male irrespective of that she is either practicing "Purdah" or not. It was for the first time happened in researcher's life that he observed the existence of the fact of strong traditional values in practice in rural milieu when he personally failed to conduct the interviews of the rural women. Even the reference of the well-known persons and institutions did not work in this regard; hence it was a matter of worry and disappointment. Later on, the problem was resolved by the idea of searching for the local para-medical staff (named LHVs: Lady Health Visitors) at local Rural Health Centers (RHCs), contacting them, convincing them to make the field visits for getting information from the women respondents, and then hiring them by giving them monetary reward of their efforts, time utilization, and labor for the collection of data. So, after completing this phase, before going into the field for conducting the interviews, the hired enumerators were trained one by one by explaining them the questionnaire that was already translated into Urdu (national language of Pakistan) language. The hired interviewers had reasonable academic qualifications and were capable of conducting the surveys because they were government employees in RHCs and had at least 12 years of schooling along with the professional training courses to be eligible for the job of LHV. Furthermore, the questionnaires were translated from the English into the Urdu language particularly to put the interviewers at ease in understanding the meaning, purpose, and context of the questions to be asked so that the actual required information could be collected.

4.6.3 How LHVs were the Suitable Choice as Interviewers

The nature of their job as LHVs makes them advantageous in contacting with the rural females in many ways.

Firstly, they (the interviewers) themselves are the females, and female respondents are not personally hesitant and culturally reluctant to share with them their personal, household, and work related information. Both interviewer and the interviewee feel free and can openly communicate like a friendly talk to ask questions and giving the responses.

They are better socialized with the rural communities, especially with the females.

They are known by the people and have their credibility and worthiness in the rural societies, so have a better position to penetrate into the community to have access to the rural women of the community.

They are respected by the people as they solve the concerns relating to the health of women, children, and also because they are educated and well mannered.

Sometimes, they are generally native to the communities or the residents of the neighboring local areas, so know enough about the local people and are known by local people as well.

They have to go door to door to visit the women at their homes. As a large majority of the rural people is illiterate and a huge share of the entire illiterate population comes from the female side. So, the job description of LHVs includes, making the illiterate rural women aware of the hygienic style of living and use of contraceptives, examining the physical and reproductive health of expected mothers and neo-natal(s) requirements, care of mother and children, vaccinations, preliminary health treatments, medication, and other preventive measures. So, for LHVs, the nature of their job made it easier for them than any other to get the information from rural women (our respondents) about their participation in livestock management related activities. The personal interest of co-supervisor in Pakistan in the project and his familiarity with the defined areas, kept me comfortable and confident regarding the authenticity of the collected information.

4.6.4 LHVs Vs University-graduate Females as Interviewers

Preference of LHVs (as interviewers) over university graduate females was the ideal choice in many respects. Even hiring of the university graduate females, convincing them for data collection is always tied to their own willingness and then the willingness and permission from their parents or families, which is almost impossible. Then, if they are convinced, providing them with the vehicle for transportation for distant districts and for travelling into the rural areas along with the local guides, providing them the security for their own protection and safety and to take away the fear of crime and happening of any kind of misconduct or unpleasant incident, safely dropping them to their homes, besides a heavy payment demanded by them for data collection were not feasible as per project budget of a student researcher. Hence, the LHVs were the best option and choice from many aspects and respects which can be better understood in the context of rural Pakistan. LHVs had no such concerns as the university graduate female could have.

4.7 Difficulties Faced in Getting the Information from Women in Punjab (Pakistan)

It is not easy, in Pakistan, to get the information from the women. Especially, in the rural areas, where the people are strongly tied with the traditional ways of living, society is male dominated; and customary norms are practiced and cultural values are still in vogue.

A lot of problem had to face during the whole field survey process.

4.7.1 Remoteness and Geographic Accessibility

All the districts were situated at a long distance from each other. Considering Faisalabad district situated in the centre of Punjab, Chakwal district is situated to its north at a distance of about 400 kilometers. It takes 4 to 5 hours travelling from Faisalabad to Chakwal on a public transport via motorway. District Bahawalnagar is situated to the south of Faisalabad at a distance of approximately 250 kilometers. Because of the poor condition of the narrowly constructed roads, a person has to spend 5 to 6 hours in travelling on a public transport to reach Bahawalnagar from Faisalabad. Up till now, we just narrated the story of journey or accessibility from one city to another city by using considerably better public transports and travelling through the metallic roads. After arriving in a city, travelling towards and into the

rural settings is another tough and tiring “adventure”. To reach in a village, availability and access to public transportation is a big deal. One can hire an auto rickshaw to access to a village lying in close proximity to the city, but for accessing the remote villages having personal automobile is obligatory.

4.7.2 Resources and Social Accessibility

Visiting the villagers, telling them the purpose of the survey and to what extent the survey can have the potential prospects of changing the socio-economic milieu of the village, gaining their trust, and then to convince them for getting the required information were not as easy as seemed. Micro level surveys, conducted by a student researcher, without the intervention or involvement of a well known organization (governmental or other), are usually considered useless and wastage of time by the rural people. They do not seem serious and interested in extracting their time to provide input such kind of surveys which benefit a single stakeholder (researcher). Agriculture Extension wing of the Department of Agriculture, health department, veterinary and livestock department, department of education, and micro-credit institutions are the well-known and well-reputed organizations/institutions near the villagers. Rural people give importance and attention to the interventions and innovations, suggestions or programs/projects launched by those organizations/institutions. As these projects target the social, economic well being and overall betterment of the rural people and give them a status of stakeholders. Hence, the above mentioned institutions or organizations and their employees are the vital sources and resources which can be used as reference and their credibility and popularity among the rural people can be utilized as reference to win people’s trust and convince them to give the required information. During the field visits, we had to get and utilize the references from all the above said institutions/organizations to complete our survey. A single student researcher has not as worthiness and credibility as the above said governmental and other institutions have in the eyes of village people. So, s/he has to find references to reach the rural people and be able to complete the survey/questionnaires.

4.8 Summary

For the present study, the data was collected from three districts of Punjab province. These districts have diverse geographic locations, characteristics, and were randomly selected. A multi-stage sampling procedure was adopted to collect the information from the respondents. At first stage, a total sample of 360 respondents was allocated to 3 districts of Punjab and it

was decided to take an equal number of, that is, 120 respondents from each district. At second stage, in each district, the allocated sample of 120 respondents was decided to collect from 4 villages, thus an equal number of, that is, 30 respondents were chosen from each selected village in the district. From each district, four villages were selected randomly. The criterion of selection of the villages was their distances from the main cities. In the final stage, at village level, only those female respondents were interviewed who were ever married and were participating in at least one activity relating to the management and production of livestock. Data collection process comprised of making field visits in the selected villages and filling a questionnaire---prepared to record information on our required variables from the targeted respondents by interviewing them at their homes. Selected respondents were interviewed for about 40 minutes each. The busy surveys and interview schedules in three districts (geographical regions) provided the valuable and necessary inputs to our study. The collected data were used to draw the valid information on different pre-determined parameters and objectives of the study.

In our study/survey, we collected information on seven different kinds of activities regarding livestock production and management, in which mostly women participate. Those activities were: fodder cutting, fodder serving, serving water to the animals, collecting dung, bathing animals, milking of animals, and selling milk. Fodder cutting, dung collection, bathing, and milking of the animals are considered as the activities *relatively hard in nature*. Activities like, fodder serving, water serving, and milk selling are considered as *relatively soft in nature*. In order to gauge women's level of participation in those activities we classify the participation levels as, low, medium, and high. The categories of family labor involved in livestock management activities are: *couple*—it includes respondent woman and her husband, *children*—it denotes to the male (son) and female (daughter) children of the respondent, *in-laws*—this category imply towards parents (her mother in-law, father in-law) and other relatives (her sister in-law, brother in-law, daughter in-law) of our respondent's husband. The different types of participations we are going to use here are: qualitative participation, quantitative participation, gender-based participation, mode of involvement based participation, and non-physical participation.

Various aspects of women's status are treated separately as dependent variables determined by a combination of individual-, household-level, and spatial factors. Some crucial aspects of women's status considered in the study are compiled as sums of scores of the constituent

elements on each (aspect) of the status. Carrying score from 1 to 7, *health status* comprises of the 2 elements: self rated health condition, no. of pregnancies. Carrying score from 1 to 5, *gender relation* consists of the 2 components: participation in the decision making on: livestock management related matters, family related matters. *Mobility Status* (having score from 1 to 5) consists of the 3 constituents: no. of visits made to the nearest city per month, nature of mobility, and observance of veil. Quantified through the score points from 1 to 3, women's *awareness status* consists of the 2 ingredients: experience of living in a city, access to the media. And lastly, comprising of score points from 1 to 4, the *socio economic status* of women is gauged by 3 constituents: literacy, marital status, and employment status.

For this study we have made the following analyses: preliminary, factor, and regression analyses. Preliminary analyses made for this study comprises of descriptive(s) analysis, that is, percentages, averages, and frequency distributions. Descriptive analysis was used to summarize the profile of the respondents and information related to women's participation in livestock management. Factor analysis—this statistical approach involves finding a way to condense information about a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information. Principal Component Analysis (PCA) was used to extract factors. Factor analysis was employed to identify latent dimensions underlying indicators that measured women's participation. Using Ordinary Least Squares (OLS) regression, multiple linear regression analysis was performed to evaluate the associations between participation indicators and respondents' socioeconomic and demographic characteristics. To estimate the subject score for each factor (obtained in the factor analysis), the Anderson-Rubin approach was applied. This is a method for estimating factor score coefficients, which ensures orthogonality of the estimated factors. Computer based software; SPSS® (Statistical Package for Social Sciences) version 20 was used for all statistical analyses. Due to ordinal nature of response variable, we chose ordered probit (O-Probit) regression model to determine the effect of factors affecting women's status. We presented the introduction, need, and mathematical construct of the ordered probit regression and illustrated through an example. O-Probit was applied by using STATA.

For data collection and to get maximum certainty of information, female interviewers were hired. The reasons for hiring the female interviewers were the cultural norms or the traditional society, which do not permit an unknown male interviewer to have a direct contact with females to collect the information, as our targeted respondents were the women. The

problem was resolved by the idea of contacting the local para-medical staff (LHVs: Lady Health Visitors) at local Rural Health Centers (RHCs) and convincing them to make the field visits for getting information from the women respondents. The nature of their job as LHVs makes them advantageous in contacting with the rural females in many ways. Furthermore, the questionnaires were translated from the English into the Urdu (national language of Pakistan) language particularly to put the interviewers at ease in understanding the meaning, purpose, and context of the questions to be asked, so that the actual required information could be collected.

A lot of problem had to face during the whole field survey process. It is not easy, in Pakistan, to get the information from the women. Especially, in the rural areas where the people are strongly tied with the traditional ways of living, society is male dominated; and customary norms are practiced and cultural values are still in vogue. However the recourses were managed to achieve the social and geographical accessibilities.

Part 2

What is the current status of rural women and their participation in livestock management activities?

CHAPTER 5

WHO ARE THE RURAL WOMEN IN PUNJAB: THE VARIOUS ASPECTS OF THEIR STATUS?

Educated, healthy, and empowered women can bring about a change in the lives of their own and their families. This chapter presents the current status of our respondent rural women who were engaged in managing and producing livestock. Various aspects of women's status: socio economic, health, gender relation, mobility, awareness statuses are gauged in the context of rural Punjab. Descriptive or uni-variate and multivariate regression analyses are made to see the relative influence of socio-economic, family, and geographical area related characteristics on these aspects of women's status.

Abstract

This chapter presents the various aspects of women's status and their constituents in rural Punjab (Pakistan). Family size was the only socio-demographic variable significantly determining women's health status. Respondent's education up to 5, her job status, her husband's primary occupation, and type of familial system were the socio-demographic variables significantly determining gender relation. Respondent's age, her husband's occupation as "laborer", and family income were the variables significantly determining women's mobility status. Respondent's education above 8, husband's occupation as "job" and "laborer", family resources (income, own land) had significant role in influencing women's awareness status at regional level. Along with the socio demographic variables the location-specific or spatial factors seem to have a direct impact on women's status, as the explanatory power (pseudo R^2 and adjusted R^2) of our models increase when these spatial variables are included, hence showing the importance of the role of spatial dimension in determining women's status.

5.1 Introduction

Women are half of the world's population. Regardless of their major contribution in the development of civilization, in most parts of the world their status is not equal to men (Rahman and Naoroze, 2007). Having fewer opportunities to acquire land, property, credit, education, skill and paid job hold back women to acquire a better status. Women constitute

the two third of the two billion (approximately) people who are considered poor in this world (ESCAP, 2002). In spite of working longer hours than men, women earn little for the reason that 60% of their total work goes unpaid (UN, 2007) and despite their hard work and contributions to world economy, they possess only one percent of the total world assets in their names (Al Mughairy, 2004).

It has also been found that as compared to their male counterparts, women are lagged behind in education. Studies indicate that about ten million more girls are out of schools than the boys (Turquet, et al. 2008). About two third of the total illiterates in the world, are women (UNESCO, 2006). In addition, due to their poor economic status, less education, and ignorance women have more health hazard than men. At least half million of women die every year due to complications in pregnancy or pregnancy related diseases (WHO, 2005). In other words one woman dies after every minute due to pregnancy related complications or at giving birth to a child (UN, 2007) and since 1990, the number of women with HIV positive is increasing worldwide (UN, 2008).

Early marriages create problems for girls and lower down their status in terms of income, education and awareness. In South Asia, nearly 10 million of young women are married before they age 18 (UNICEF, 2005). Violent behavior against women is also a big social issue and globally, a number of women have to face violence in many forms. A cross country study has shown that nearly 15 to 71 percent of the women become the victim of domestic violence over the course of life time (WHO, 2005a). Another study indicated that in Australia, Canada, Israel, South Africa and United States, 40 to 70% of female murders were committed by their partners (WHO, 2002).

Gender Empowerment Measure (GEM) and Gender-related Development Index (GDI) are the UNDP's constructed indices on the subjects of women's empowerment and gender's equality in the countries over the world. These are composite indices and depict the relative conditions and positions of women within the countries of the globe. According to the GEM index which is developed on the basis of political, economic activity and decision making capability of women at country level, Pakistan is ranked 82nd amongst a list of 93 countries. Likewise, regarding GDI which is a measure of gender disparity with respect to health, income and education, Pakistan gets 125th position out of 157 countries. So, both the indices do not have satisfactory values and imply towards much lower women status and prevalence of gender inequalities within the country. While it is noted, with a few exceptions, all the

other countries of the South Asian region (though their conditions are also not encouraging) are at better positions in the ranking order relative to Pakistan (UNDP, 2008). According to the Pakistan's Millennium Development Goal Report (PMDGR) 2010, on all the indicators of eight goals, including MDG 3; promote gender equality and empower women and MDG 5; improve maternal health, Pakistan's progress is either slow or lagging behind the satisfactory fulfillment (GOP, 2010).

In Pakistan, women are usually subordinate to men and their role is confined only to the household chores and child care. They rarely have access to productive resources and have very limited participation in important household decisions. Even most of the important decisions of a woman's life, such as, education, work, marriage, major purchases, number of children, and decisions regarding children education and marriage are taken by the male members. Their low relative status in the household is reflected in their high illiteracy, low educational attainment, fewer opportunities for skill development, and lower participation in economic and political activities (Nazli and Hamid, 1999).

Gender discrimination starts from the early days of a female child. They have no power to make decisions on how to behave or dress, whether or not to get an education, whom to marry, whether to have children and how many, whether to plan a family, whether to maintain ties with her parents' family⁹, marriage or divorce, contact with the outside world, her health and so forth. All powers are vested with the males of the family. Such circumstances make her unaware of the complexities of the outside world and foster an ignorance of the laws of the country that govern her life (Habib, 2004).

In South Asia and in the Islamic world, women's lower status is characterized by their lower education, poor health facilities, and poor economic standing as compared to men. Healthy, educated and empowered women can bring about a change in their lives as well as in the society, so drastic measures are required to improve women's lives (Khan, 2010).

This chapter intends to present results and discussion on the various aspects of women's status in the context of rural Punjab and the relative influence of socio-economic, family, and area related characteristics on women's status.

⁹ The traditional Indian family is characterized by an expected transfer of a woman's loyalty upon marriage from her natal to her marital home (Basu and Koolwal, 2005). The same tradition is practiced in Pakistan as well and after marriage a woman has to reside along with her in-laws.

5.2 Various Aspects of Women's Status: A Descriptive Analysis

To describe the facts in easy and understandable form, at initial stage of data analysis, descriptive statistics comprising the calculated averages, percentages, and frequency distribution of different variables was applied. In other words, to study the socio-cultural and demographic condition of the women living in Punjab (Pakistan) a uni-variate analysis was made first and the description is given below.

5.2.1 Socio-economic Status

A slightly more than 96% of our ever-married women respondents were married and about 4% were widows. More than half of them were illiterate and only 20% women had their educational level from one to five schooling years. A very small fraction (3.06%) of them was doing a proper job in the fields like, teaching, nursing, tailoring, basic health provider, and in private sector (Table 4).

5.2.2 Health status (Table 5)

Majority (62.50%) of the respondents were having lower health status, that is, from “average” to “poor”. These respondents were, on an average, of relatively older aged, had lower educational status, more number of pregnancies, and married at earlier ages than those women with their health status from “good” to “very good”. Poverty also seems to be one of the reasons of having poor health status, as those who were not enjoying good health mostly belonged to economically resource poor families by having relatively less annual familial income and the size of agricultural land owned. A large majority of widows were also found having lower health status.

Gender relations between husband and wife were seen as having an important impact on women's health. Respectively, 78%, 66%, 59%, and 58% of the women having their health status as poor, average, good, and very good reported that their husbands consulted them for making decision on livestock management related matters. Similarly, the percentages of respondents who participated in the decision making regarding family matters, were higher for those having better health than those who were in a poor health condition. Domestic violence (happening of a quarrel between husband and wife) was also seen to be reported lesser by healthier women than the women of average and below average health.

The occurrence of vast differences in the status of women's health did not make differences in women's level of participation in livestock management related activities. Women from each category of health, on an average, were carrying out more than four livestock management related activities out of a total of seven activities.

About 16% respondents told that at the time of marriage they were less than 18 years old, while majority (54.17%) of the respondents belonged to age group 18-20 at the time their marriage. A relationship was seen between women's level of education and their ages at the time of their marriages. Women with lower educational level were married at early ages and women with relatively higher educational levels were seen to be married at relatively later ages. Alderman and Chishti () confirm this finding. In Punjab, generally in poor families and in some castes (especially in lower castes) girls/daughters are married at early ages, and it is evident from the socio-economic status of the respondents who were married at early ages.

On an average, a woman had 3.40 pregnancies and nearly 46% respondents had 3 to 4 number of pregnancies. Number of pregnancies was found to be increased with an increase in the age of a woman, that is, a woman of relatively younger age had less number of pregnancies. A relationship was observed between respondents' educational levels and number of pregnancies. Women with number of pregnancies from 0-2, 3-4, 5-6, and above 6 were seen to be having their number of schooling years as 4.14, 3.39, 2.32, and 1.44 respectively.

5.2.3 Gender relations (Table 6)

In this research, we are studying gender relations by seeing women's participatory role in the decision making process and by noticing the existence of domestic violence between husband and wife within a rural family. As it is evident from the table that respectively 37.50%, 25.28%, 24.44%, and 12.78% replied that they are consulted by their husbands for making decisions regarding livestock management related matters as, always, often, sometime, and never. A further exploration of each category of the respondents showed that the women who always participated in the decision making concerning livestock management related matters were of relatively older ages and their families had relatively lesser economic resources (in terms of acreage of own land, number of animals kept, and average annual familial income) than the families of women who were not always participating in the decision making process. Regarding their personal attributes, women always participating in livestock

management related decisions had relatively lesser educational levels (2.71) than those of participating as often (3.02), sometime (4.34), and never (3.72) but were carrying more number of livestock management related activities than those of others. Given importance by the husband to woman's say on different matters indicates a better relation between two genders. Similarly, domestic violence (happening of a quarrel between husband and wife) was slightly (least percentage) reported by those who were always participating in decision making but was reported highly by others. So, one thing which is evident from this study is that gender relations have greater influence on women's health than their families' economic conditions.

As regards their participation in the decision making relating to the family matters, 37.50% had no right to participate, as told by the respondents. Family related matters imply towards matters relating to the education and marriages of children, financial concerns, having relationships with the people, other domestic affairs, etc. Women who were consulted by their husbands while making decisions on family related matters were relatively of older aged¹⁰, had less number of schooling years, and had higher level of participation in the livestock management related activities. They were more in a condition of good health and reported less percentage of happening of a domestic violence as compared to those women who were not consulted by their husbands while making family related decisions. So, once again existence of good relationships between husband and wife seems to have a better impact on women's general health status.

Nearly 24% (82 in numbers) respondents complained about happening of a quarrel (domestic violence) between husband and wife while 76% replied no to the quarry on happening of a quarrel. The victims of domestic violence were relatively better in terms of their educational levels (human resources), livestock inventories, and annual family income (economic resources) than those who were not facing any kind of violence by their husbands. The women not suffering from any domestic violence were also enjoying a better health status.

A further analysis was made for a profound understanding of those 82 (about 24% of the total) respondents who were victimizing of domestic violence by their husbands. The average age of the women was 41.54 years and about 67% of them were having their health status from average to below average, in spite of the fact that on an average they belonged to

¹⁰ In the rural context of Punjab, women in their older ages are given more respect and they have more empowerment and authority in different family matters especially in the decision making.

reasonably well-off families. Respectively, 26.83%, 32.93%, 25.61%, and 14.63% of them complained of facing domestic violence as once, twice, 3-4 times, and more than 4 times in a month. On the basis of happening of domestic violence between husband and wife, respondents were placed into four categories. A sequential decrease in women's average educational levels and health status was observed as moving from a category with lower frequency of domestic violence happening towards a category with higher frequencies of domestic violence. In the similar way, a sequential decrease in women's annual familial income was also observed. In this way, the nature of gender relations can be positively associated with the human (respondent's education and health) and economic (average annual income of respondent's family) resources.

On asking about the reasons of happening of quarrel between husband and wife, nearly 43% of those who reported the domestic violence were reluctant to share the reason. But the main reasons reported by the others were relating to the money, work, and family related matters.

5.2.4. Mobility Status (Table 7)

The percentages of respondents observing and not observing veil (purdah) were 19% and 81% respectively. Women who were practicing veil were relatively younger aged and had strong personal and familial resource bases, that is, they were relatively more educated and having more familial income and land resources. In the rural context of Punjab, land lord and economically well-off families are mostly influential, powerful (especially, in terms of their political authorities and having relations with influential parties), and respected by the people. So, due to women's belongingness to the economically well-off and land lord families they have to practice veil as a family tradition to protect and preserve the noble fame and honor of the family. Age factor also matters in the observance of veil. In the countryside of Punjab, a woman in her older age is not strictly demanded to observe veil, it is mostly observed by the younger aged women, usually from or before their early teen up till their mid forties.

On the basis of frequency of visiting the city in a month, respondents were fall into five categories. The percentages of those visiting the city less than once, once, twice, 3-4 times, and more than 4 times in a month were respectively, 20.83%, 31.94%, 22.22%, 18.05%, and 6.94%. Frequency of visiting the city by the respondent was seen to be increasing with an increase in respondent's educational level, farm land size, and average annual income of the family. In other word, relatively more educated and economically prosperous respondents

were making repeated visits to the city. The main purpose of visiting the city, as responded by respectively, 69.73%, 21.12%, and 5.84% of the women was shopping (generally buying family related commodities, like, clothes, shoes, ration, etc.), medication, and both.

The mobility of the women, who were making visits to the city, was not independent or free. Their mobility to the city was either as accompanied or as unaccompanied. Only 20% of the respondents can travel to the city alone while a large majority of the respondents (80%) was accompanied by a close relative for making their visit to the city. Respectively, 41.39%, 33.33%, and 3.61% respondents told that they mostly go along with their husbands, sons, and daughters to the city. Women's mobility status can be seen in terms of cultural dictate (like, observance of veil) and in terms of their autonomy or empowerment status. In a patriarchal and male dominating society, women are generally considered as inferior and subordinate to men and are dependent on men for their all kinds of needs (especially financial needs), so their mobility also depends on men's approval. Traditionally, their accompanied mobility is also made to ascertain their protection and even they themselves feel a sense of security and safety by accompanying someone (particularly a male family member) along with them while travelling somewhere or going outside the home.

Women who were making accompanied visits to the city were, on an average, belonging to the relatively richer families (having more acreage of agricultural land and average annual familial income). So, as indicated earlier, women from land lord and rich families are more likely to observe purdah. In this way, women's accompanied mobility can be seen in terms of families' restriction put on them or it can also be related to the practice of purdah, as 22% of those making accompanied visits to the city were practicing veil also as compared to the only 6.8% those who were going to the city alone.

5.2.5 Awareness Status (Table 8)

A woman having an experience of living in a city is probably more aware of the world outside home and knows more about the things going on or happening in the civic society. In our study, only 15% respondents were found to be having an experience of residing in a city in any part of their lives. It was also seen that they and their husbands had relatively higher levels of education and owned large sized agricultural land resources, livestock inventories, and average annual familial income than those respondents who never had an experience of living in a city. One of the reasons for that may be the profession of respondents' husbands as

it is evident from the data that percentage of respondents' husbands engaged in non-farm occupations were respectively, 45% and 32% for those "having" and "not having" an experience of residing in a city. Amongst those respondents who had an experience of living in a city, a significant number of their husbands were engaged in the services sector as either government employees (in the armed forces, energy & power, and in the educational sectors) or in the private sectors so it is more likely for their families to be with them in the cities where they are or were appointed.

The percentages of the respondents having and lacking television set at their homes were respectively, 80.56% and 19.44%. Those respondents having television at their homes, and their husbands were mostly of younger aged, had relatively higher educational levels, having more experience of living in a city, owning more acreage of farm land and average annual familial income than those who were not keeping television. So, all the above said characteristics well justify the reason behind keeping a television set by the respondents. Probably, higher educational status of young aged couples provide for them the willingness and preference to keep television (they can be more interested in gaining information, knowledge and for entertainment). A strong economic resource base can resolve the constraint of affordability to keep television, in other words rich families have purchasing power to buy a television set.

Amongst the respondents who had television at their homes a quarter of them were not watching television. The preferred programs for a large majority of television watchers were drama serials (36.24%), news (19.27%), and Islamic programs (14.22%), while 30.27% television watching respondents told that they were interested in all sort of programs. Those who kept but not watching television were mostly older aged, had less number of schoolings, had no to less experience of living in a city, but from relatively rich families as compared to those who were watching television. Women after thirties of their ages, in rural areas of Punjab, bear more responsibilities regarding household related matters and particularly the women from rich families become more participative in the social activities at village level, so perhaps because of this they have no time to watch television. Lower educational statuses also make the reason of having no to less interest in watching television.

5.3 Women's Overall Status at Regional Level: Ordered Probit Regression Analyses

We are going to present the situation of women's status at regional level and covering the sample size of 347 respondents as representative of Punjab province. Figure 15 presents the multiple linear regression results regarding the socio-economic characteristics affecting various aspects of women's status.

Health Status: Amongst the socio-economic or socio-demographic variables, the family size was the only and negatively related variable with women's health status and was significant at the 1% level. It means that a large family size is concerned with a large number of children or pregnancies, so it has a direct impact on women's health status. Amongst the spatial variables, as compared to the least deprived district (Faisalabad), in the most deprived district (Bahawalnagar) women had low health status (with the coefficient significant at 5 % level). (See Table 9, 10, 2nd column)

Gender Relation: for measuring the gender relations, we are seeing the participation of women-respondents in decision-making process. We asked her that how often she is consulted by her husband while making decision on different matters. As compared to the illiterate respondents, those women-respondents with their level of education up to 5 grades of schooling had better gender relations (the variable was positively related to the gender relation at 10% level of significance). As compared to the women not engaged in any income generating activity, working women had relatively better gender relations. In comparison with those women with their husbands' primary occupation as "farmer", the women with their husbands' primary occupation as "laborer" had poor gender relations. The most probable reason for such a result could be that in the categories of husband's primary occupation, "laborer" is a category characterized by those which are mostly landless and had no any particular employment other than wage earner either on-farm or off-farm as a source of livelihood. Laborer can be classified as the poorest amongst all categories of husbands' primary occupation. Besides the lack of land and income resources, poor also have lack of human capital, that is, education (literacy). So, illiteracy not only confines their job opportunities but also affects their marital relations. In place of joint familial system, women-respondents living under nuclear familial system had poor gender relations. The negative sign of the coefficient of nuclear family system is found significantly associated with gender

relations. Better and significant gender relations were recorded in the villages at the distances far from the cities. It could be due to the reason that women living in the villages at close proximities to the city, as compared to those living in the villages at far off distances from the city, had less participation in the activities relating to the management of livestock, so perhaps their husbands do not consider it important to consult with their wives on the matters relating to livestock management. Gender relations were poor in the most deprived district (Bahawalnagar) with the coefficient significant at 1 % level. (See Table 9, 10, 3rd column)

Mobility Status: As compared to the women of the age group 56-65, women of about all age groups had greater mobility status and the coefficients were found significant for the categories 26-35 and 36-45. The likely reason for this can be that this age group is too old, so becomes difficult for an old lady to make visit to the city alone. Women of younger ages generally have accompanied mobility along with a male relative like husband, brother, father. Older aged women due to poor health or lack of physical strength usually rest at their homes. The women with their husbands' primary occupation as "laborer" had lower mobility status. It could be due to the reason that husbands with their primary occupation as laborer were mostly illiterate that is why they may be more conservative and tied to the customary norms of restricted women's mobility. Income was found positively associated with women's mobility status at the 1% level. It means that women from economically well off families have better mobility status. Women from the most (Bahawalnagar) and medium (Chakwal) deprived districts had high mobility status. Again the relative development status of the region seems influencing the behavior of people regarding women's mobility. (See Table 9, 10, 4th column)

Awareness Status: Women with their education above 8 schooling grades had positive and significant association with their awareness status. Better educational level makes them more aware of the world. The women with their husbands' primary occupation as "laborer" had lower awareness status, while high awareness status was recorded for the women with the category of their husbands' primary occupation as "job". Women respondents with their husband's occupation as "laborer" had no or relatively lower access (as compare to those women whose husbands' primary occupation as "job") to the sources of information (like, television) and had no or less exposure of the life in cities. Own land size and family income were positively and significantly associated with the awareness status of women. The reason is economic, because the women from land-lord families are more educated and have access

to informational sources to be in touch with the outer world. Women from the most (Bahawalnagar) and medium (Chakwal) deprived districts had high awareness status but the coefficient was only significant for Bahawalnagar district at the 1% level. (See Table 9, 10, 5th column)

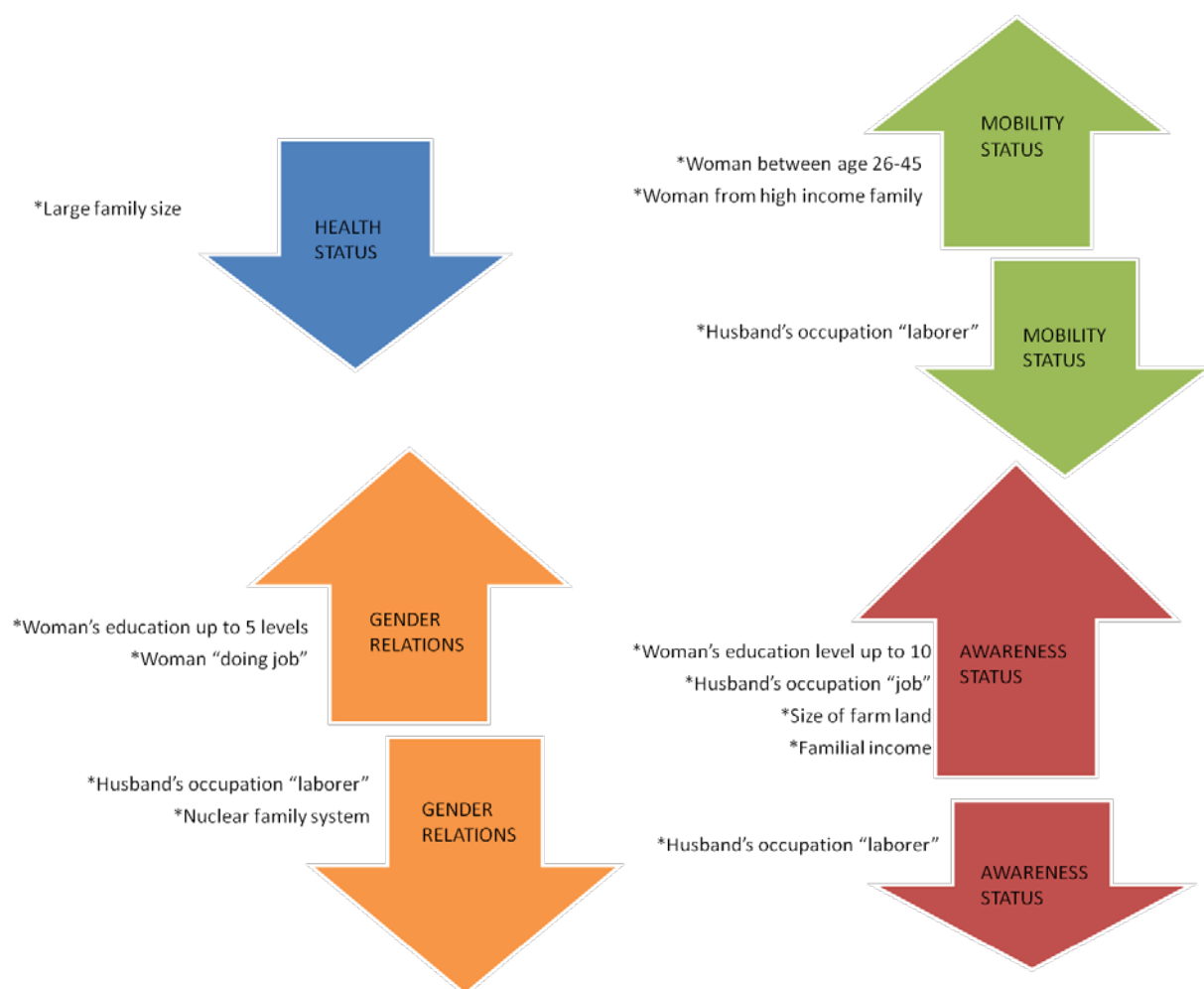


Figure15: Socio-economic characteristics affecting various aspects of women's status (multiple linear regression results)

5.4 Rural Deprivation Level and the Various Aspects of Women's Status

As compared to the less deprived districts (Faisalabad, Chakwal), gender relations and women's health status were found relatively poor (figure 16) whereas women's mobility and awareness statuses were relatively better in the most deprived district (Bahawalnagar). The possible reasons for that could be deprivation of women in multiple dimensions (like in education, health, living standards, and access to other basic services etc.) in the rural areas of Bahawalnagar district. These dimensions of multiple deprivation are enough to keep the

people in a condition of poverty and it ultimately imply towards poor situation in terms of health and spousal relationships due to lack of income and human capital (education) resources. Under these conditions, in spite of prevailing cultural settings women have to work along with males to sustain the lives of their families and their owns. So, they have to interact with people outside home (for example by marketing an agricultural produce etc.) which make them more mobile and aware of the world outside homes.

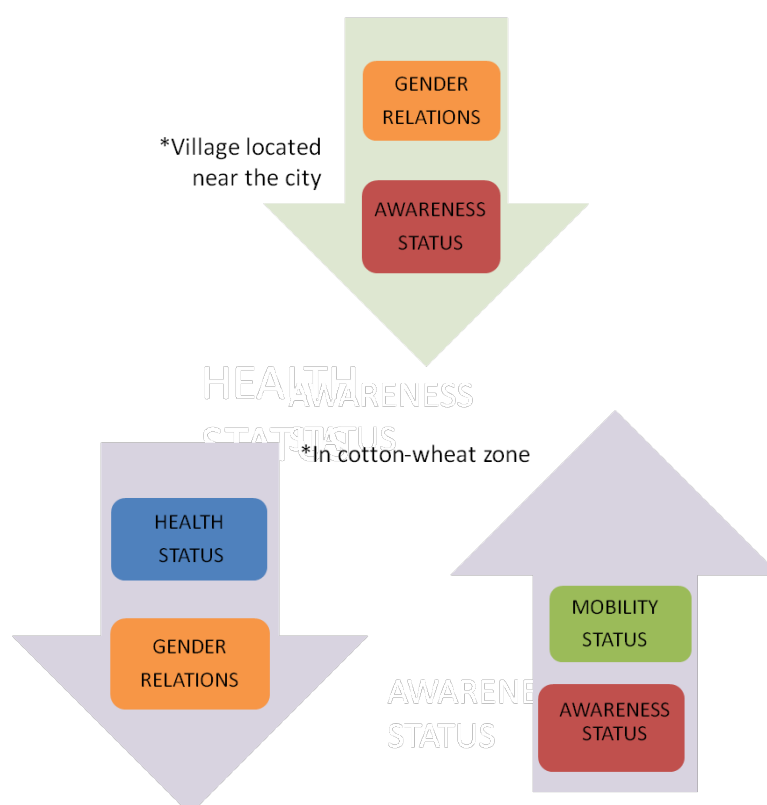


Figure 16: Impact of geographical characteristics on various aspects of women's status (multiple linear regression results)

5.5 Socio-demographic and Spatial Variables as Determinants of Various Aspects of Women's Status at Regional (Punjab) Level

The spatial variables (either alone or together): rural deprivation levels of the sub-region, and the distant location of the village from the city, were significantly determining the various aspects of women's status. Family size was the only socio-demographic variable significantly determining women's health status. Respondent's education up to 5, her job status, her husband's primary occupation, and type of familial system were the socio-demographic

variables significantly determining gender relation. Respondent's age, her husband's occupation as "laborer", and family income were the variables significantly determining women's mobility status. Respondent's education above 8, husband's occupation as "job" and "laborer", family resources (income, own land) had significant role in influencing women's awareness status at regional level. (See Tables 9, 10)

Many of our findings on gender relations (participation in decision making) are in line with the findings of (Pervez, et. al.,2012) who analyzed the present status of rural women in agricultural decision making in KPK province of Pakistan and revealed that women had little or no autonomy in many decision making process in the study area. Like our study, majority of women were found illiterate and dominated not only by their husbands but also by many male members of the family while making agricultural decision. Similarly, in their study at household level, woman's age was the only statistically significant regression coefficient and the positive sign of that coefficient had suggestion that women in households gain more decision making power as they grow older. Like our findings, the extended (non nuclear) family system, number of children (family size), and women's education were found non-significant in their study. However, the extended family system had positive relationship, and the number of children and wife's education had negative relationship with women's decision making in the house hold.

In a study conducted by (Khan, 2010), in two districts of Punjab (Pakistan), type of family, paid job involvement of respondents, and respondent's education were among the socio-cultural factors (variables) that were identified for their significant influence on women's empowerment status (especially in domestic sphere).

The findings of Khan and Awan's (2011) study have recognized and indicated the presence of contextual women empowerment at household level in Pakistan. They investigated women's empowerment by taking into account the 'family planning' and 'economic decision making' as two empowerment contexts. Empirical results showed that the geographic differences were also seen predominantly significant in explaining women's empowerment subject to each of the context. Women's level of education was found generally improving their empowerment. Their findings also suggest that within the household, a woman gains more empowerment in economic decision making context, as her age increases.

5.6 Conclusion

In this chapter, we tried to present various aspects of women's status: health, gender relations, mobility, and awareness and the influence of different socio-economic and spatial variables on the various aspects of women's status at regional level. A same set of determinants relating to women (age, education, employment) their husbands (education, occupation), their families (size and type of family, own land size, annual income), and to their localities/village (proximity to the nearest city, deprivation level of district) served as right hand variables in all four aspects of women's status.

At regional level, large family size had a negative effect on women's health. In her younger age a woman had better mobility status. Women from nuclear families were enjoying relatively better awareness status. Education of respondent's husband had no significant role in determining any aspect of women's status. Spatial variables (deprivation level of the district; agro-ecological sub-regions, and location of the village from a particular distance from the city) were significantly influencing almost all the aspects of women's status. As compared to the villages located remote from the cities, gender relation and women's mobility status were found better in the localities (villages) lying in close proximities to the cities. As compared to the less deprived districts (Faisalabad, Chakwal), gender relations and women's health status were found relatively poor whereas women's mobility and awareness statuses were found relatively better in the most deprived district (Bahawalnagar).

Respondent's education above 8, husband's occupation as "job" and "laborer", family resources (income, own land) had significant role in influencing women's awareness status at regional (Punjab) level. Various age groups of the respondents, husband's occupation as "laborer", and family income were the variables significantly determining women's mobility status. Similarly, at regional level, family size was determining her health status and respondent's education, her job status, occupation of her husband, and the type of her family, were the socio-demographic variables significantly determining gender relation.

As the spatial or geographical variables have shown significant influence in determining various aspects of women's status, so the study suggests in the words of (Sathar and Kazi, 2000) that: "...because women's empowerment and status are multi-dimensional, several measures have to be utilized to gauge women's status in various settings. Greater power or

autonomy in one dimension and in one community is not expected to amount to the same in another”.

Table 4 : Socio-Economic Characteristics of the Respondents

Age Group			Marital Status		
Scale	Freq.	%	Characteristics	Freq.	%
18 to 35	116	32.23	Married	347	96.39
36 to 55	220	61.1	Widow	13	3.61
above 55	24	6.67	Total	360	100.00
Total	360	100			
Level of Education			Job Status		
Scale	Freq.	%	Characteristics	Freq.	%
Illiterate	204	56.67	Not doing Job	349	96.94
1 to 5	72	20.00	Doing Job	11	3.06
6 to 8	34	9.44	Total	360	100.00
9 to 10	28	7.78			
11 to 12	13	3.61			
13 to 14	9	2.50			
Total	360	100.00			

Table 5 : Health Related Characteristics of the Respondents

Health Status			Age at Marriage			No. of Pregnancies		
Scale	Freq.	%	Scale	Freq.	%	Scale	Freq.	%
Very Good	41	11.39	14 to 18	132	36.67	0 to 2	108	30.0
Good	94	26.11	19 to 23	174	48.33	3 to 4	165	45.8
Average	166	46.11	24 to 28	47	13.06	5 to 6	71	19.8
Poor	59	16.39	above 28	7	1.94	Above 6	16	4.4
Total	360	100.00	Total	360	100.00	Total	360	100.0
			Average	20.08		Average	3.40	

Table 6 : Gender Relations

Participation in Making Decision Regarding Animals			Frequency of Happening Quarrel in a Month		
Scale	Freq.	%	Scale	Freq.	%
Always	135	37.50	Less than 1	1	1.22
Often	91	25.28	1 to 2	48	58.54
Sometime	88	24.44	3 to 5	23	28.05
Never	46	12.78	Above 5	10	12.20
Total	360	100	Total	82	100.00
Participation in Decision Regarding Family Matters			Reason for Quarrel		
Who does make decision	Freq.	%	Reasons	Freq.	%
My Husband	125	34.72	Money matters	18	21.95
Me & My Husband	174	48.33	Work	13	15.85
Myself/Respondent	31	8.61	Childlessness	2	2.44
All/Whole Family	20	5.56	meeting parents	3	3.66
Others	10	2.78	Sickness	1	1.22
Total	360	100.00	Family matters	5	6.10
			Children	2	2.44
Quarrel between Husband and Wife			Fodder serving	2	2.44
Scale	Freq.	%	On going to city	1	1.22
No	265	76.37	NA	35	42.68
Yes	82	23.63	Total	82	100.00
Total	347	100.00			

Table 7 : Mobility Status of the Respondents

Observance of Purdah			No. of visits to the city in a month		
Scale	Freq.	%	Scale	Freq.	%
No	292	81.11	Less than 1	72	20.00
Yes	68	18.89	1 to 2	196	54.44
Total	360	100.00	3 to 5	77	21.39
			Above 5	13	3.61
Reason for Visiting the City			NA	2	0.56
Reasons	Freq.	%	Total	360	100.00
Shopping	251	69.73			
Medication	76	21.12	Who accompanies while going to the city		
Both of above	21	5.84	Relation	Freq.	%
To meet parents	5	1.38	Husband	149	41.39
Other	5	1.38	Son	120	33.33
NA	2	0.55	Alone	72	20.00
Total	360	100.00	Daughter	13	3.61
			Other	4	1.11
			NA	2	0.56
			Total	360	100.00

Table 8 : Awareness Status of the Respondents

Experience of Living in a City			Preferred Program(s)		
Scale	Freq.	%	Program(s)	Freq.	%
No	307	85.28	Drama	79	36.24
Yes	53	14.72	News	42	19.27
Total	360	100.00	Islamic	31	14.22
			All type / Mix	66	30.27
			Total	218	100.00
Watching TV as a source of mass media					
Watch TV		Freq.		%	
No		70		19.44	
Yes		290		80.56	
Total		360		100.00	

Table 9 : Ordered Probit Regression Results

Variables	Health Status	Gender Relations	Mobility Status	Awareness Status
age1625	0.437 (0.39)	0.192 (0.39)	0.138 (0.39)	0.096 (0.46)
age2635	0.132 (0.31)	-0.065 (0.31)	0.536* (0.32)	0.188 (0.37)
age3645	0.108 (0.29)	0.233 (0.29)	0.629** (0.29)	-0.395 (0.34)
age4655	0.120 (0.28)	0.375 (0.29)	0.360 (0.29)	-0.190 (0.34)
upto5	-0.034 (0.17)	0.316* (0.18)	0.058 (0.17)	0.102 (0.20)
upto8	0.147 (0.23)	-0.323 (0.23)	-0.102 (0.23)	0.345 (0.27)
upto10na	0.229 (0.23)	-0.014 (0.23)	0.303 (0.23)	0.533* (0.27)
jobstatus	0.186 (0.36)	0.901** (0.41)	0.230 (0.36)	0.474 (0.42)
heupto5	-0.156 (0.19)	0.270 (0.20)	0.101 (0.19)	0.188 (0.23)
heupto8	-0.201 (0.20)	0.064 (0.20)	-0.017 (0.20)	0.230 (0.23)
heto10na	-0.007 (0.18)	0.117 (0.19)	-0.177 (0.19)	0.134 (0.22)
hooother	-0.308 (0.31)	0.092 (0.31)	-0.036 (0.31)	-0.059 (0.35)
hojob	0.132 (0.18)	-0.042 (0.18)	-0.068 (0.18)	0.715*** (0.22)
holowerpro~i	0.190 (0.27)	0.481* (0.28)	-0.250 (0.27)	0.211 (0.32)
holabor	0.144 (0.23)	-0.451* (0.23)	-0.504** (0.23)	-0.489* (0.27)
fysize	-0.609*** (0.05)	0.016 (0.04)	-0.032 (0.04)	0.065 (0.05)
nuclear	0.008 (0.12)	-0.270** (0.13)	0.047 (0.12)	0.241 (0.15)
ownlnd	0.008 (0.01)	-0.006 (0.01)	0.003 (0.01)	0.044*** (0.01)
lnincome	-0.003 (0.11)	-0.175 (0.11)	0.327*** (0.11)	0.272** (0.13)
near	-0.207 (0.13)	-0.455*** (0.13)	0.065 (0.13)	-0.353** (0.15)
mostdeprived	-0.356** (0.17)	-0.550*** (0.17)	0.641*** (0.17)	0.577*** (0.20)
mediumdepr~d	0.040 (0.18)	0.100 (0.19)	0.999*** (0.19)	0.262 (0.22)
Log likelihood	-446.5658	-491.0523	-447.9851	-236.5264
Pseudo R sq	0.2250	0.0838	0.0667	0.1902

Table 10 : Ordered Probit Regression Results

Variables	Health Status	Gender Relations	Mobility Status	Awareness Status
	Beta (SE)	Beta (SE)	Beta (SE)	Beta (SE)
age1625	0.207 (0.38)	-0.169 (0.38)	-0.083 (0.38)	0.285 (0.44)
age2635	-0.030 (0.30)	-0.317 (0.31)	0.439 (0.31)	0.296 (0.36)
age3645	0.067 (0.28)	0.174 (0.29)	0.393 (0.29)	-0.336 (0.33)
age4655	0.083 (0.28)	0.329 (0.28)	0.369 (0.28)	-0.074 (0.33)
upto5	-0.053 (0.17)	0.255 (0.18)	0.058 (0.17)	0.104 (0.20)
upto8	0.039 (0.22)	-0.486** (0.22)	-0.138 (0.22)	0.380 (0.26)
upto10na	0.102 (0.22)	-0.220 (0.22)	0.268 (0.22)	0.557** (0.26)
jobstatus	0.270 (0.36)	0.979** (0.40)	0.313 (0.35)	0.443 (0.41)
heupto5	-0.115 (0.19)	0.295 (0.19)	0.106 (0.19)	0.084 (0.22)
heupto8	-0.166 (0.19)	0.089 (0.20)	0.083 (0.19)	0.109 (0.22)
heto10na	0.013 (0.18)	0.107 (0.18)	-0.115 (0.18)	-0.004 (0.21)
hoother	-0.336 (0.30)	0.051 (0.30)	0.267 (0.30)	-0.009 (0.35)
hojob	0.217 (0.18)	0.126 (0.18)	0.085 (0.17)	0.722*** (0.21)
holowerpro~i	0.163 (0.26)	0.456 (0.28)	-0.080 (0.26)	0.362 (0.31)
holabor	0.002 (0.22)	-0.660*** (0.23)	-0.419* (0.23)	-0.331 (0.26)
fysize	-0.609*** (0.05)	0.002 (0.04)	-0.088** (0.04)	0.071 (0.05)
nuclear	0.006 (0.12)	-0.273** (0.12)	0.176 (0.12)	0.189 (0.14)
ownlnd	0.007 (0.01)	-0.005 (0.01)	0.014 (0.01)	0.054*** (0.01)
lnincome	-0.010 (0.09)	-0.205** (0.10)	0.054 (0.10)	0.092 (0.11)
Log likelihood	-451.3304	-505.7349	-462.8748	-243.1288
Pseudo R sq	0.2168	0.0564	0.0357	0.1676

Impact of Spatial Variables on Various Aspects of Women's Status			
Various aspects of women's status	Explanatory power of regression model (Pseudo R-square)		
	Without spatial variables	with spatial variables	% Variability explained
Health status	0.2168	0.2250	0.82
Gender relations	0.0564	0.0838	2.74
Mobility status	0.0357	0.0667	3.1
Awareness status	0.1676	0.1902	2.26

CHAPTER 6

FAMILY, LABOUR, GENDER ROLES & WOMEN'S PARTICIPATION IN LIVESTOCK MANAGEMENT ACTIVITIES

In order to see the participation of family labor in livestock management activities we have made analysis of the participants at each of the three geographical levels: regional, sub regional, and local. The categories of participants involved in livestock management activities were: *couple* (wife/respondent and her husband), *children* (respondent's daughter and Son), and *respondent's in-laws* (female in-laws: mother-in-law, daughter-in-law, and sister-in-law, and male in-laws: father-in-law and brother-in-law). For a list of seven livestock management related activities: fodder cutting, fodder serving, water serving, dung collection, bathing, milking, and milk selling, we made the six different types of participations to divide the family labor on, and these were: qualitative, quantitative, gender based, mode of involvement based, family structure based, and non-physical participation. The nature of our analyses is descriptive, that include averages, percentages, and frequency distributions. Women-to-men participation ratio and wife-to-husband participation ratio have been used as measures to determine the gap between the both genders in terms of carrying out the number of livestock management activities.

Abstract

In determining the nature and level of participation of the family labor in livestock management activities, cultural norms (women's restricted mobility, and practice of observing veil (purdah)), theory of masculinity & femininity (participation in soft and hard natured activity), availability of family labor (number of helping hands), and physical condition of the participant (old or young age, health condition) seems to matter the most than the other factors, that is, agro-climatic and geographical/spatial variations. In the context of Punjab, the activities like, fodder serving, serving water, dung collection, and milking are considered soft-natured activities and can be performed inside the four walls of home, so are mostly women's job. Activities like, fodder cutting, bathing the animals, milk selling are generally hard-natured and outside home activities, so are mostly performed by the men. Women's participation was low in the activities (like, milk selling) where more chances were there for them to interact with unknown males. So, cultural restriction of purdah (seclusion)

and confined mobility were dynamic in Punjab. Bathing of animals was the most performed activity by respondent's son. Amongst the female in laws, the most of the activities were performed by respondent's mother in law and her maximum participation in milking activity seems justified in terms of her old age and relatively soft-nature of milking activity. Out of total seven major livestock management activities, in cotton-wheat zone, rain-fed zone, and mix-crop zone the average number of activities being carried out by women/respondents were 4.43, 3.72, and 4.34 respectively. After the respondent, the second person whose participation was the maximum in managing livestock was her husband. Though he comes second in undertaking livestock management activities but in comparison with his wife, his participation was approximately three times less than that of his wife. In the rural families of Punjab, children were found as the third major contributor in livestock management activities. Amongst the family labor, in the livestock management activities, the participation of respondent's in laws was the lowest. At each of the three geographical levels (regional, sub regional, and local), women respondent's participation level was multiple of that of their husbands' level in livestock management activities. Wife-to-husband participation ratio was raising as the distance of a village from the nearest city was increasing. The level of participation, for a husband with his primary occupation farming, was high in livestock management related activities. The women-to-men participation ratio served as a measure to capture the gap between the both genders in terms of carrying out the number of activities. Women-to-men participation ratio measured for our study was ranging from the minimum 1.74 (calculated for rain-fed zone) to the maximum 3.40 (calculated for mix-crop zone). Amongst the agro-climatic zones, the largest gap was seen in mix-crop zone followed by the cotton-wheat zone, while the least gap was calculated for the rain-fed zone. As per our expectations, the wider gap was recorded amongst gender participation in the villages located at far off distances from the cities. Respondent-women's non physical participation in the livestock management was relatively better in rain-fed zone followed by mix-crop zone, whereas the situation was poor in cotton-wheat zone. Our findings show that women's level of participation in livestock management activities empower rural women in terms of better gender relations or increased decision-making power on the matters relating to the livestock management.

6.1 Introduction

While going through the literature on women's participation in livestock management in Pakistan, many research findings can be seen. But in all the previous researches, only household woman and her husband can be seen as only two of the family members taking part into the upkeep of animals. The current research is novel and interesting in the way that it brings into notice some other actors or family members who perhaps always remain unobserved, though our primary focus is on our respondent due to her large and significant role in livestock management activities. In rural areas of Pakistan (Punjab), family labor is engaged in managing livestock. We have placed the family members who are involved in the upkeep of livestock into three categories. Each member is working either individually or in combination with other family members.

6.2 Participants of the family labor

The categories involved in livestock management activities are: couple (wife/respondent and her husband), children (respondent's daughter and Son), and respondent's in-laws (female in-laws and male in-laws). Now we, one by one, see the personal attributes of each of the participant category.

6.2.1 Couple

i) Wife (Respondent)

She is the key participant who has the highest participation level than other participants in the family. Most of the livestock management related activities are performed by her. So, being the important part of livestock management system, it is important to describe her, that who she is. The average age and number of schooling years recorded for the respondents were respectively, 40.87 years and 3.32. Except 4% widows, all the respondents had marital status as "married". Regarding the status of their health, only 37.50% were enjoying a health status from "good" to "very good" level, while a large majority (62.50%) had "poor" to "average" level of health status. Except a very small percentage of employed respondents, all respondents were unemployed and were engaged in housekeeping and mostly serving as family labor in performing seasonal, pre-, and post-harvesting activities relating to crop production.

ii) Husband

After the respondent, it is her husband who ranked second on the basis of his level of participation in the livestock management. The average age and number of schooling years, recorded for her husband were 45.56 years and 5.59 respectively. More than 60% of the respondents' husbands were engaged in crop farming, 26.51% were dependent on the off-farm activities for their livelihoods, and 8.65% were occupying both farm and non-farm activities as type of employment. Out of those engaged in off-farm employment, 59.79% were employed in the service sector, 22.82% were laborers, 10.87% were self-employed, and 6.52% were engaged in professional or technical occupations.

6.2.2 Children

It was found that out of 360 households, only in 75 (20.83%) households children were engaged in livestock management activities along either with one or both of their parents. In 46, 14, and 15 households, respectively, it was the respondent's son only, her daughter only, and both of her children who were participating in livestock management activities. Average age and number of schooling years recorded for the children were 22 years and 6.72 respectively. Gender disaggregated analysis for both male and female children gave slightly differentiated information on their marital and occupational status. Out of those male children who participated in livestock management activities, 82% were unmarried while out of those female children who participated in livestock management activities, above 93% were unmarried. Most of the male children at the age of 18 or below had student status, whereas those of having their age above 18 were mostly engaged either in the crop farming or were self-employed. All of the female children engaged in livestock management activities were neither student any more nor were occupying any job but were serving as the helping hands to their mothers in domestic or housekeeping related affairs.

6.2.3 In-laws

In the rural context of Punjab, a large majority of the families live under joint familial system. In a milieu of predominating joint familial system, a woman after her marriages has to live along with her in-laws. In this category, amongst the female in-laws, mother-in-law, daughter-in-law, and sister-in-law were the main participants, while amongst the male in laws; father-in-law and brother-in-law were the main participants. Amongst those two sub-

categories of in-laws (male and female in-laws), mother- and father-in-laws were seen more active in participating in livestock management activities.

6.3 Family Characteristics and Gender Relations

The average size of the family was recorded as 5.37 persons and regarding the familial system, 46% were living under nuclear familial system while 54% were living under non-nuclear family system. Only in a few (8.61%) cases, it was told that it was the woman-respondent who had the whole power or authority to make decisions regarding family related matters. In most (62.50%) of the cases, as replied by the respondents, her participation in decision making was jointly, that is, either as a decision maker along with her husband or with the whole family. About 37.50% respondents told that they were not consulted while making decisions on the family related matters. A large number (62.78%) of respondents told that their participation in the matters relating to the management of livestock was from “often” to “always” while for the rest of 37.22% respondents their level of participation was from “never” to “sometime”. About 24% respondents reported the happening of a quarrel between husband and wife on different matters. In a matter of fact, generally such issues are not reported but hided, especially from unknown persons. But sometimes, an unknown person is trusted by considering him or her a neutral person and issues like domestic violence are not told (to him or her) but indicated lightly and expressed in counted words by giving smile as other family members (especially in-laws) are near by the interviewee, so precautionary measures are taken by her to safe her side.

6.4 Different Types of Participation

We are going to identify that, in the livestock management activities, how the participation of these aforementioned actors can be observed in terms of different types of participation. We have the following different types of participations to divide the family labor on, and these are: *Qualitative Participation, Quantitative Participation, Gender based Participation, Mode of Involvement based Participation, and Family Structure based Participation and Non-physical Participation.*

6.4.1 Qualitative Participation

It is concerned to take into account the type or nature of activities undertaken by the participants. Frequency and percentage distribution of both sexes regarding their participation in the different types of livestock management related activities in the districts of Punjab are given in the table 11.

In determining the nature of participation by type of livestock management activity, socio cultural factors (of women's restricted mobility, and practice of purdah), economic factors seems to matter the most than the other, that is, agro-climatic and geographical variations/factors. Traditional cultural norms are operative even in determining the gendered division of labor in livestock management activities. Male seems participating more in the activities mostly concerning livestock management activities out of home (figure 17). For example, for cutting of fodder for the animals, one has to go to the fields in close vicinity of the village or situated at too far locations from the home. So, women are less participative in this activity and it is mainly men's activity. The results from our data analysis present fodder cutting as the least performed activity by our respondent women. While a woman's most performed livestock management activity in each sub-region, region, and location is dung collection. Culturally, dung collection is considered exclusively women's job. They collect dung to dump it to make compost/farmyard manure, to make dung cakes (to use as bio fuel for cooking food/meals in most of the rural households), or to use it to coat the house courtyards and walls along with mud and clay. Hence, for men, the dung collection was as their least performed livestock management activity. At most of the places, the participation of respondent's daughter was the least in fodder cutting. Again the cultural reasons that is, women's confined mobility and the practice of veil (purdah) are operative here. Culturally, women can participate in the farming (crop or livestock) activities if occurring inside or near to their homes. Secondly, the theory of masculinity and femininity seems to operate in the division of family labor. Fodder cutting is generally and culturally considered as hard natured activity, so males preferably undertake such kind of activities. At the same time, daughter's participation was the least in the activities like, milk selling and bathing of the animals. Daughter's least participation in the selling of milk activity can be justified by stating that may be she is too young and do not understand the principles/tactics of marketing, and secondly, while the marketing of milk, more chances are there for her to interact with unknown male consumers/buyers. So, cultural restriction of purdah (seclusion) is dynamic

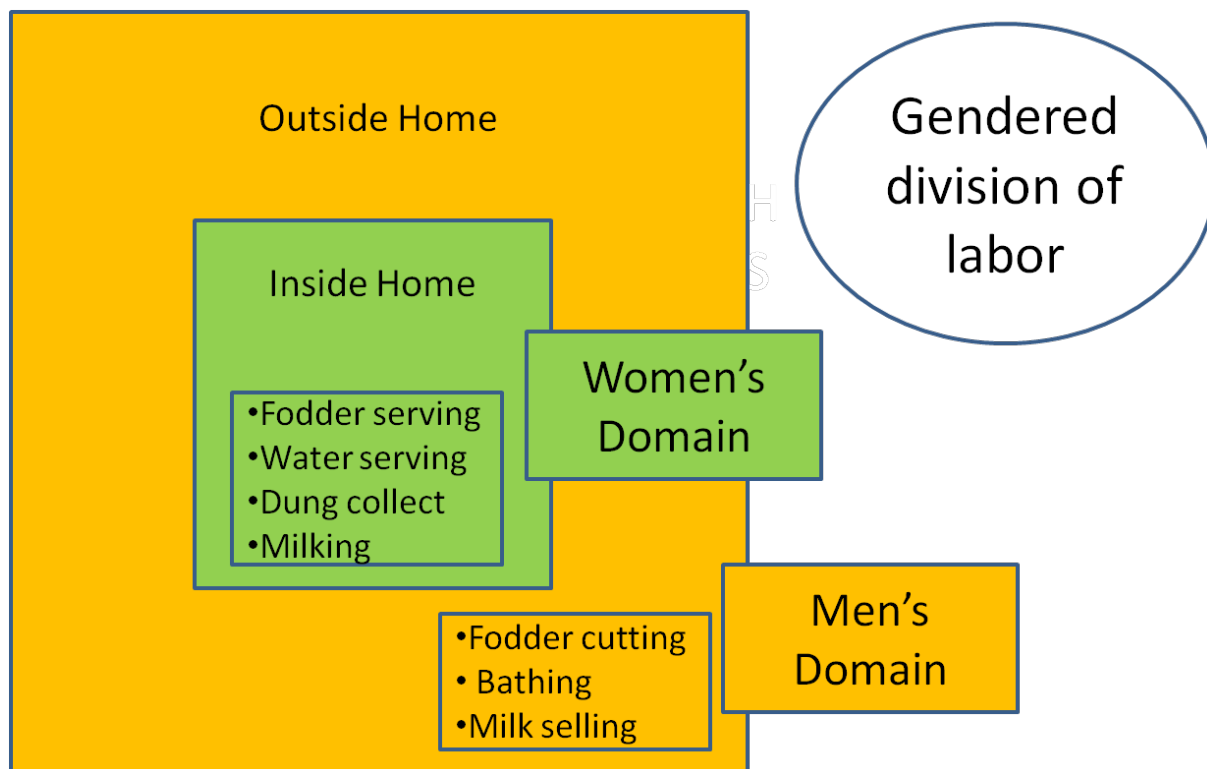


Figure 17: Nature of participation

here. In rural areas of Punjab, for bathing, the animals are usually carried to an open water source, like pond, canal, water channel, etc. These water resources are usually far away from the homes, so carrying the animals for bathing is preferably boys' (respondent's son) activity. For young boys, it is a recreational activity, as is evident from the data that bathing animals was the most performed activity by respondent's son. The least participation of respondent's son in dung collection and milk selling again strongly confirm the tight clutches of the cultural norms. Amongst the family labor, in the livestock management activities, the participation of respondent's in laws was the lowest. It was hard to identify the commonly occurring least and most performed activities by respondents' in laws. Amongst the female in laws, the most of the activities were performed by respondent's mother in law, so her most participation in milking activity seems justified in terms of her old age and relatively soft-nature of milking activity. The activities like, fodder cutting, bathing of animals, and dung collection are hard-natured activities, so difficult to be carried out by an old lady. Amongst the male in laws, respondent's father in law was carrying out most of the activities and he was seen participating mostly in bathing of animals, which is often an outside home activity. Again culturally, male in laws' participation was the least in dung collection activity.

6.4.2 Quantitative Participation

It focuses on the extent or level of participation of the participants in terms of number of activities undertaken by them. Frequency distribution of the participants regarding their different levels of involvement in livestock management activities is given in the table 12-13 and figure 18.

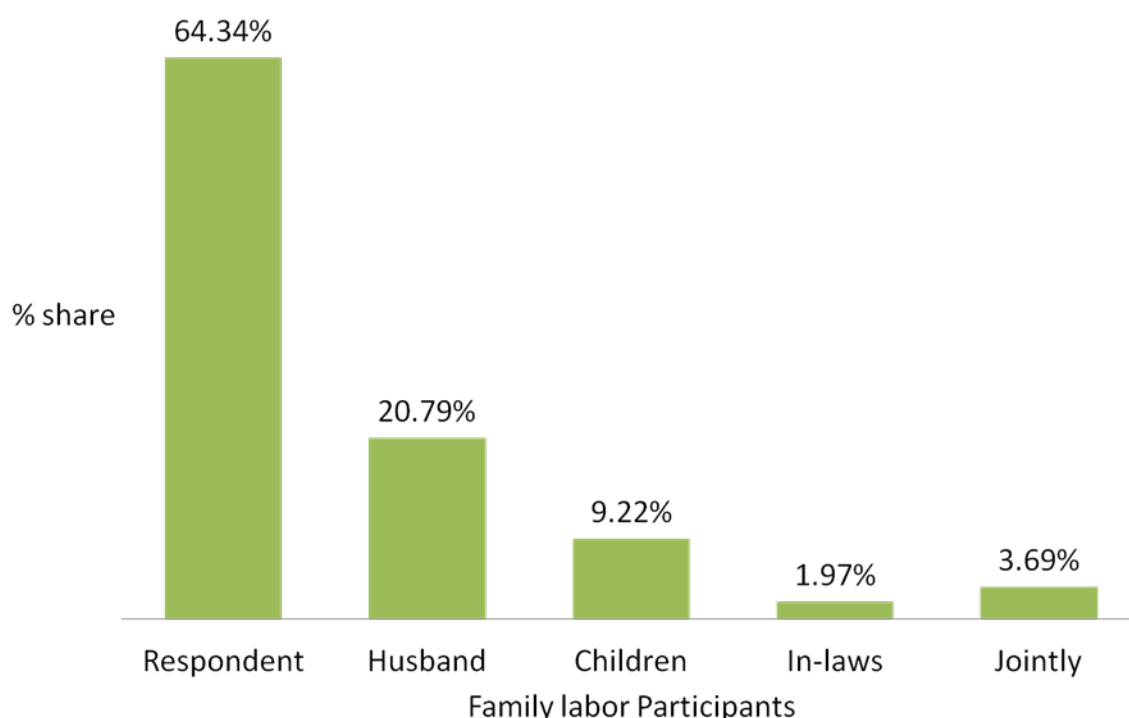


Figure 18: Level of participation

Out of total seven major livestock management activities, in cotton-wheat zone, rain-fed zone, and mix-crop zone the average number of activities being carried out by women/respondents were 4.43, 3.72, and 4.34 respectively. This finding shows that amongst the three agro climatic zones, only in rain-fed zone women/respondents were performing the lowest average number of activities. The most probable reason for this, as evident from the data, may be the help from the other family members (husband, children, and in-laws) in terms of their participation in livestock management activities to share the woman/respondent's burden and save her labor. It shows the facilitative attitude of the family members toward respondent and also the availability of family labor. Education has a key role in building the behavior and attitude of the persons. In rain-fed zone, amongst the three

agro climatic zones, the literacy rate and level of education is the highest, so the people have more caring and facilitating attitude toward women.

It is evident from the table 13 that at each of the three geographical levels (regional, sub regional, and local), women respondent's participation level is multiple of that of their husbands' level in livestock management activities. Another interesting finding (also apparent from the results in the table) is that wife-to-husband participation ratio raises as the distance of a village from the nearest city increases (see participation ratio in the table for the villages at their distances from the city). It means that in the villages locating at remote distances from the cities, as compared to their husbands, women were more heavily engaged in performing the livestock management activities. This finding strengthens our hypothesis about the effect of distance (nearness/remoteness) of a rural area from the urban area on women's participation in livestock management activities. The data depicts that the average number of livestock management related activities carried out by husbands decrease when the distance of a village from the city increase. Our results also show that in the villages in close proximities to the cities, respondents' husbands were mostly engaged in farming occupations, so used to share the burden of their wives by participating in livestock management activities because crop and livestock farming are almost the allied activities. Hence, for a husband whose primary occupation is farming, it is more probable to participate more in carrying out livestock management related activities as well.

6.4.3 Gender-based Participation

Under this type of participation, we are going to know that what percentages of total activities were performed by females, males, and by both of them (table 14 and figure 19).

A descriptive analysis of gender based participation in livestock management is given in the table. At each geographical level (regional, sub regional, and local) gendered participation is measured by using a measure—women-to-men participation ratio. The measure for our study was ranging from the minimum 1.74 (calculated for rain-fed zone) to the maximum 3.40 (calculated for mix-crop zone). The value of this measure determines the activities carried out by women as a multiple of the activities carried out by the men. Greater is the value of women-to-men participation ratio wider is the gap between the both genders in terms of

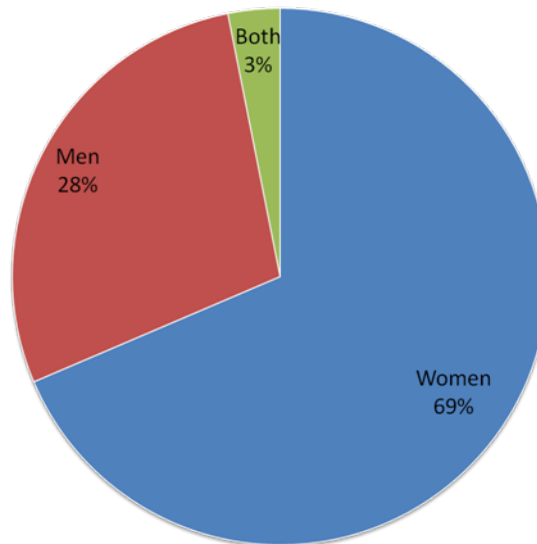


Figure 19: Gender-based participation

carrying out the number of activities. Amongst the agro-climatic zones, the largest gap was seen in mix-crop zone followed by the cotton-wheat zone, while the least gap was calculated for the rain-fed zone. The reason, as discussed earlier, could most probably be the existence of relatively more facilitative attitude towards spouse in rain-fed zone. As per our expectations, the wider gap was recorded amongst gender participation in the villages located at far off distances from the cities. In the figure 20, women-to-men participation ratio equal to 1 mean equal participation of both the sexes. A participation ratio less than 1 mean more number of activities carried out by men than that of the women and vice versa.

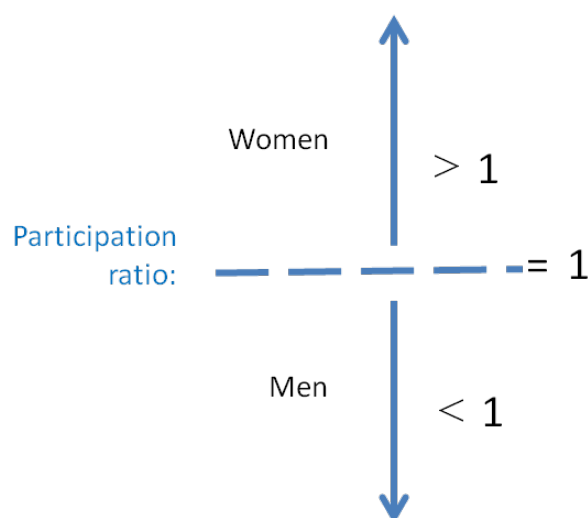


Figure 20: Defining women-to-men participation ratio

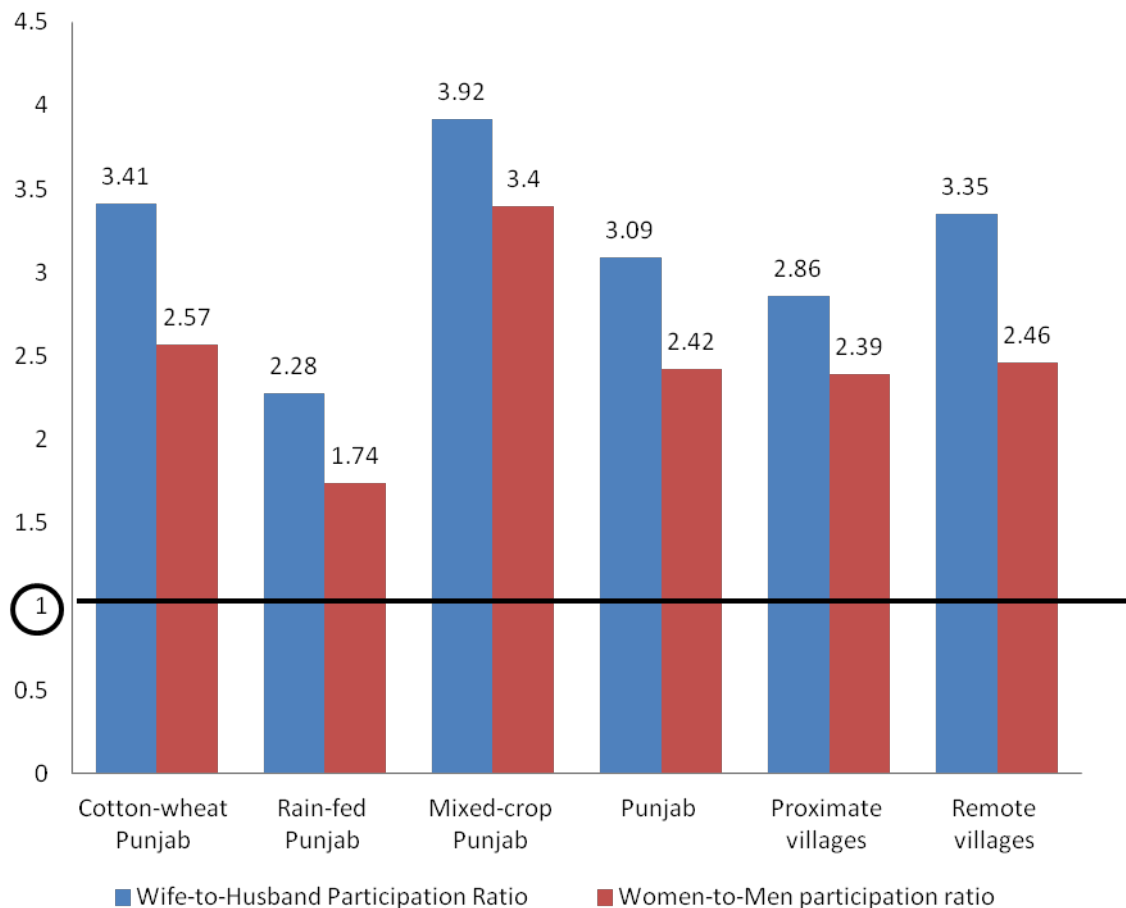


Figure 21: Wife-to-husband participation ratio at different geographical levels

6.4.4. Mode of Involvement based Participation

Mode of involvement in an activity implies toward an activity carried out either by a single person or by two persons. Mode of involvement in livestock management can be divided into two: activity performed singly (participant is carrying out an activity alone or as a single individual) and activity performed jointly (a single activity is shared by two individuals to be performed mutually). Regarding joint participation, diversity was seen across agro-climatic zones and at overall Punjab (table 15 and figure 22). In joint participation, on the basis of family members' involvement, the combinations seen were: *female-female* (respondent-daughter), *female-male* (respondent-husband, respondent-son), and *male-male* (husband-son). Amongst the all combinations the major part of the jointly performed activities came from the respondent-husband combination and it remained an important and considerable combination that was practiced in the three agro-climatic zones in Punjab. The joint participation of husband and wife was mostly seen in the activities of fodder serving, fodder cutting, bathing, and serving water to the animals. Remaining all combinations other than respondent-husband,

were seen only in one (cotton-wheat: BNR) agro-climatic zone. It was recorded that after respondent-husband, the maximum number of activities was performed by the respondent in combination with her daughter.



Figure 22: Mode of involvement based participation

At region, sub region, and local levels about more than 93% activities were performed singly by any of the participants. Only less than 7% activities were performed jointly by the respondent along with any of the family member (amongst her husband, son, and daughter). Most of the jointly performed activities were shared by the respondent and her husband. Amongst the sub regions, respectively 3.74%, 1.17%, and 6.18% activities were performed jointly in cotton-wheat, rain-fed, and mix-crop Punjab. The maximum jointly performed activities were carried out in the mix-crop Punjab but the minimum in rain-fed Punjab. At local level, as compared to the villages located at remote distance from the city, more number of jointly performed activities was carried out in the villages located in close proximities to the city.

6.4.5. Family Structure based Participation

This type of participation can be defined in terms of the relatives of a nuclear family: husband, wife, and their children, and the relatives of a joint family that are mainly (regarding our study): mother in law, daughter in law, sister in law, father in law, and brother in law.

The nature of participation observed in livestock management related activities was different for different types of relatives. The part of our respondent's in laws in sharing the burden of her daily livestock management related tasks remained only about 2 per cent. While about 98 per cent activities were carried out by her own self, followed by her husband and children (table 16, figure 23).

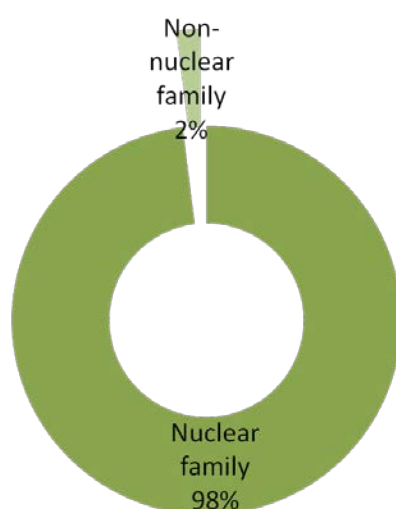


Figure 23: Family structure based participation

i) Comparing Respondent's and her Husband's Participation

As it is evident from the results (table 18) that, at regional, sub regional and local levels, a large number of activities were carried out by the respondent alone. After the respondent, the second person whose participation is the maximum in managing livestock is her husband. Though he comes second in undertaking livestock management activities but in comparison with his wife, his participation is approximately three times less than that of his wife. Amongst the sub regions, not in a single activity, husband's participation outnumbers the participation of his wife.

By comparing the type of activities performed by the respondent and by her husband, we find some interesting and variant information. When we rank the activities, undertaken by our respondent, in a descending order, we find that in all three districts and on overall basis her participation was at most in dung collection activity while for her husband the participation was the least in dung collection. On overall basis, husband's participation was at the top for

fodder cutting but at the bottom for the respondent. A comparative ranking of the livestock management related activities undertaken by rural women and their husbands is given in the table 8. The table-8 shows the participation trend of both sexes in livestock management related activities. For the list of activities given in the table, woman's level of participation is decreasing as going from top to down, contrary to her husband for whom the level of participation is increasing as going from the top to the bottom. In comparison with her husband in each type of activity, she is 3 to 5 times more participative than him in terms of number of activities performed.

ii) Children's Involvement in Livestock Management Activities

In the rural families of Punjab, children were found as the third major contributor in livestock management activities. Among the children, gender based participation has been recorded. Activities carried out by male child (son) outnumbered the activities undertaken by female child (daughter). On overall, the activities carried out by male child were multiple (2.30 times) of those undertaken by female child. General pattern and nature of participation in livestock management activities was almost similar at overall Punjab level and in the three agro-climatic zones of Punjab. Descending order of top three activities where maximum participation of male children had been seen were: bathing, fodder cutting, and serving water to the animals. While for female children, top three activities where their maximum participation recorded were: dung collection, milking and serving water to the animals.

iii) In-laws' Participation

On overall basis 47 activities were performed by the in-laws of the respondents. Their maximum participation was seen in milking and serving water to the animals. Out of the total 47 activities being performed by the in-laws of the respondent, 27 activities were performed by female in-laws and 20 by the male in-laws.

6.4.6 Non-physical Participation

This can also be called mental participation. In this type of participation we are going to consider the participation of our respondent women in the decision making regarding different matters relating to livestock management. Men are the main decision makers in the social and cultural context of the rural Punjab. In this type of participation, we see that how

often our respondents are consulted by their husbands while making decisions on livestock management related matters.

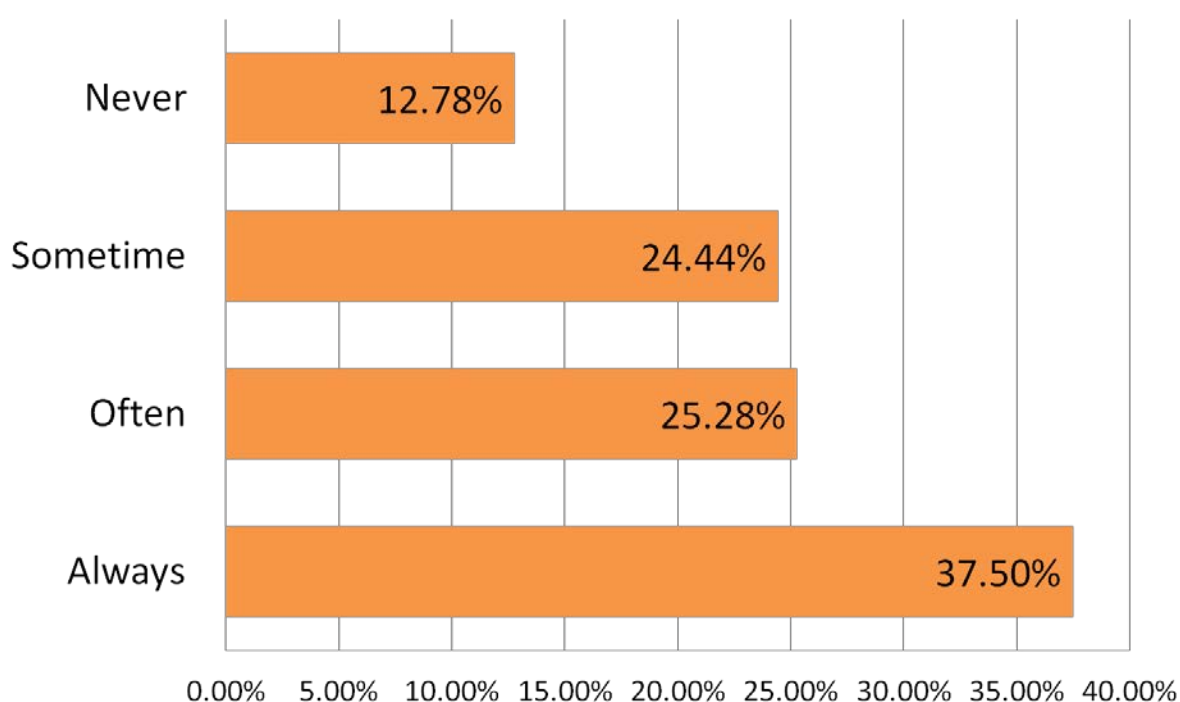


Figure 24: Participation in decision making on livestock management related matters

Woman-respondent's participation in the decision-making on the matters relating to the livestock management is gauged through asking her the question: how often she is consulted by her husband while making decision on the matters relating to the livestock? So, there exist two elements here, firstly, the quality of gender relations, and secondly, woman-respondent's non physical participation in livestock management activities. Women's non physical participation was calculated on the four point scale: always, often, sometime, and never (table 17, figure 24). It is evident from the results that the quality of gender relations or respondent-women's non physical participation in the livestock management was relatively better in rain-fed zone followed by mix-crop zone, whereas the situation was poor in cotton-wheat zone. The possible reason for this differential could be the relative developmental status of these zones. As compare to cotton-wheat zone, the other zones are more developed in terms of indicators on literacy, educational status of the people, economic and employment opportunities, and overall provision of developmental infrastructure. The situation of women's participation in the decision making on livestock management related matters was better in the villages located at far off distances from the cities, as compared to the villages locating in close proximities to the cities. The most probable reason for such variation could

be the difference in the level of participation in livestock management at both these location of the villages. In our case, results have shown that women in remote villages were carrying out more number of livestock management activities as compared to those of living in the villages at close distances from the city. So, it means that women's level of participation in livestock management activities empower rural women in terms of better gender relations or increased decision-making power on the matters relating to the livestock management.

6.5 Conclusion

Cultural norms, theory of masculinity & femininity, availability of family labor, and physical condition of the participant seems to matter the most in determining the nature and level of participation of the family labor in livestock management activities. In the context of Punjab, the activities like, fodder serving, serving water, dung collection, and milking are considered soft-natured activities and can be performed inside the four walls of home, so are mostly women's job. Activities like, fodder cutting, bathing the animals, milk selling are generally hard-natured and outside home activities, so are mostly performed by the men. Women's participation was low in the activities (like, milk selling) where more chances were there for them to interact with unknown males. So, cultural restriction of purdah (seclusion) and confined mobility were dynamic in Punjab. Bathing of animals was the most performed activity by respondent's son. Amongst the female in laws, the most of the activities were performed by respondent's mother in law and her maximum participation in milking activity seems justified in terms of her old age and relatively soft-nature of milking activity. Out of total seven major livestock management activities, in cotton-wheat zone, rain-fed zone, and mix-crop zone the average number of activities being carried out by women/respondents were 4.43, 3.72, and 4.34 respectively. After the respondent, the second person whose participation was the maximum in managing livestock was her husband. Though he comes second in undertaking livestock management activities but in comparison with his wife, his participation was approximately three times less than that of his wife. In the rural families of Punjab, children were found as the third major contributor in livestock management activities. Amongst the family labor, in the livestock management activities, the participation of respondent's in laws was the lowest. At each of the three geographical levels (regional, sub regional, and local), women respondent's participation level was multiple of that of their husbands' level in livestock management activities. Wife-to-husband participation ratio was raising as the distance of a village from the nearest city was increasing. The level of

participation, for a husband with his primary occupation farming, was high in livestock management related activities. The women-to-men participation ratio served as a measure to capture the gap between the both genders in terms of carrying out the number of activities. Women-to-men participation ratio measured for our study was ranging from the minimum 1.74 (calculated for rain-fed zone) to the maximum 3.40 (calculated for mix-crop zone). Amongst the agro-climatic zones, the largest gap was seen in mix-crop zone followed by the cotton-wheat zone, while the least gap was calculated for the rain-fed zone. As per our expectations, the wider gap was recorded amongst gender participation in the villages located at far off distances from the cities. Respondent-women's non physical participation in the livestock management was relatively better in rain-fed zone followed by mix-crop zone, whereas the situation was poor in cotton-wheat zone. Our findings show that women's level of participation in livestock management activities empower rural women in terms of better gender relations or increased decision-making power on the matters relating to the livestock management.

Table 11 : Qualitative Participation

Qualitative Participation													
		BNR		CKL		FSD		OA		Near		Far	
	Act Per	LMA	%	LMA	%	LMA	%	LMA	%	LMA	%	LMA	%
Wife	LP	FC	31.67	BG/FC	38.34	FC	46.67	FC	42.26	FC	26.11	BG	50.00
	MP	DC	89.17	DC	79.17	MS	84.62	DC	85.46	MS	83.44	DC	82.78
Husband	LP	DC	0.83	DC	4.17	DC	5.83	DC	3.86	DC	2.22	DC	5.00
	MP	FC	45.83	FC	38.34	FC	29.17	FC	40.48	FC	48.33	FC	27.22
Daughter	LP	MS	0	FC/BG	0.83	FC	0.00	FC/MS	0.89	FC	1.67	FC/MS	0.00
	MP	DC	4.17	DC	8.33	DC/BG	4.17	DC	5.93	DC	7.22	DC	3.89
Son	LP	DC	0.83	MS	1.23	MS	0.00	MS	1.32	MS	0.00	DC	2.78
	MP	BG	11.67	BG	20.84	BG	4.17	BG	13.06	BG	9.44	BG	15.00
Feml in law	LP	DC/ MS	0	DC/MS	0.00	FC/FS/WG/B G	0.83	DC/BG	0.59	BG	0.56	DC/MS	0.00
	MP	WG	0.83	MG	4.17	DC/MG/MS	1.70	MG	2.02	MG	2.22	MG	1.67
Mal in law	LP	DC	0	FC/DC/ MS	0.00	MG/MS	0.00	MS/MG	0.29	MG/MS	0.00	DC	0.00
	MP	BG	0.83	BG	1.66	FC/FS/WG/B G	1.67	BG/FS	1.48	FC/FS/WG/ BG	1.11	BG	1.67
Servant	LP			MS	0.00	MS	0.86			MS	0.00	MS	0.71
	MP			FC/DC	5.0	FC	12.5			DC/BG	7.78	FC	6.67
Jointly	LP	WG		DC/MS	0.00	DC	1.67	DC	1.18	DC	2.22	DC	0.00
	MP			WG	1.67	FS/BG	8.33	FC	4.77	FS	7.22	FC/BG	2.78

LMA=Livestock Management Activity, LP= Least Performed, MP= Most Performed, FC=Fodder Cutting, FS=Fodder Serving, WG=Watering, DC=Dung Collection, BG=Bathing, MG=Milking, MS=Milking Selling. The values show the % of houses wherein the particular livestock management is performed.

Table 12 : Quantitative Participation (Activities Performed in No. and Percentages)

Participant	BNR		CKL		FSD		OA		NEAR		FAR	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Respondent	532	66.33	447	57.98	522	68.68	1501	64.34	718	61.53	783	67.15
Husband	156	19.45	196	25.42	133	17.50	485	20.79	251	21.51	234	20.07
Children	76	9.48	99	12.84	40	5.26	215	9.22	110	9.43	105	9.01
In laws	8	1.00	20	2.59	18	2.37	46	1.97	26	2.23	20	1.72
Jointly	30	3.74	9	1.17	47	6.18	86	3.69	62	5.31	24	2.06
Total	802	100.00	771	100.00	760	100.00	2333	100.00	1167	100.00	1166	100.00
Servant	23		30		77		130		76		54	
Families not selling milk	15		39		3		57		17		40	
	840		840		840		2520		1260		1260	
*Wife-to-Husband Participation Ratio	3.41		2.28		3.92		3.09		2.86		3.35	
* Wife-to-Husband Participation Ratio = total number of activities performed by wives / total number of activities performed by husbands BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city												

Table 13 : Quantitative Participation (Average No. of Activities)

Participant	BNR	CKL	FSD	OA	NEAR	FAR
	Mean	Mean	Mean	Mean	Mean	Mean
Respondent	4.24	3.72	4.35	4.10	3.98	4.22
Husband	1.30	1.63	1.11	1.35	1.39	1.30
Children	0.63	0.81	0.33	0.59	0.60	0.58
In laws	0.07	0.15	0.15	0.12	0.13	0.11
Servant	0.19	0.25	0.64	0.36	0.42	0.30
BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city						

Table 14 : Gender based Participation

	BNR		CKL		FSD		OA		NEAR		FAR	
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%
Activities performed by women	563	70.20	486	63.04	551	72.50	1600	68.58	785	67.27	815	69.90
Activities performed by men	219	27.31	279	36.19	162	21.32	660	28.29	329	28.19	331	28.39
Activities performed by both	20	2.49	6	0.78	47	6.18	73	3.13	53	4.54	20	1.72
Total	802	100.00	771	100.00	760	100.00	2333	100.00	1167	100.00	1166	100.00
Women-to-Men participation ratio	2.57		1.74		3.40		2.42		2.39		2.46	
Av. Activities performed by women	4.50		4.03		4.59		4.37		4.34		4.40	
Av. Activities performed by men	1.83		2.31		1.35		1.83		1.82		1.84	
BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city												

Table 15 : Mode of Involvement based Participation

	BNR		CKL		FSD		OA		NEAR		FAR	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Singly	772	96.26	762	98.83	713	93.82	2247	96.31	1105	94.69	1142	97.94
Jointly	30	3.74	9	1.17	47	6.18	86	3.69	62	5.31	24	2.06
Total	802	100.00	771	100.00	760	100.00	2333	100.00	1167	100.00	1166	100.00
BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city												

Table 16 : Family Structure based Participation

	BNR		CKL		FSD		OA		NEAR		FAR	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Nuclear	794	99	751	97.41	742	97.63	2287	98.03	1141	97.77	1146	98.28
Non-nuclear	8	1.00	20	2.59	18	2.37	46	1.97	26	2.23	20	1.72
Total	802	100.00	771	100.00	760	100.00	2333	100.00	1167	100.00	1166	100.00
BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city												

Table 17 : Non Physical Participation (Participation in Making Decision Regarding Livestock Management Related Matters)

Husband Consults	BNR		CKL		FSD		Over all		NEAR		FAR	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Always	29	24.17	51	42.50	55	45.83	135	37.50	51	28.3	84	46.7
Often	20	16.67	50	41.67	21	17.50	91	25.28	45	25.0	46	25.6
Sometime	44	36.67	19	15.83	25	20.83	88	24.44	55	30.6	33	18.3
Never	27	22.50	0	0.00	19	15.83	46	12.78	29	16.1	17	9.4
Total	120	100	120	100	120	100	360	100	180	100.0	180	100.0
BNR=Cotton-Wheat Punjab, CKL=Rain-fed Punjab, FSD=Mix-Crop Punjab, OA=Overall Punjab, NEAR=Villages located in close proximity to city, FAR= Villages located at remote distance from the city												

Table 18 : Comparative Ranking Order of the Activities Performed by respondent and her husband

Activities	Respondent	Husband
Dung Collection	1	7
Milking	2	6
Milk Selling	3	5
Watering	4	4
Fodder Serving	5	2
Bathing	6	3
Fodder Cutting	7	1

Part 3

What is the effect of women's participation in livestock management on rural households' welfare?

CHAPTER 7

IMPACT OF WOMEN'S PARTICIPATION IN LIVESTOCK MANAGEMENT ACTIVITIES ON THEIR FAMILIES' WELFARE STATUS

In the context of Punjab, the upkeep of animals is mainly done by women who work as unpaid family labor to provide their families the multiple benefits from livestock, like food, income, traction, and energy (bio-fuel). The purpose of this chapter is, by presenting the current poverty/welfare profile of the livestock keeping families, to determine the impact of women's level of participation in livestock management related activities on their families' welfare. To gauge the welfare/poverty status of rural families, we divided them into poor and non poor. The yard stick used for this divide was the poverty line. Internationally known three FGT measures of poverty namely, head count index (HCI), poverty gap index (PGI), and severity of poverty gap index (SPGI) were applied as poverty indicators. The further exploration of the poor and non poor categories was done through devising the poverty bands. Poverty bands determine poverty dynamics by calculating the situation of extremely poor, chronically poor, transient poor, transient vulnerable, transient non poor, and non poor. Socio-economic characteristics of poor and non poor families were also presented. Binary logistic regression was applied to identify the determinants of poverty/welfare. Descriptive statistics were applied to see the impact of rural women's participation in livestock management activities on the welfare of their families. Chi square test was applied to test the hypotheses concerning the association of women's level of participation in livestock management activities with provision of family's income, food, and fuel. Simple linear regression models were developed in order to determine the nature of relationship between the variables.

Abstract

In the context of Punjab, in a farm family, livestock management is mainly a woman's job who works as unpaid family labor to provide their families the multiple benefits from livestock. In Punjab, poverty is more a rural than an urban phenomenon. Rural livestock keeping families' welfare situation is gauged through measuring their statuses as poor or non poor. After presenting the poverty scenario, effort has been made to see the impact of

women's participation in livestock management activities on their families' welfare. The four bases of divide, we made to see the impact of rural women's participation in livestock management activities on the welfare of their families were: overall study area (Punjab), agro-climatic zone, geographical location, and family's welfare/poverty status. According to head count index (HCI) of poverty, amongst the agro-climatic zones, maximum number of poor livestock keeping families was in rain-fed zone followed by the cotton-wheat zone, while the least number of poor livestock keeping families was noted in the mix-crop zone. In the villages situated at far off distances from the cities, as compared to the villages located near to the cities, more number of livestock keeping families was living below the poverty line. Poverty gap index (PGI), amongst the three agro-climatic zones of Punjab, was the highest (8.18%) in cotton-wheat zone while the lowest (0.82%) in mix-crop zone. The higher (7.71%) poverty gap ratio was recorded in the villages located at far off distances from the cities, whereas the ratio was lower (3.50%) for the families living in the villages situated at close proximities to the cities. Similar trends were recorded while calculating the severity of poverty (SPGI) in the areas. Poverty bands made the further exploration of the poverty. The participation of rural women in livestock management activities had great and diverse impacts on their household welfare in the study area but the family's welfare was not related with woman's level of participation in livestock management activities. Nearly 60% of the total poor families were those where women's level of participation in livestock management activities was the highest. Family size, herd size, own land size, distant location of the village from the city, and agro-climatic conditions of the area were found as the key determinants of the welfare or poverty status of a rural livestock keeping family in Punjab. It is suggested that the government must initiate the projects for the families with small herd size (small farmers)—who are already resource poor but at country level the large share of total livestock production comes from these small farmers. Government's intervention of targeting the small farmers can enable them to make their farming more productive and profitable.

7.1 Introduction

Numerous benefits can be extracted from the animals kept by a rural family and amongst those the main can be the food, income, traction, and energy (bio-fuel). In the context of Pakistan, the upkeep of animals is mainly done by women who work as unpaid family labor to provide their families the multiple benefits from livestock. Generally rural women's participation in livestock management activities, in place of considering an extra

responsibility, is taken as a part of their routine activities. The main focus of this chapter is to determine the impact of women's participation in livestock management activities on their families' welfare. Regarding the existence (and the nature) of association between women's level of participation in livestock management activities and provision of family's income, food, and energy (fuel) from livestock, we have devised three hypotheses, to testify. The hypotheses are:

Hypothesis 1: There exists significant association between women's level of participation in livestock management activities and the income earned by the family from livestock.

Hypothesis 2: There exists significant association between women's level of participation in livestock management activities and the amount of milk available for family's consumption.

Hypothesis 3: There exists significant association between women's level of participation in livestock management activities and the availability of bio fuel (from dung) to fulfill family's energy needs.

The devised hypotheses are concerning how rural women's level of participation in livestock management activities is contributing toward their families' welfare—in terms of income, food, and fuel provisions from livestock. Before knowing these, we firstly want to present the welfare status of rural families living in three agro-climatic zones (districts) of Punjab, that is, cotton-wheat zone, rain-fed zone, and mix-crop zone. Throughout this chapter, we are going to use welfare status and poverty status as synonym ally.

In order to identify the determinants of rural families' poverty (or welfare) status, the following hypothesis is formulated to testify.

Hypothesis: In rural areas of Punjab, family head's age, her/his level of education, her/his occupation, family size, child dependency ratio, herd size, land tenure status, own land size, distant location of the village from the city, and agro-climatic conditions of the area determine the welfare or poverty status of a rural livestock keeping family.

The objective of this chapter is, by presenting the current poverty/welfare profile of the livestock keeping families in three agro-climatic zones of rural Punjab and at distant location of the village from the city, to determine the impact of women's level of participation in livestock management related activities on their families' welfare.

7.2 Data, Variables, and Methods

To gauge the welfare/poverty status of rural families, we split them into poor and non poor. The yard stick used for this divide is the poverty line. After making inflationary adjustments, as used by Saboor (2004), international poverty line of one-dollar-a-day—equivalent to 1418 Pakistani rupees per month per person is used to divide the population into poor and non-poor. See the figure 25 below.

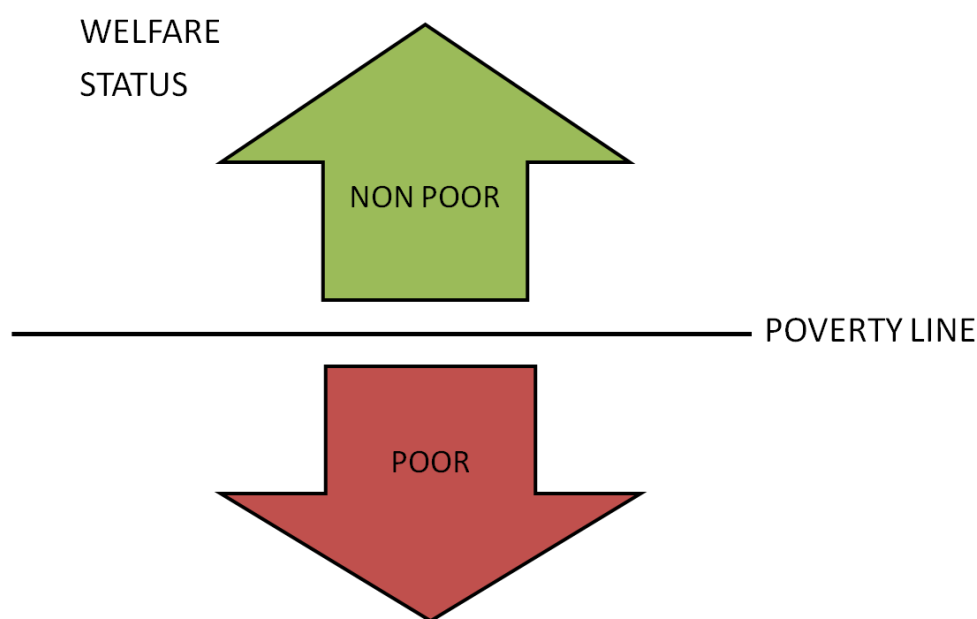


Figure 25: Based on the poverty line the two divides of livestock keeping families

Internationally known three FGT measures of poverty namely, head count index (HCI), poverty gap index (PGI), and severity of poverty gap index (SPGI) are decided to be applied as poverty indicators for overall data set and for each agro-climatic zone separately. To further explore the poor and non poor categories, we have devised poverty bands. Poverty bands determine poverty dynamics by calculating the situation of extremely poor, chronically poor, transient poor, transient vulnerable, transient non poor, and non poor at overall level and across the agro-climatic zones. Socio-economic characteristics of poor and non poor families are also presented.

Chi square test is applied to test the hypotheses concerning the association of women's level of participation in livestock management activities with provision of family's income, food,

and fuel. Measures and dynamics of poverty have been determined by using their own specific formulas and criteria. To identify the determinants of poverty/welfare, the hypotheses are tested by using binary logistic regression.

Table 19 presents the attributes (simple descriptive statistics: averages, percentages) of rural families, from both poor and non poor. For the present analysis of poverty in the targeted areas, the families are classified as poor and non poor on the basis of the poverty line Rs. 1418 per adult equivalent per month. Based on international poverty line (one-dollar-a-day) for the year 2001-02, this poverty line was indicated by Saboor (2004) in his work. It is evident from the results in table 19 that there exist a considerable difference between the two divides (poor and non poor) regarding the selected variables.

Three measures of poverty calculated for each of the three districts separately and on the whole are given in the table 20 and the percentage of population living under various poverty bands in our targeted areas are presented in table 21.

The main body of data for this study was subjected to descriptive statistics. This is in form of frequency and percentage distribution tables. Chi-square test was used to test the devised hypotheses and to confirm the association between women's participation in livestock management activities and the benefits to their families. Simple linear regression models were developed in order to determine the nature of relationship and the coefficient of determination (adjusted R^2) between the variables.

7.3 Situation of Poverty in the Sampled Livestock Farming Families

In order to determine the situation of poverty in the livestock raising families of rural Punjab, we have taken into account the three indicator or measures of poverty: head count index, poverty gap index, and squared poverty gap index. In the previous sections, we have already given the description of each of the index. Here we present the calculated values of these indexes at different divides, i.e., at overall Punjab, in agro-climatic zones, and on the basis of geographical locations of the villages.

Head count index (HCI) determines the percentage of the livestock farmer families living below the poverty line. According to this index of poverty, in overall Punjab, amongst the livestock keeping families, almost 21% were living below the poverty line. Amongst the

agro-climatic zones, maximum number of poor livestock keeping families was in rain-fed zone (HCI calculated was 30%) followed by the cotton-wheat zone (HCI was 27.5%), while the least number of poor livestock keeping families was noted in the mix-crop zone (5%). For the villages located near the cities and at far distances from the cities, the head count index values calculated were respectively, 11.67% and 30%. It means that as compared to the villages located near the cities, in the villages situated at far distances from the cities, more number of livestock keeping families was living below the poverty line. Poverty gap index (PGI; which is a measure of the depth of poverty), amongst the three agro-climatic zones of Punjab, was the highest (8.18%) in cotton-wheat zone while the lowest (0.82%) in mix-crop zone. The higher (7.71%) poverty gap ratio was recorded in the villages located at far distances from the cities, whereas the ratio was lower (3.50%) for the families living in the villages situated at close proximities to the cities. Amongst the agro-climatic zones and the villages, similar trends were recorded for the severity of poverty (SPGI).

Head count index only determines the proportion of a population living below the poverty line. In order to see the categories of poor other than just poor and non poor, we have classified the livestock keeping families on the basis of poverty bands. The percentages of the families falling in each poverty band at different levels are also presented in the table 21.

All these poverty bands revolve around the poverty line. So, World Bank's international absolute poverty line of one-dollar-a-day—equivalent to 1418 Pakistani rupees per month per person, as used by Saboor (2004), was employed to divide the population into the poverty bands.

7.4 Benefits from Livestock and Rural Family's Welfare

The welfare of a family has to do with the state of well-being, health, nutrition, happiness and safety of the members of the family. Rural family welfare is therefore affected by the nature of access the family has to medical care, food, hygienic water and income as well as the nature of education and social security the family members enjoy. Livestock are known to play important roles in the welfare of rural families by providing food, income, and materials to use as bio fuel.

The benefits from the livestock on rural families' welfare in the study area include provision of income, food, and fuel for family's own consumptions (figure 26). Rural families realize

reasonable income from animal farming in the study area. These include income earned from the sale of animals as well as from the sale of animal products like milk, butter, butter oil, etc. The income earned by rural families from the sale of the aforementioned animal products has multiple uses, like it is used to buy food for household use, to buy clothes for family members as well as pay for the education of their children. All these help rural families to be in a state of good welfare. Livestock provides a variety of food materials to the rural families of the 3 sub regions in the study area. This is especially in the form of milk and milk products. In this way, livestock are the source of a variety of foods that supplement and complement what is obtained from agriculture (food crops). The varieties of foods obtained by rural households from the livestock in the study area provide them protein-rich diet (milk, meat, eggs, cheese), hence such a food enable them not to show any form of nutritional deficiencies even during periods of food scarcity. The use of animals' waste products as energy also plays an important role in ensuring that many rural families in the study area are in a state of good welfare. This is so, considering the fact that dung fuel along with firewood is very important source of fuel used by households in the rural areas of the Punjab to cook food and to process agricultural produces. A large number of the families in the 3 sub regions of the study area use dung fuel as their main source of cooking energy. Availability of dung fuel therefore enables rural families to cook their food properly and ensures that they enjoy good nutrition from their food and hence enjoy good health and welfare. This is because when foods are not properly cooked, it increases the risk of a household having food borne diseases and hence be in a state of poor health.

In Pakistan, poverty is considered as more a rural than an urban phenomenon. The rural areas have been identified and regarded as the backward sector of the economy. A considerable proportion of rural households in the country lives in a state of poor welfare. As earlier stated, the income earned by rural families from animals has an important influence on their family welfare.

The results of the study showed that the participation of rural women in livestock management activities has great and diverse impacts on their household welfare in the study area. Despite the no to limited control over livestock assets and income earned from these resources rural women have the main role in livestock management and make significant contributions to the welfare of their households in the study area. The reason for this might not be unconnected with the fact that rural women are known to be hard working. They are

also known to be skillful in the act of managing livestock and making useful products for the benefit of their families.

Abdulwahid (2006) noted that women are of a nature to serve their families or communities either because of their caring temperament or because their gender roles embed them more than men in family or neighborhood ties.

From the foregoing it therefore follows that rural women by undertaking livestock management and production related activities make significant contributions to the welfare of their households in the study area. The impact of the participation of rural women in livestock management activities on rural household welfare in the study area can be categorized broadly as direct and indirect impact. We are just seeing the direct impacts that include: provision of income, provision of food, and provision of energy.

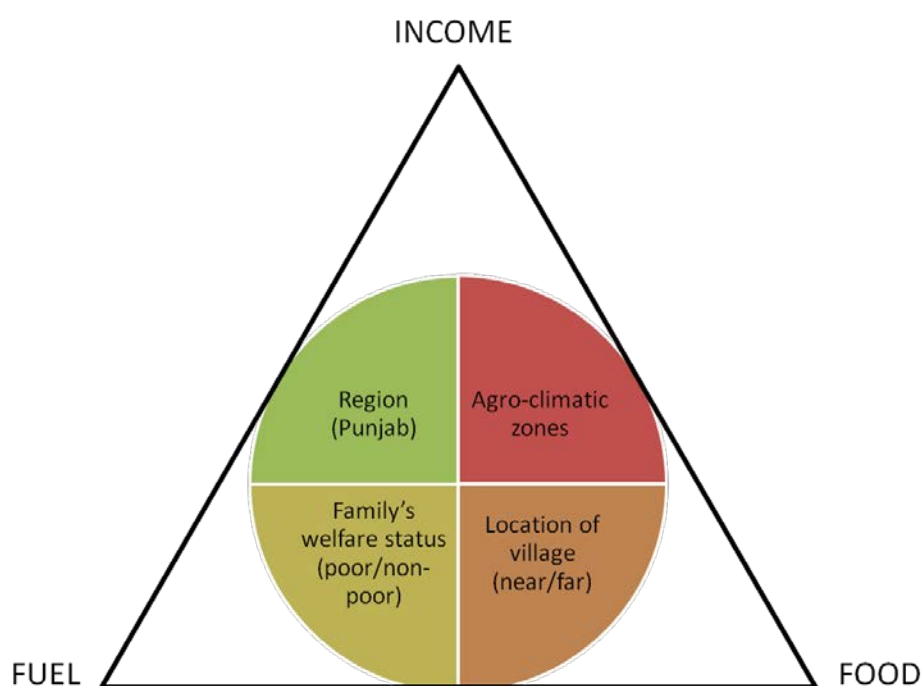


Figure 26: Benefits from livestock

7.4.1 Provision of Income

The results of the study showed that a substantial part of rural families' total income is derived from the livestock farming in the study area. Chi-square test shows that a significant association exists between women's level of participation in livestock management activities

and total income earned from livestock by rural families in the study area. Rural women in the Punjab depend so much on dung fuel for domestic cooking and they even earn income from its sale. They have to spent considerable time to make dung cakes, putting them in the sunlight for drying, and then storing at dry places.

7.4.2 Provision of food

The access of a household to food can determine to a large extent the level of welfare of that household. The close relationship between rural women and the livestock management has helped to provide high valued protein food to rural households. Livestock products contribute to improving the well-being of local populations by providing a wealth of food (milk, meat, eggs), flavorings (yoghurt, butter, butter oil, etc.), and beverages (milk based hot and cold drinks: tea, butter milk etc.). Hence livestock sources specifically contribute to the richness of diets and so reducing various dietary deficiencies.

7.4.3 Provision of bio-fuel (energy)

Rural women through making dung cakes provide bio-fuel (energy) for cooking to their families in the 3 sub regions of the study area. Provision of bio-fuel energy has an important impact on the welfare of rural households in the study area. This is because the use of dung cake is an important form of energy source that rural households depended on for domestic cooking and for the processing of agricultural products. Many a rural families in the study areas cannot afford the other alternative sources of fuel. For a rural household to feed well and have high nutritional status, they need to cook their food very well by using fuel derived from the animal sources. This no doubt will help the households to be in a state of good welfare. However it should be borne in mind that rural women provide this bio-fuel energy to their households at a great cost in terms of the time and energy they spent before they can collect enough animal waste/dung to make dung cakes to be used as fuel by their families.

This is because women hold the key to the welfare of rural households and the general development of rural areas in the country. What rural women need is to be empowered and motivated towards fulfilling their roles in their households. Empowering rural women to ensure a better access, use and control of earned income resources is vital for their families' welfare. Involving women does not mean excluding men (Williams, 1992). Depending on the

cultural and social situation and on the particular activities, women and men should work together for the good of their households and the society.

Chi square test (table 22), at overall Punjab level, shows that a significant association exists between women's level of participation in livestock management activities and the income earned by the family from livestock in the study area (hypothesis 1 and chi square value 1 of table). This implies that in rural areas of Punjab families rely too much on livestock to earn their income and women's level of participation in livestock management activities is significantly related with families' part of income earned from livestock. Chi square test also validates the hypothesis 2 that a significant association exists between women's level of participation in livestock management activities and the amount of milk available for family's consumption. This determines the important role of rural women in provision of nutritious food to their families by managing livestock. Amongst the livestock management related activities, dung collection is the activity exclusively performed by women. They collect dung, make the dung cakes, dry those in sunlight, store in proper places, and use those as fuel to cook food, hence fulfill the domestic energy needs of rural families. In our analysis, chi square value (in table 22) validates our third hypothesis as well and proves that there exists a significant association between women's level of participation in livestock management activities and the provision of bio fuel (from dung) to fulfill family's energy needs.

7.5 Impact of Rural Women's Participation in Livestock Management Activities on Their Families' Welfare (Descriptive Statistical Analyses)

To see the impact of rural women's participation in livestock management activities on the welfare of their families, we have four bases of divide, which are: overall study area (Punjab), agro-climatic zone, geographical location, and family's welfare/poverty status (figure 27).

Overall study area (OA) covers the all three districts of Punjab from where the sample/data is collected. The data was collected from three districts of Punjab and each district was situated in an agro-climatically varied zone, which are: cotton-wheat zone (BNR), rain-fed zone (CKL), and mix-crop zone (FSD). Geographical location denotes the distant location of the sampled village, in terms of its proximity (NEAR) or remoteness (FAR), from the city. The data disaggregation on the basis of a family's welfare/poverty status indicates either a family is poor (POOR) or non poor (NONPOOR). The average per capita income is used as a yardstick to classify the rural families into these two divides. So, the whole data was

disaggregated on the bases of aforementioned 8 divides and the benefits obtained from livestock were gauged for each divide.

At overall level, on an average, a rural family's annual income earned from livestock was 52358.33 Pakistani rupees (PKRs), availability of milk for family's consumption was 2.26 liter daily, and nearly 57% of the rural families were benefiting the use of fuel from animals' wastes/dung. On an average, in overall Punjab, rural families were earning nearly 24% of their total familial income from animal sources.

Amongst the three agro-climatic zones, the mix-crop zone (FSD), by earning 78250 PKRs per annum from livestock, was at the top followed by the rain-fed (41041.67 PKRs) and the cotton-wheat (37783.33 PKRs) zones. For each of the rain-fed (CKL) and cotton-wheat (BNR) zones, average amount of milk available for a family's consumption was 1.83 liter per day. While in mix-crop zone, the average amount of milk available for a family's consumption was 3.13 liter per day. In the same way, in each of the rain-fed and cotton-wheat zones, 72.50% rural families were using dung cakes as a source of fuel for cooking foods. In BNR, CKL, and FSD zones, respectively 24%, 21%, and 26% of the total familial income was coming from the livestock source.

The results from data analyses show that geographical location of a village, in terms of its distance from the city, matters in determining the level of benefits reaped through livestock management. Average income earned from livestock sources by a rural family living in a village in close proximity to a city (NEAR) was 57316.67 PKRs, while it was 47400 PKRs for a rural family living in a village at remote distance from the city (FAR). For the two geographical divides of NEAR and FAR, the average amount of milk available for a family's daily consumption was respectively, 2.20 liter and 2.33 liter. In the same order of the geographical divides, respectively 57.22% and 57.78% rural families were using dung cakes as a source of fuel for cooking purposes. In comparison with those living in the villages at close distance from the city, the families living in the villages at far distances from the city, had relatively more reliance on livestock because averagely they were getting 26% of their total income from livestock.

Large variation was seen between the poor (POOR) and the non poor (NONPOOR) regarding the benefits gained from livestock sources. Average income earned from the livestock by a poor rural family was 19200 PKRs per annum, while on an average, a non poor rural family

was getting annually 61084.21 PKRs from animal sources. The average amount of milk available for a poor and a non poor family was respectively, 1.65 liter and 2.42 liter daily. More than 77% of the poor families were using dung cakes as a source of fuel for cooking, whereas 52.28% of the non poor families were benefiting from this provision. Poor and non poor families, on an average, were earning above 27% and 23% of their total income from livestock sources, respectively.

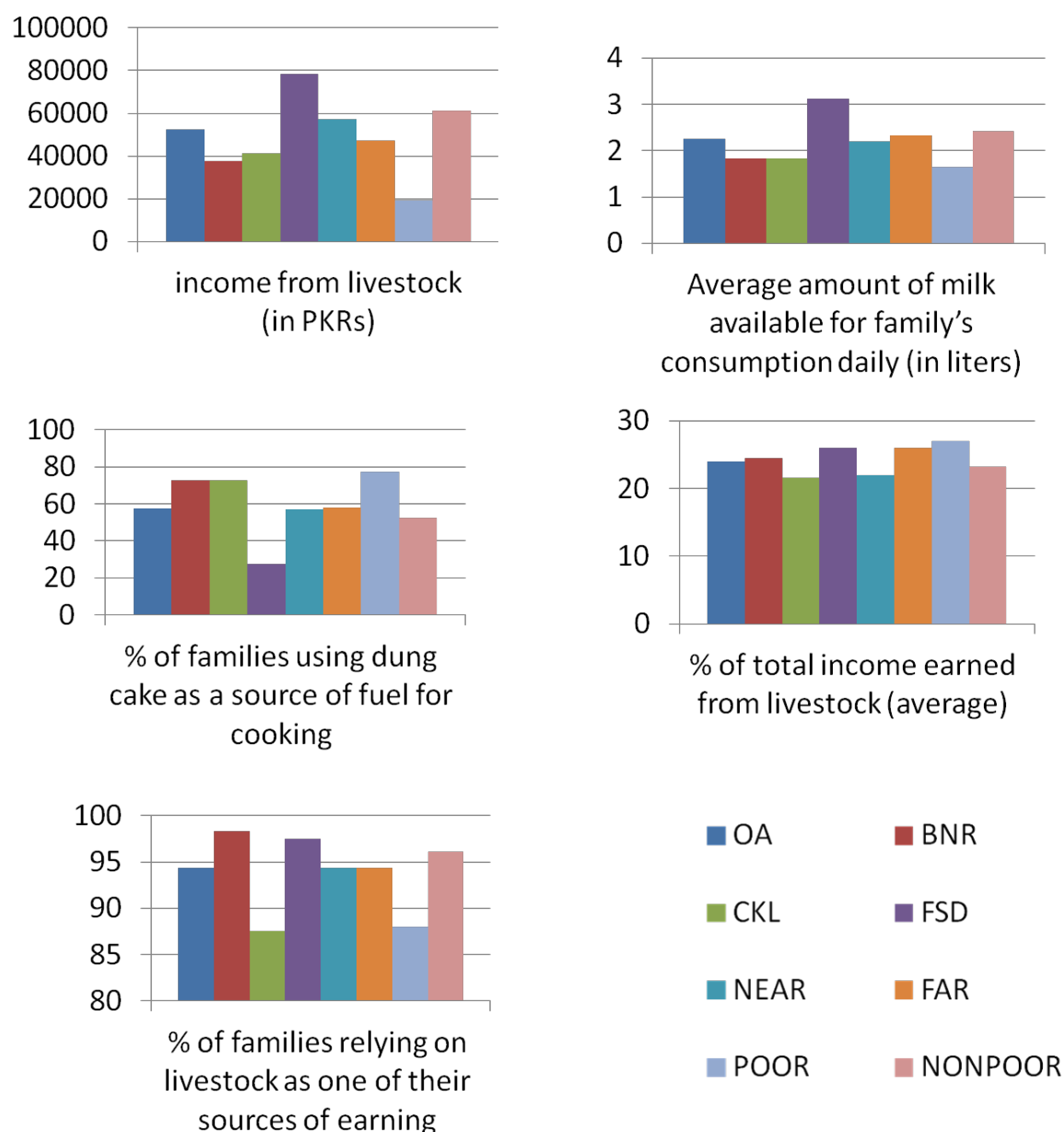


Figure 27: Benefits from livestock at three geographical levels and regarding family's welfare status

Amongst the agro-climatic divides, mix-crop zone was the area where rural families were getting the maximum benefits from livestock in terms of income earned and the amount of

milk available for domestic use, while regarding these respects the rain-fed zone remained intermediary and cotton-wheat zone stayed at the bottom. The variability of the zones in terms of getting diverse amount of benefits from the livestock seems lying in their relative development situations. Faisalabad district—the representative of mix-crop zone is more developed area and has industrial installations. As against cotton-wheat (56.67%) and rain-fed (50%) zones, in mix-crop zone more than 80% families' heads were engaged in farming as their primary occupation and were getting the second maximum share (26.03%) of their family income from animals (after crops' 50.32%). Suitability of the climate for growing a variety of crops provides the farmers of mix-crop zone with the choice options while cultivation of the crops. Contrary to that, the climate of cotton-wheat zone permits only the cultivation of typical conventional crops and in rain-fed zone the annual rain fall pattern further shrunken the scope of crop cultivation and families get maximum share of their income from the sources other than crops and livestock. In rain-fed zone, livestock was the tertiary source of rural family's income. Mix-crop zone is the home of a number of agricultural research institutions and food processing industries. Due to more developed situation of the zone, the market situation is also developed. Farmers have market oriented infrastructure availability, well informed of the market knowledge, aware of and adopting the modern agricultural production techniques, therefore the productivity of their resources is high and they have the better return of their produces because their produce is market demand oriented as well. In mix-crop zone, 39.2% of the rural families were getting above 30% of their total familial income from animal sources, whereas in cotton-wheat and rain-fed zones respectively, 21.7% and 25.8% of the rural families were getting the aforementioned share of income from livestock. So from the above discussion, it is clear that in Punjab the ranking order of the agro-climatic zones, in terms of benefits (income and milk) enjoyed from livestock resources by rural families, is the same as the relative development status of the area. Availability of infrastructure in the area has an impact on the productivity or profitability of agricultural resources.

Geographical location of a village in terms of its nearness or remoteness from a city has impact on the share of benefits gotten from the livestock. It seems that, in comparison to that located at far distance from a city, a village has strong rural-urban ties if it is located in proximity to a city. Strong rural-urban linkages benefits the rural families in terms of being well informed of the urban market situation, getting the veterinary facilities, and adopting modern ways of livestock keeping like: practicing better and scientific ways of livestock

management, using specialized feed for either fattening the animals or milk production enhancement, use of artificial insemination for getting a breed of particular genetic make-up, etc. to make their livestock resources economically more productive and profitable. Hence, rural families get better returns, regarding money, for their good-quality produce from livestock. The urban neighborhood of a village provides opportunities to the families of that village to market their produce in the city markets—which remain always attractive for the farmers to sell their commodities at higher prices to generate high revenues. So, the rural families living in the villages located at close distance from the city always remain advantageous to get maximum benefits from livestock.

As compared to the non poor livestock keeping families, the poor livestock raising families were disadvantageous for the reason that they had less number of resources in the form of livestock, agricultural land, available labor, and human capital. In the study area, more than 40% poor families were landless and remaining 60% land owners had less number of acreage for their own lands. Lack of resources did not let them obtain the more from the scarce factors of production. So, they can get limited production or profits from their limited resources. Poor can hardly afford the veterinary expenditures for the treatment of their sick or diseased animals. They generally follow traditional ways for raising livestock. Adopting modern ways of livestock management and production always require money which they are lacked. So, capital is required to enhance the productivity and profitability of resources. In the study area, the poor were also poor in all dimensions of poverty, either it was the situation of human resources, land resources, number of earning hands in a family, livestock resources, or other income related resources. Poor families had small landholdings, small herd size, large families, high dependency ratios, and less job opportunities. Lack of capital or resources did not allow them to make value addition and access high priced markets to sale their produce, so they sell their agricultural commodities in easily accessible local markets at low prices, hence remain always disadvantageous and in the vicious circle of poverty.

7.6 Women's Level of Participation in Livestock Management Activities and the Magnitude of Benefits Obtained By the Rural Families

Up till now we have seen that rural families, where the upkeep of animals is mostly women's job, are getting income, food, and fuel from animals. To find a relationship between a woman's level of participation in livestock management activities and the extent of benefits

from livestock enjoyed by her family we have applied simple linear regression models. Keeping in view the already devised hypotheses, we have developed 3 sets of regression models. In the table 23, set 1 comprises of the 8 simple linear regression models that explain how women's level of participation in livestock management activities (X1 to X8) affects the income their families earn from livestock (Y1 to Y8) in overall Punjab (OA), cotton-wheat zone (BNR), rain-fed zone (CKL), mix-crop zone (FSD), village located near a city (NEAR), village located far from a city (FAR), poor (POOR), and non poor (NONPOOR) families. Set 2 also contains 8 simple linear regression models explaining the relationship between women's level of participation in livestock management activities (X1 to X8) and the quantity of milk available for their families' consumption (Y9 to Y16) in the above given divides. Comprising of 8 regression models, set 3 determines how women's level of participation in livestock management activities (X1 to X8) explains the provision of dung cake for their families' use (Y17 to Y24). Results from these regression models revealed that women's level of participation in livestock management activities was negatively associated with the income derived from animals and with the amount of milk available for their families' consumption but was positively related with the provision of dung cake as fuel. It means that as compared to the families with women's low level of participation in livestock management activities, the families with women's high level of participation were getting a smaller amount of income from the animals kept. Similarly, as compared to the families with women's low level of participation in livestock management activities, the quantity of milk available for the families' consumption was also smaller in the families with women's high level of participation. The results show that the amount of benefits enjoyed by a rural family is inversely associated with the level of participation of woman in livestock management activities in that family. For comparison purpose, on the basis of women's level of participation in livestock management activities, we divided the rural families in two categories: the families with women's low level of participation and the families with women's high level of participation. A woman's level of participation was considered low and high if she was respectively, carrying out 1 to 4 activities and above 4 activities.

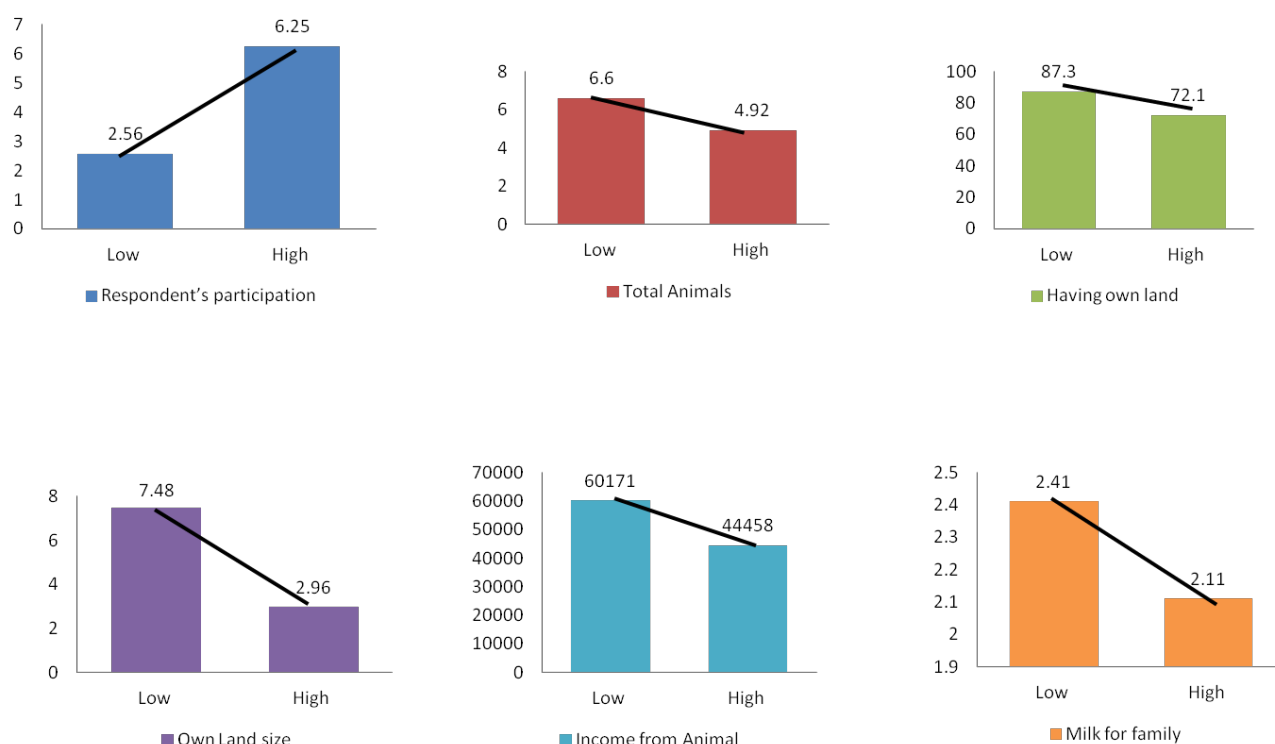


Figure 28: Levels of participation and benefits from livestock: a comparison

Descriptive statistics (averages and percentages) for both the categories of rural families showed that as compared to the families with women's low level of participation, the families with women's high level of participation were relatively resource poor and had more the characteristics of the poor. Figure 28 presents a comparison. They comprised more number of landless; had less number of acreage of own agricultural land, small herd size, considerably less overall and per capita income; were getting relatively less income from crops, livestock, and other sources; had large family size with high dependency ratios and majority of the families were living under joint familial system. The quality of human resources, in the families with women's high level of participation in livestock management activities, in terms of their levels of education, literacy, and employment was also more like the poor. Those families were also more relying on animals' waste for using as fuel and were getting, on an average, less amount of milk for their daily consumption. Due to landlessness or having small number of acreage of own agricultural land, they were getting the maximum share of their familial income from the sources other than crops and livestock. Contrary to that, the families with women's low level of participation in livestock management activities were economically wealthier and enjoying a better welfare status. Better socio economic status by owning more land and livestock (large herd size) resources enable these families to hire labor

for up keep of the animals, so for managing livestock they rely less on women's participation. Capital in the form of money (financial), human resources, and even the social capital make possible for these prosperous families to adopt the modern ways of production of animals to make livestock farming economically more productive and profitable. They also have more chances to get advantage of keeping large herd size because many of the governmental projects for livestock or dairy development, target only those families having large herd size. These projects provide the livestock keeping families with loan and other infrastructure (veterinary facilities, suggestions, scientific techniques, etc.) to expand their enterprises of livestock farming, hence help them to flourish their livestock related business. The families with poor livestock resources (keeping small herd size) remain disadvantaged from such projects.

In a previous study conducted in Punjab, the poor economic condition of rural families had been related with the family head's age, her/his level of education, family size, child dependency ratio, and with the economic resources owned by the family. With the inclusion of the formerly mentioned variables and with some others, we have developed a binary logistic regression model (table 25) to determine the poverty/welfare (poor/non poor) status of the rural livestock keeping families of Punjab.

7.7 Determinants of Poverty: Binary Logistic Regression Results (figure 29)

Household Head's Age: for this variable, at overall level the odd was greater than one indicating that there the probability of being poor ($y = 1$) will be high where a household's head will be of older age. But the finding was statistically insignificant.

Household Head's Education Level: the odd for this variable was less than 1, hence showing a lower probability for a household to be classified as "poor", if household head's educational level is high. This variable was also found statistically insignificant.

Family Size: the odd for family size was greater than 1 and was found statistically significant. This finding shows that a large family sized household is more likely to be considered as poor.

Child Dependency Ratio: though this determinant of poverty was found statistically insignificant but the odd for the variable was found greater than 1, indicating that more

chances were there for a household having more number of children below age 15 to be classified as “poor”.

Herd Size: Same like own landholding size, herd size had odds less than 1 and statistically significant. It shows that more the number of animals a household had less probability was there for the household to be categorized as “poor”.

Land tenure status: the odds for this variable was less than 1 but statistically insignificant. It means that a family’s landlessness status increases the chances for it to be categorized as poor.

Own Landholding Size: the odds for own landholding sizes were seen less than 1 and were found statistically significant as well. It implies that probability of being poor reduces with an increase in the size of own landholding.

Village’s Level of Remoteness from the City: the odds for this variable were greater than 1 and was found statistically significant. It implies that a household living in a village located at far off distance from the city will have more chances to be put into the category of poor.

Agro-climatic zone: the odds for this variable was less than 1 and highly significant at 1% level of significance. It means that moving from cotton-wheat zone (the least developed region amongst the three of our sampled zones) towards rain-fed and mix-crop zones (relatively more developed areas) reduces the probability of being poor.

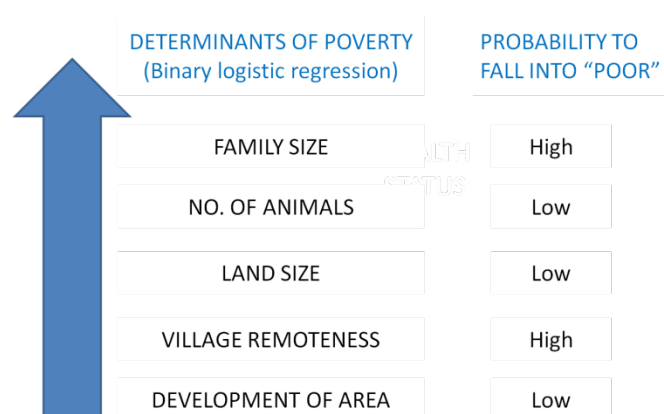


Figure 29: Determinants of poverty in livestock keeping families of rural Punjab (Pakistan)

7.8 Conclusion

In rural Punjab, women, in the families which keep livestock, are taking a large part in livestock management activities, and their families are getting benefits from livestock in the form of income, food, and fuel. But the amount of benefits enjoyed by a rural family, irrespective of the extent of women's involvement in the livestock management activities, was dependent on the welfare status of that family. As compared to the resource poor families, the economically well-off rural families by having more resources were getting more benefits from livestock and the women from those families had also less level of participation in livestock management activities due to their affordability to hire labor and due to the more commercial nature of livestock farming. Whereas, the families which were not in a better state of welfare were getting less benefits from livestock due to lack of resources, but women in these families, by participating in a maximum number of livestock management related activities, were putting their best to reap the utmost benefits from scarce resources for their families. It is also a considerable fact that nearly 60% of the total poor (per capita income below the poverty line) families were those where women's level of participation in livestock management activities was the highest.

For the families with small herd size, we have recommendation that government must initiate the projects for small farmers—who are already resource poor but a large share of total livestock production comes from the small farmers, to enable them to make their farming more productive and profitable. This step will help them come out of poverty, hence will raise their standard of living, and at country level it will contribute in raising the share of livestock in GDP. If through better farm practices or by other means the yield per animal is increased in just small units, at country level it will be an increase in production in very large units.

Table 19 : Socio-economic Dimensions of Poverty (Descriptive Statistics)

	Punjab	Agro-climatic divides			Geograph. divides		Poverty divides		Participation divides	
	All	BNR	CKL	FSD	NEAR	FAR	POOR	NONPOOR	LOWPPTN	HIGHPPTN
Quality of human resources										
Hd's Age	45.56	40.69	49.72	46.40	44.29	46.79	48.07	44.95	46.22	44.89
Hd's Edu.	5.59	4.75	6.04	5.97	6.74	4.47	4.47	5.86	5.82	5.35
Hd Ocptn Farmer	62.50	56.67	50.00	80.83	64.44	60.56	44.00	67.37	67.40	57.54
Family labour participation										
Resp pptn	4.40	4.65	3.80	4.74	4.33	4.46	4.75	4.31	2.56	6.25
HusPptn	1.47	1.43	1.67	1.33	1.58	1.37	1.08	1.58	2.29	.65
Children pptn	.64	.74	.84	.33	.66	.62	.68	.62	1.15	.12
Inlaws pptn	.13	.07	.17	.15	.14	.11	.11	.13	.24	.01
Demographic characteristics										
Fy Size	5.37	5.31	4.77	6.03	5.08	5.65	6.33	5.11	5.09	5.64
F Sys Nuclear	.46	.43	.58	.37	.53	.39	.45	.46	.48	.44
No. of children below 15	1.46	1.79	.98	1.61	1.61	1.32	1.81	1.37	1.27	1.65
Land, livestock, and income resources										
Total Animals	5.76	6.65	4.57	6.07	4.98	6.54	4.61	6.06	6.60	4.92
% of total income earned from livestock	24.0157	24.4395	21.5763	26.0313	21.9837	26.0477	27.0333	23.2216	23.8952	24.1376
landless	20.3	41.7	9.2	10	17.2	23.3	46.7	13.3	12.7	27.9
Own Lnd size	5.23	5.44	5.52	4.73	5.10	5.36	1.68	6.16	7.48	2.96
Benefits from livestock										
Income from Animal	52358.33	37783.33	41041.67	78250.00	57316.67	47400.00	19200.00	61084.21	60171.27	44458.10
Milk for family	2.26	1.83	1.83	3.13	2.20	2.33	1.65	2.42	2.41	2.11
Making Dung Cake (Yes=1, N0=0)	57.50	72.50	72.50	27.50	57.22	57.78	77.33	52.28	56.91	58.10

Table 20 : The measures of poverty at overall Punjab, in agro-climatic zones of Punjab, and at village locations

Measures of Poverty	Overall Punjab (OA)	Cotton-wheat Zone (BNR)	Rain-fed Zone (CKL)	Mix-crop Zone (FSD)	Near (NEAR)	Far (FAR)
P ₀ : Head Count Index (%)	20.83	27.5	30	5	11.67	30
P ₁ : Poverty Gap Index (%)	5.60	8.18	7.82	0.82	3.50	7.71
P ₂ : Squared Poverty Gap Index (X 100)	2.38	3.69	3.25	0.21	1.46	3.31

Table 21 : Poverty bands at overall Punjab, in agro-climatic zones of Punjab, and at village locations

Poverty Bands	Pakistan	Punjab	Overall Punjab (OA)	Cotton-wheat Zone (BNR)	Rain-fed Zone (CKL)	Mix-crop Zone (FSD)	Near (NEAR)	Far (FAR)
Extremely Poor	2.7	1.9	3.3	5.8	4.1	0	2.22	4.44
Chronically Poor	13.2	11.9	7.7	10.0	11.6	1.6	3.89	10.00
Transient Poor	23.1	24.8	9.7	11.6	14.1	3.3	5.56	15.56
Transient Vulnerable	17.8	16.7	7.5	6.6	10.0	5.8	6.11	8.89
Transient Non Poor	29.1	28.1	22.2	23.3	23.3	20.0	23.33	21.11
Non poor	14.0	16.5	49.4	42.5	36.6	69.1	58.89	40.00
Note: In the columns 2 nd and 3 rd population living under various poverty bands in Pakistan and Punjab are as calculated regarding year 2001-02 by Saboor (2004) by using a national level data. Remaining columns (from 4 th on ward) are as calculated by the author regarding current micro-surveys data collected in year 2011.								

Table 22 : Chi square values of hypotheses tested

Hypotheses	Association between variables	Pearson Chi square Value	df	Asymp. Sig. (2-sided)
Hypothesis 1: Association between women's level of participation in livestock management activities and the income earned by the family from livestock	X1*Y1	108.341	108	NS
	X2*Y2	123.481	114	NS
	X3*Y3	187.556	144	***
	X4*Y4	212.419	180	**
	X5*Y5	165.912	138	*
	X6*Y6	260.197	192	***
Hypothesis 2: Association between women's level of participation in livestock management activities and the amount of milk available for family's consumption	X1*Y7	34.786	30	NS
	X2*Y8	33.5	24	*
	X3*Y9	46.674	48	NS
	X4*Y10	68.063	48	**
	X5*Y11	57.573	36	**
	X6*Y12	76.695	48	***
Hypothesis 3: Association between women's level of participation in livestock management activities and the utilization of bio fuel (from dung) to fulfill family's energy needs	X1*Y13	23.024	6	***
	X2*Y14	6.34	6	NS
	X3*Y15	11.201	6	*
	X4*Y16	8.034	6	NS
	X5*Y17	19.024	6	***
	X6*Y18	18.165	6	***
<p>X1, X2, X3, X4, X5 and X6 = level of participation of rural women (respondents) in livestock management activities in BNR, CKL, FSD, NEAR, FAR, and OA areas respectively.</p> <p>Y1, Y2, Y3, Y4, Y5 and Y6 = natural log of income derived from livestock by respondents' families in BNR, CKL, FSD, NEAR, FAR, and OA areas respectively.</p> <p>Y7, Y8, Y9, Y10, Y11 and Y12 = amount of milk (in liters) available for domestic consumption for respondents' families in BNR, CKL, FSD, NEAR, FAR, and OA areas respectively.</p> <p>Y13, Y14, Y15, Y16, Y17 and Y18 = utilization of dung cakes as a source of fuel by respondents' families in BNR, CKL, FSD, NEAR, FAR, and OA areas respectively.</p>				

Table 23 : Regression Results

Sets of Regression Models	Dependent Variable (Y)	Explanatory Variable (X)	Intercept (Constant) (a)	Gradient (Beta) (b)	Std. Error	Sig.
Set 1: Participation (X1-X8) & Income (Y1-Y8)	Y1	X1	10.354	-0.093	0.065	*
	Y2	X2	10.85	-0.198	0.078	**
	Y3	X3	9.452	-0.084	0.169	NS
	Y4	X4	11.71	-0.279	0.072	***
	Y5	X5	10.141	-0.052	0.09	NS
	Y6	X6	10.613	-0.137	0.095	*
	Y7	X7	9.819	-0.046	0.052	NS
	Y8	X8	10.890	-0.150	0.027	**
Set 2: Participation (X1-X8) & Milk for home (Y9-Y16)	Y9	X1	2.73	-0.158	0.032	***
	Y10	X2	2.489	-0.247	0.047	***
	Y11	X3	2.389	-0.319	0.037	***
	Y12	X4	3.816	-0.219	0.058	**
	Y13	X5	3.253	-0.37	0.043	***
	Y14	X6	2.093	0.091	0.046	NS
	Y15	X7	1.753	-0.048	0.054	NS
	Y16	X8	2.861	-0.161	0.037	***
Set 3: Participation (X1-X8) & Use of dung (Y17-Y24)	Y17	X1	0.502	0.07	0.013	NS
	Y18	X2	0.249	0.406	0.021	***
	Y19	X3	0.704	0.024	0.022	NS
	Y20	X4	0.251	0.027	0.017	NS
	Y21	X5	0.461	0.112	0.017	NS
	Y22	X6	0.553	0.023	0.019	NS
	Y23	X7	0.625	0.144	0.025	NS
	Y24	X8	0.487	0.035	0.014	NS
<p>X1, X2, X3, X4, X5, X6, X7, and X8 = level of participation of rural women (respondents) in livestock management activities in OA, BNR, CKL, FSD, NEAR, FAR, POOR, and NONPOOR areas respectively.</p> <p>Y1, Y2, Y3, Y4, Y5, Y6, Y7, and Y8 = natural log of income derived from livestock by respondents' families in OA, BNR, CKL, FSD, NEAR, FAR, POOR, and NONPOOR areas respectively.</p> <p>Y9, Y10, Y11, Y12, Y13, Y14, Y15, and Y16 = amount of milk (in liters) available for domestic consumption for respondents' families in OA, BNR, CKL, FSD, NEAR, FAR, POOR, and NONPOOR areas respectively.</p> <p>Y17, Y18, Y19, Y20, Y21, Y22, Y23, and Y24 = utilization of dung cakes as a source of fuel by respondents' families in OA, BNR, CKL, FSD, NEAR, FAR, POOR, and NONPOOR areas respectively.</p>						

Table 24 : Benefits from Livestock: Rural Families' Welfare

Benefits from Livestock	1	2			3		4	
	Overall Region Punjab	Agro-climatic Divides/Zones			Geographical Divides (Distance of village from city)		Welfare/Poverty Divides	
	OA	BNR	CKL	FSD	NEAR	FAR	POOR	NONPOOR
Average annual income from livestock (in rupees)	52358.33	37783.33	41041.67	78250.00	57316.67	47400.00	19200.00	61084.21
Average amount of milk available for family's consumption daily (in liters)	2.26	1.83	1.83	3.13	2.20	2.33	1.65	2.42
% of families using dung cake as a source of fuel for cooking	57.50	72.50	72.50	27.50	57.22	57.78	77.33	52.28
% of total income earned from livestock (average)	24.02	24.44	21.58	26.03	21.98	26.05	27.03	23.22
% of families relying on livestock as one of their sources of earning	94.4	98.30	87.5	97.5	94.4	94.4	88.00	96.10
% of poor families	20.83	27.50	30.00	5.00	11.67	30.00	100.00	0.00
No. of poor families	75.00	33.00	36	6	21.00	54.00	75.00	0.00
N	360	120	120	120	180	180	75	285

Table 25 : Binary Logistic Regression Results

X Variables	S.E.	Exp(B)
HbAge	0.020	1.032 ^{NS}
hdseducation	0.123	0.947 ^{NS}
FySize	0.121	1.350**
Below15children	0.135	1.217 ^{NS}
TotalAnimals	0.056	0.869**
LandTenureStatusLandless0TenantAtPart1OwnLand	0.279	0.772 ^{NS}
OwnLnd	0.062	0.845***
distfromcity	0.349	3.663***
AgroZone	0.229	0.414***
Constant	1.005	0.123
-2 Log likelihood	254.170	
Cox & Snell R Square	0.272	
Nagelkerke R Square	0.425	
*significant at p < 0.1, ** significant at p < 0.05, ***significant at p < 0.01, NS = non significant		

CHAPTER 8

FACTORS AFFECTING WOMEN'S PARTICIPATION IN LIVESTOCK MANAGEMENT ACTIVITIES

In this chapter we are going to see the factors which are affecting or can affect the scope of women's partaking in handling livestock in the social, economic, and geographic context of Punjab. To determine the factors we initiated from devising the sets of hypotheses under particular themes. The formulation of the hypotheses was based on the particular context of Punjab and the findings from the already existing literature. We established a list of 30 hypotheses or factors and put them under 7 categories. Each category was assigned a name. After formulation the next step was to testify the validity of hypotheses on statistical ground. Our dependent variable (Y) was always *women's level of participation in livestock management activities*. To confirm the significant association of the hypothesized variables (as factors) with the dependent variable, we applied chi-square test statistics. To determine the nature of association of each X variable with the Y variable and also to determine the variability explained (R-square values) by that X variable in the Y variable, we devised 30 simple linear regression models and in each model the same Y variable (in our case, *women's level of participation in livestock management activities*) was regressed repeatedly by one of the 30 hypothesized factors/regressors (independent variables). For each category of the factors, to gauge the magnitude of influence of that category (R^2 : the coefficient of determination) on women's level of participation, we applied a multiple linear regression analysis. So, 7 multiple linear regression models were developed. And finally to measure the impact of all 30 factors on women's participation level, the Y variable was regressed by all 30 regressands in a multiple linear regression model. A factor analysis was also made to compare the overall variance explained by the two statistical techniques.

Abstract

Existing literature in social sciences, on agriculture, livestock, gender, socio-cultural dynamics, and rural demographics provides a solid background to construct a list of hypotheses that predict and provide information on the existence of a relationship between women's participation in livestock management related activities and social, economic, cultural, familial, and livestock related factors. This chapter has analyzed factors influencing

women's level of participation in livestock management activities in rural Punjab province of Pakistan using multiple regression and factor analysis. In the regression analyses, the identified main factors (in decreasing order in terms of variance explained by R^2) were respectively: *participation of family labor* (variance explained = 56.70%), *various aspects of women's status* (= 16.10%), *livestock related factors* (= 11.30%), and *economic factors* (= 10.50%). The value of the coefficient of determination (R^2) of the regression model (including all factors) was 0.675. Factor analysis summarized the originally 30 variables (participatory indicators) into 11 factors, which accounted for 66.617% of the total variance explained. The results signify the need for micro-level (targeting rural families) and gender analysis in livestock farming and indicate that women's participation in livestock management can be enhanced by using a gendered approach in the agricultural development programs. In addition, increasing women's participation in livestock management and production is essential in improving overall family's health, education, and income. Policies reforms and/or development projects, to improve women's participation in livestock management by using any mean(s) and mechanism(s), must give attention to the cultural settings that are seen to have strong effects for a successful implementation.

8.1 Introduction

As we have seen in the previous chapters that rural women have significant role in the management and production related activities in Punjab (Pakistan). They participate in a large number of activities and contribute in their families' welfare by providing them income, food, and fuel from animal sources. Now we are going to see the factors which are affecting or can affect the scope of women's partaking in handling livestock in the social, economic, and geographic context of Punjab. To determine the factors we initiated from devising the sets of hypotheses under particular themes. The formulation of the hypotheses was by and large based on the particular context of Punjab as well as on the findings from the already existing literature.

8.2 Categorization of Factors Affecting Women's Participation in Livestock Management Activities

We established a list of 30 hypotheses and put them under 7 categories (table 26, figure 30). Each category of particular hypotheses (or factors) was assigned a theme or name. These

categories are: various aspects of women's status, husband's socio-economic status, participation of

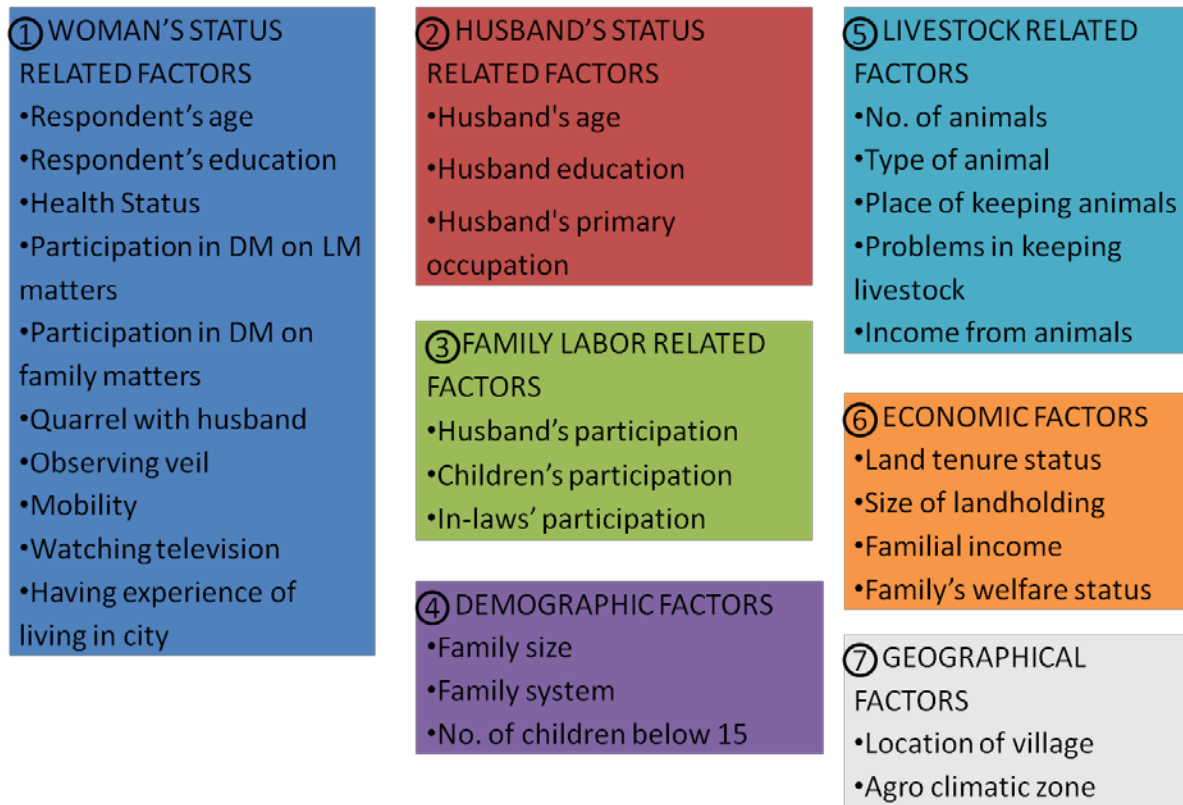


Figure 30: Categorization of Factors Affecting women's participation in livestock management activities

family labor, demographic factors, livestock related factors, economic factors, and geographic factors. A short description of each of the category is given below.

Various aspects of women's status: comprising of five different aspects of women's status this category consists of 10 hypotheses/factors (from hypothesis1 to hypothesis 10). Each aspect further comprises of its constituents. Women's *socio-economic status* comprises of two elements which are: respondent woman's age and her level of education. *Health status* simply determines respondent woman's self reported health condition. *Gender relations* are being determined by the degree of her participation in the decision making on the matters relating to livestock management, her participation in the decision making on family related matters, and the situation of domestic violence she is confronting with. Respondent woman's *mobility status* is captured by taking into consideration the practice of observance of veil

(purdah), and the nature of her mobility (accompanied or unaccompanied). Two elements determining a woman's *awareness status* are: either or not she is watching television and either or not she had ever an experience of living in a city. *Husband's socio-economic status*: comprising of 3 hypotheses/factors (from hypothesis 11 to hypothesis 13) this category taking into account the age, level of education, and occupational status of respondent woman's husband. The category of *participation of family labor* is comprised of 3 hypotheses/factors (from hypothesis 14 to hypothesis 16) concerning the levels of participation of respondent's husband, her children, and her in-laws in the livestock farming activities. *Demographic factors* carry 3 elements (from hypothesis 17 to hypothesis 19) which are: family size, family type, and the number of children below 15 years age. *Livestock related factors*, this category (from hypothesis 20 to hypothesis 24) consist of 5 factors: total number of animals, type of the animals, place of keeping animals, number of problems in keeping livestock, and natural logarithm (LN) of the income earned from the animals. *Economic factors* (from hypothesis 25 to hypothesis 28) include the respondent's family's land tenure status, size of the own landholding, natural logarithm (LN) of the total family income, and the poverty/welfare status of the respondent's family. *Geographic factors* (from hypothesis 29 to hypothesis 30) comprise of 2 factors: distant location of the village from the city, and agro-climatic conditions of the area.

8.3 Data Analysis (Descriptive, Chi square, Simple/Multiple Linear Regression, and Factor Analysis)

After formulation the next step was to testify the validity of hypotheses on statistical ground. Our dependent variable (Y) was always *women's level of participation in livestock management activities*. To confirm the significant association of the hypothesized variables (as factors) with the dependent variable, we applied chi-square test statistics. The results from chi-square test authenticated the statistical significant association of 15 factors/variables with the dependent variable (Table 29). Chi-square test just determines, statistically, the existence or non-existence of association between two variables and does not give description about the association. To find out the nature of relationship between the variables we applied regression analyses. To determine the nature of association of each X variable with the Y variable and also to determine the variability explained (R-square, adjusted R-square values) by that X variable in the Y variable, we devised 30 simple linear regression models and in each model the same Y variable (in our case, *women's level of participation in livestock management*

activities) was regressed repeatedly by one of the 30 hypothesized factors/regressors (independent variables). The results of simple linear regression are shown in the table (30) which confirms the statistically significant association of 21 explanatory variables with the Y variable. For each category of the factors, to gauge the magnitude of influence of that category (measured by noting the value of R^2 : the coefficient of determination) on women's level of participation, we applied a multiple linear regression analysis. So, 7 multiple linear regression models were developed (table 31). And finally to measure the impact of all 30 factors on women's participation level, the Y variable was regressed by all 29¹¹ regressands in a multiple linear regression model (table 32). A factor analysis was also made to compare the overall variance explained by the two statistical techniques. Factor analysis was employed to identify latent dimensions underlying indicators that measured respondent women's participation (Table 33). This statistical approach involves finding a way to condense information about a number of original variables into a smaller set of dimensions (factors) with a minimum loss of information (Hair et al., 1998). Each factor is interpreted according to its loadings, that is, the strength of the correlations between the factor and the original variables (Tabachnick and Fidell, 1996).

Creating a small set of factors can reveal “latent” patterns of relationships among the variables. In this respect, a factor can be regarded as a single (unobserved) variable that reflects the variations in a set of variables with high loadings. Principal Component Analysis (PCA) was used to extract factors using Varimax rotation to ensure that the extracted factors were independent and unrelated to each other, and to maximize the loading on each variable and minimize the loading on other factors (Bryman and Cramer, 2005).

To test the relevance of factor analysis for the data set, the Bartlett Test of Sphericity and the Kaiser–Meyer–Olkin (Kaiser, 1974) measure of sampling adequacy were applied. Kaiser–Meyer–Olkin's overall measure of sampling adequacy for our dataset (0.642) was well above the recommended threshold value of ≥ 0.5 (Kaiser, 1974), indicating that patterns of correlation in the dataset are relatively compact and that factor analysis can be validly applied. The results of a Bartlett Test of Sphericity were also highly significant ($\chi^2 = 3124.420$, $df = 435$, $p < 0.000$), again suggesting that factor analysis can be validly applied to the dataset, and supporting the factorability of the correlation matrix. The number of

¹¹ one X variable—the age of respondent's husband (X_{11}) was dropped from the model due to the problem of multi-collinearity

significant factors was determined by calculating the eigenvalue (variance accounted by each factor). Factors with eigenvalues exceeding 1.0 were considered significant following Kaiser's criterion.

In statistical analyses, when two or more predictors in the model are correlated and provide redundant information about the response, this situation or problem is known as multi-collinearity. Existence of high multi-collinearity increases the standard error (S.E.) of estimates of the betas. Hence, betas' reliability decreases. Ultimately, high multi-collinearity often induces confusing and misleading results. So, to detect the existence of multi-collinearity, Variance Inflation Factors (VIFs) of each predictor are calculated. If a predictor has VIF value greater than and equal to 10 then there is a problem with multi-collinearity. Multi-collinearity can be ignored if the interest is only in estimation and prediction, but if the wish is to establish association patterns between X and Y variables, then the analyst can eliminate some predictors from the model. In our case, age of the respondent's husband (X_{11}) was correlating with age of the respondent (X_1) so, we dropped X_{11} this single variable from the model, as VIF values for this variable was above 8 (giving an abnormal trend), while the VIF values for the remaining 29 variables, except a few, were all below 2.00 as it is evident from the table 32. The variables or factors presented in the tables follow the same sequence.

8.4 Profile of the Respondents

The frequencies and percentages of respondents have shown that most respondents (66.67%) were 25 to 45 years old and the second most frequent (29.17%) age group was 45-65 years implying that women participating in livestock management activities are mostly of active age. The levels of education of the women were quite low. More than half (56.67%) of the respondents were illiterate and 20% of them finished primary school (5 years of education). Older women were often found to be either illiterate or having a relatively low level of education. Respectively, 11.39%, 26.11%, 46.11%, and 16.39% of respondents were having their health status as, very good, good, average, and poor, implying that majority of them were not enjoying a better health. Most respondents (62.22%) had family size from four to six family members, about a quarter (23.06%) had a family size from seven to nine, while 13.61% and 1.11% of the respondents had 1-3 and above 10 family members, respectively. A large proportion (54.17%) of the respondents was living under non-nuclear family system whereas 45.83% respondents were residing as nuclear families. The main reason for living

under non-nuclear familial system by majority of the respondent is the preference of people to live jointly along with the parents and brothers even after their marriages. Nearly 60% of the respondents belonged to the families falling into the category of their total annual income from 1001 to 3000 US dollars. And respectively, 17.23%, 15.84%, and 7.50% of the respondents were those who belonged to the families categorized as having their total annual incomes from 3001-5000 US dollar, less than and equal to 1000 US dollars, and above 5000 US dollars. Regarding respondents' husbands, 50% were in the age group from 25 to 45 and 43.06% were 46 to 65 years old. In terms of their educational levels, 35.73% were illiterate, 23.63% obtained their education from 9th to 10th levels, and 17.58% completed 6 to 8 schooling years.

8.5 Results and Discussion

8.5.1 Regression Analyses

In the table 4, models from 1 to 10 constitute the first category of factors (*various aspects of women's status*). At respectively 1% and 5% levels of significance, respondent's age and her level of education (models 1 and 2) were found negatively associated with Y variable. In the models, the variance explained (R-square value) by these variables remained 2% and 1.7% respectively. It shows that in livestock management activities, as compared to a woman of relatively older age, the level of participation of a woman of relatively younger age is high. Similarly, as compared to a woman of relatively high level of education, a woman either illiterate or with relatively less number of schooling years have more responsibility for her day-to-day activities concerning livestock management. We have also generated descriptive statistics (averages, percentages) of these factors/variables on the basis of respondents' levels of participation: low (if undertaking 4 activities), and high (where women's involvement is in more than 4 activities). Descriptive statistics (table 27, 28) on these factors confirm our findings that in livestock farming activities as compared to a woman with low level of participation, a woman with high participation level was of relatively younger age and had low educational level. Husband's level of consultation with the respondent (wife) while making decision on the matters relating to livestock management (model 4) and respondent's participation in the decision-making on family related matters (model 5) were highly significant and had positive relationship with the Y variable. The variances explained (R-squares) by these variables/factors were respectively, 2.6% and 2.0%. Both of these

factors/variables (of models 4 and 5) are also the indicators of gender relations between wife and her husband. So, the results show that the existence of good gender relationship has a positive impact on the extent of women's participation in livestock management activities. Descriptive statistics on these variables also validate this finding by showing the high percentages of the respondents taking part in decision-making (gender relation) for those women with high level of participation in livestock management activities. Respondent's observance of veil/purdah (model 7) was highly significantly (at 1 % level) associated with her lower level of participation in livestock management activities and was explaining 3.5% variability in the model. Veil is a kind of seclusion which limits the mobility and working ability of a woman. Generally, women cannot go alone at distant places outside home and are accompanied mostly by any of her close male relatives (like son, husband, brother, father) or by her female relatives. A woman's unaccompanied mobility means more trust by the family members on her and by this way, she can have more sense of freedom and sense of autonomous mobility, in addition, it can make her more confident even to access the markets to sale the livestock products. It is evident from our results (model 8) that a woman's unaccompanied mobility is significantly relating to her higher level of participation in livestock management activities. The variance explained (R-square) by this factor/variable in the model was 1.7%. More aware a rural woman is about the modern ways of living and decent life style, lesser will be her level of participation in livestock management activities. Results of model 10 present the same nature of relationship between respondent women's level of participation in livestock management activities and her (awareness) experience of living in a city. Urban life style has an impact in terms of modernizing a person's ideas and thoughts and increases a person's awareness and knowledge. So, a woman having an experience of living in a city has more probability to deny her heavy indulgence in the livestock management related activities. The variability explained (R-square) by this variable was 1.5%. But the variance explained by the factors of this category remained 16.10% (see the value of R^2 for model 1 in table 31).

Simple linear regression models from 11 to 13 consider the factors of our second category (*husband's socio-economic status*). The variance explained by this category was only 3.70%. The age of respondent's husband (model 11) was negatively associated with her degree of involvement in livestock farming activities. Comparative (descriptive) statistics also show that the average age of the husband for the women with high level of participation was lower than that of women with low level of participation. It may imply towards that in the

participation of livestock farming activities, as compare to the husbands of younger ages, relatively older aged husbands have a more facilitative or burden-sharing attitude towards their wives. And so, a helping hand from her husband reduces the extent of her engagement in livestock raising activities. The variance explained (R-square) by this variable was only 1.3%. The negative sign of the coefficient (beta, in model 13) shows that the primary occupation of the respondent's husband as "non-farmer" increases the burden of respondent (his wife) in terms of more number of livestock management activities undertaken by her. Primary occupation of the respondent's husband as "non-farmer"—this category comprises of the husband's occupation/employment as either engaged in the government/private job, running own business, daily wage earner (laborer), or as a retired pensioner. In the rural context of Punjab, crop farming and animal keeping are generally complementary activities. Almost every rural family, engaged in crop farming has been rearing livestock as well to supplement its farm income. So, going to the agricultural farms/fields, cutting or collecting fodder, and carrying fodder to the home to serve as feed to the animals, etc. are usually the routine matters a farmer performs everyday as allied activities of crop farming. Contrary to this, if a husband is a non-farmer but keeps animal, than a large burden concerning the upkeep or management of animals is on the shoulders of her wife. The variance explained (R-square) by this factor was 1.4%.

The number of activities undertaken (levels of participation) by the respondent's husband (model 14), her children (model 15), and her in-laws (model 16) individually determine respondent's level of partaking in livestock raising activities. The variables in these three models (from 14 to 16) are presenting the factors of the third category (*participation of family labor*). Determining the maximum variability in the Y variable ($R^2 = 0.567$), this category is carrying the most influential group of factors. The negative signs of the betas in these three models depict the existence of inverse relationship with the dependent variable. It means that our respondent woman's level of participation will be lessening if the available labor/helping hand from her family is increased. The variances explained by these variables in the models were respectively, 20.6%, 16.2%, and 3.7%. Husband's level of participation in livestock management activities was the most (the largest in terms of magnitude) determining factor for settling/deciding the extent of women's involvement in livestock management activities. The role of respondent's children, as a factor, comes second in fixing the degree of women's engagement in animals' up keeping related activities. Respondent's in-laws though relatively lesser but have significant role in deciding her responsibilities in raising animals.

Amongst the demographic factors, respondent's family size (model 17) and (family's non-working age population) number of children below 15 years age (model 19) were positively associated with the dependent variable and the variances explained by the two variables were respectively, 1.3% and 1.2%. The results of these two models can be interpreted in terms of poverty. Women respondents with high level of participation in livestock management activities, as compared to those with low level of participation, had relatively poorer base in terms of their agricultural land, livestock (inventory), income, and human (education, employment, available hired labor, etc.) resources. The descriptive statistics for both categories (with their levels of participation as: low, and high) of the respondent participants on the comparison of above said resources confirm the validity of our statement. Family members in poor families are generally large in number and in poor families, usually the dependency ratios either for children or for old aged persons are also higher than the non-poor families. So (in the models 17 and 19), the statistically significant (at 5 % level) and positive signs of the coefficients can be better justified, interpreted, and understood in terms of the welfare/poverty status of the rural families. In short, in resource poor families, along with the responsibilities of housekeeping, looking after their non-working aged children, and others, women have to heavily engage in livestock management related activities to reap the benefits from animals for their large sized families. Hence, rural women are doing their best at the part of their efforts, energies, time, and labor (even health) to enhance the productivity and profitability of the limited resources available to them for the welfare of their families. Explaining only 2.20% variability in the Y variable, the demographic factors do not seem to have considerable influence on women's level of participation in livestock management related activities.

Models from 20 to 24 are carrying the variables which constitute the fifth category of factors (*livestock related factors*). In terms of determining the large percentage of variability in the Y variable, this category is ranked third. The variance explained by the factors of this category was 11.30%. Woman's level of participation decreases as the number of animals (herd size) kept by her family increases (model 20). The similar trend can be seen in the model 24 where woman's level of participation is negatively associated with the income (taken in the natural log form) earned from livestock. In the rural milieu of Punjab, keeping and managing large sized herd is affordable and feasible only by the landlord and economically well of farm families. Managing large number of animals broadens the scale of animal farming more for the commercial purposes, though the benefits are also enjoyed by the families domestically.

So, animal farming at large scale and where in place of a source of supplementing familial income for subsistence, this activity has more a business objective, women's less participation in this enterprise in those well off families has valid reasons that: more commercial nature of the livestock farming, due to more economic interests, makes it more attractive for the males to participate more in livestock management related activities. In addition, the economic interests let them afford to hire labor (technical, non-technical), seek the modern ways of livestock farming, know market trends, and adopting the methods to enhance the profitability of their livestock farming enterprise. Income earned from livestock by the well off farm families is much more than that of earned by the small farmers. It is because, as compared to the small farmers, the productivity of livestock resources managed by the large farmers is much more and per unit output is also high. Women's participation remain low and mostly in less laborious activities, like milking, milk selling, etc. type of animals or herd type (model 21) is also a statistically significant determinant of women's level of participation in livestock management activities. As compared to managing small ruminants, upkeep and management of large ruminants require more efforts and energies, so women's level of participation increases on increasing the number of large ruminants in the herd. It is evident from the result that the place where the animals are kept (model 22) matters in determining the extent of women's partaking in the activities concerning the management of animals. In the families where the animals are kept at homes, women are culturally more comfortable to participate in a wide range of activities relating to livestock management. Cultural norm of *purdah* allows women work mostly within the premises of four walls of their homes. Comparative descriptive statistics show that women undertaking relatively wide range of livestock management activities were mostly keeping animals at their homes in place of keeping at *havelies* or *deras* (farm-houses). The variances explained by the X variables in the models 20, 21, 22, and 24 were respectively, 2.6%, 2.2%, 2.9%, and 2.7%.

Models from 25 to 28 represent the sixth category of factors (*Economic factors*). The value of R-square calculated to determine the variability in Y variable due to economic factors was 0.105. It is evident from the results that land tenure status of the respondent's family (model 25), size of own landholding (model 26), and total income (taken in natural log form) of the respondent's family (model 27) are negatively associated with the scale of women's participation in livestock management activities. It means that the families, which are landless or have small pieces of agricultural land, and their total familial income is low, are resource poor families. Those resource poor families were heavily relying on livestock as one

of the sources of their familial income. Women were greatly participating in livestock management activities and putting their best to get the maximum benefits from livestock for their families' welfare. The variances explained by these factors were respectively, 3.8%, 8.9%, and 3.3%.

The last category of factors (*geographic factors*) comprising the variables/factors: distant location of the villages from the city, and agro-climatic conditions of the areas, did not show statistically significant effect in determining the magnitude of women's involvement in livestock management activities.

So the analyses are carried out at macro, meso, and micro levels. See the figure 31 below for the main determining factors.

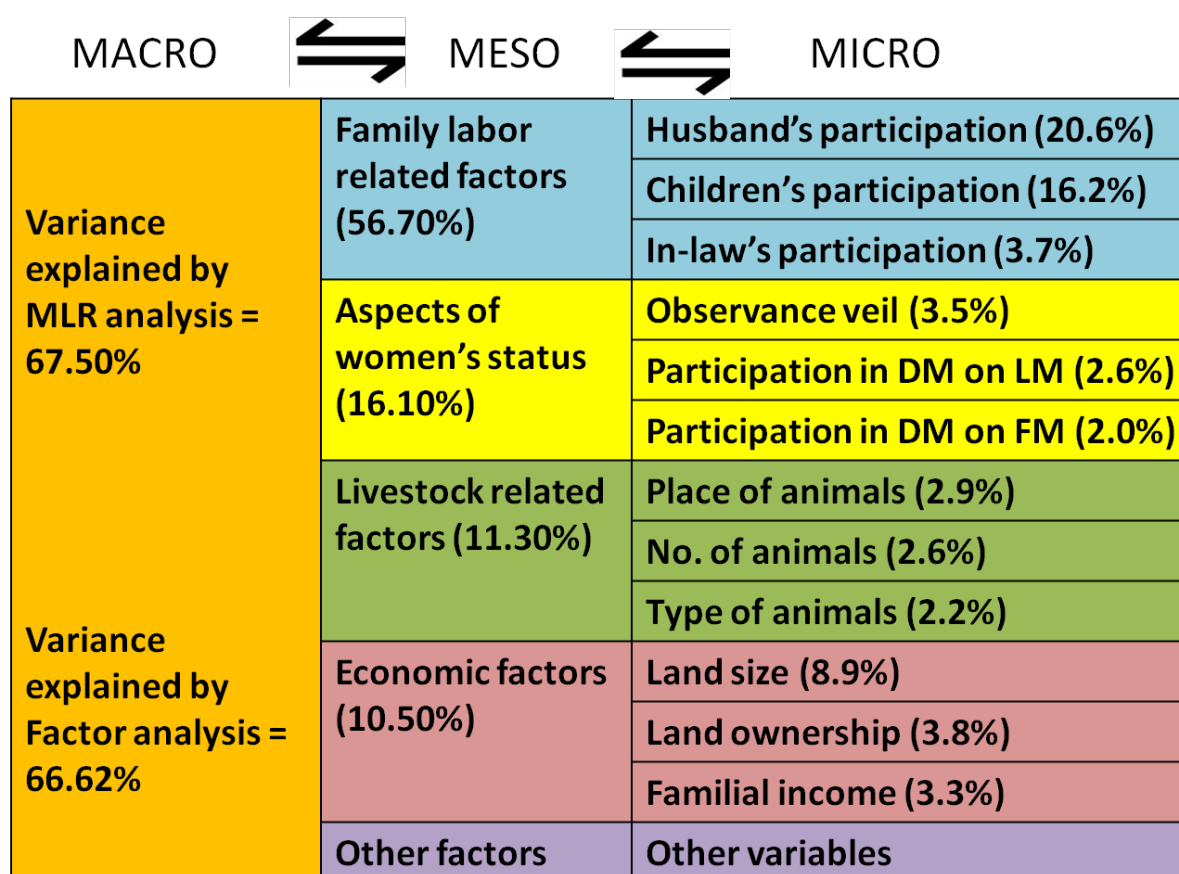


Figure 31: Factors affecting women's participation in livestock management activities: the levels of association

In the figure, variance explained by all variables (macro-level analysis), categories of variables (meso-level analyses), and by individual variables (micro-level analyses) is given. Multiple linear regression analysis (table 32) showed the statistically significant association

of 13 factors with women's level of participation in livestock management activities. Amongst the factors of first category (*various aspects of women's status*), respondent's age, her level of education, participation in the decision making on livestock related matters, and her practice of observing veil were showing their significance. All the three factors of the third category (*participation of family labor*): levels of participation of respondent's husband, children, and her in-laws in livestock management activities were very significantly related in explaining the level of women's engagement in livestock management activities. Family size was the only significantly relating *demographic factor*. Amongst the *livestock related factors*, the type of animal and place of keeping animals demonstrated statistically significant relationship with the Y variable. Number of acreage of land, total income, and the welfare/poverty status of respondent's family were amongst the *economic factors* which were significantly relating with respondent women's level of participation in livestock management activities. The value of the coefficient of determination (R^2) of the model was 0.675, which means that 67.50% variability in the explained (Y) variable is due to the significantly associated X variables of the model. A resume of the factors affecting directly or inversely the level of participation can be viewed in the figure 32.

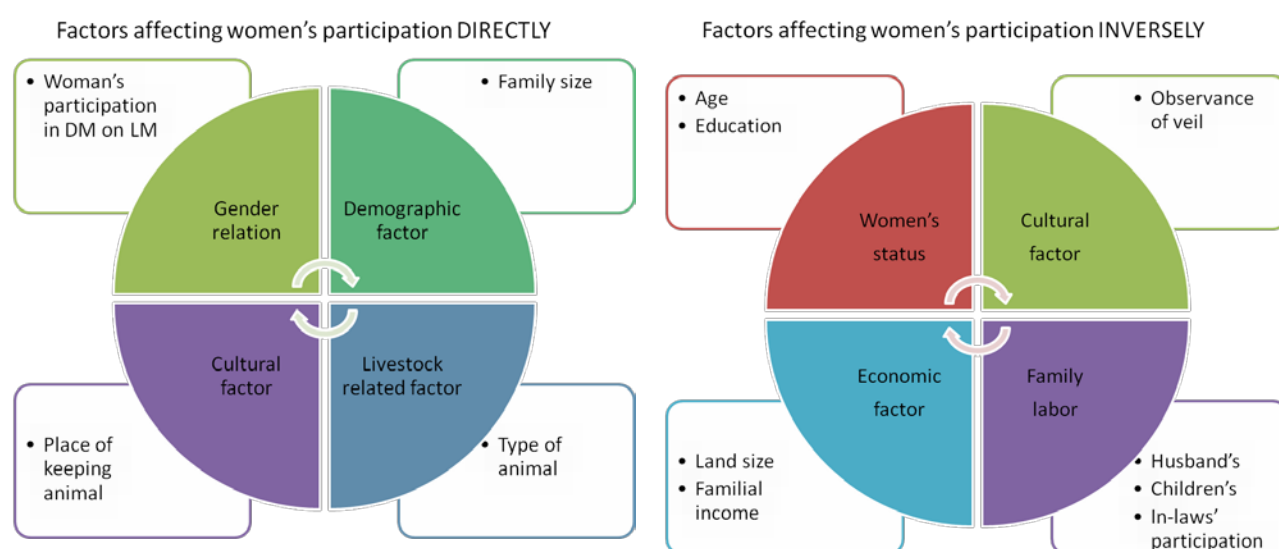


Figure 32: Factors affecting women's participation in livestock management activities: the natures of association

Factor analysis follows its own procedure or criteria to summarize the variables/indicators into the factors. In our case, the factor analysis summed up originally 30 variables in 11 factors (table 33). Here, we do not intend to go deep in the details of all factors, but are

interested in factor 1, factor 5, factor 6, and factor 9 only. The reason of our interest is the existence of resemblance between these factors and the categories of factors we made. Explaining 10.31% variation, factor 1 is comprised of the variables more or less relating to the condition of economic resources in the respondent's family. The constituents of factor 5 are related to the respondent's participation in decision making on livestock and family related matters. This factor explained 6.05% variation. Explaining 5.39% variation, factor 6 is carrying two demographic variables. Factor 9 is about the mobility status of respondent women and explains 4.36% variance. More interestingly, the total variance explained by all the variables/factors in factor analysis was 66.617% which is comparable with that of explained by our multiple linear regression model with its R^2 value 0.675.

8.6 Conclusions

Going through the parts to the whole in search of how an explanatory factor—affecting either individually and/or collectively in a group of related or non-related factors—explains a particular variable, we made simple and multiple linear regression analyses. Descriptive analyses were made to present the characteristics of the variables. Chi square analysis confirmed the hypotheses about the association between variables. The purpose of factor analysis was to compare the variance explained with the R-square given by multiple linear regression. The findings obtained in this study indicate that, the factors associated to participation of family labor, various aspects of women's status, livestock related matters, and economic resources are the most important determinants of rural women's participation in livestock management activities in Punjab (Pakistan).

Availability of family labor, that is, the levels of participation of respondent's husband, children, and her in-laws in livestock management activities have substantial role in determining the level of women's engagement in livestock management activities. Socio economic status of women (respondent's age, her level of education), gender relations (her level of participation in the decision making on livestock related matters), and cultural norms (practice of observing veil) have confirmed their role as well in determining the extent of women's involvement in livestock management activities in rural Punjab. Finding the scope of women's workability in managing livestock kept at homes and out of the homes, has also the cultural interpretations. Respondent's family size, type of the herd, land ownership status of respondent's family in terms of number of acreage of farmland, total familial income, and

the welfare/poverty status of respondent's family are also amongst the determinants of women's partaking in the activities relating to livestock management.

The availability of land resources and livestock management related infrastructure can facilitate the rural families in keeping livestock. Majority of the respondents belonged to the families engaged in crop farming, hence livestock keeping provide them an opportunity to diversify their livelihoods, that is, rather than relying solely on crop farming, livestock farming assure for them at least the food security and a source of continuous income in case of crop failure due to its exposure to the natural calamities or due to any other reason(s). Women's participation in livestock management can be enhanced if the sphere of their participation in the decision making process can be broadened. Prevailing traditions and cultural settings towards assigning roles or making division of labor between husband and wife in agricultural activities have strong implications for determining women's participation in livestock management activities. As in our study, it was seen that in 47%, 24%, 21%, and 8% cases (families) husband's participation in managing livestock was respectively, none, low, medium, and high. So, women remained to shoulder for the bulk of the rest of the activities.

These results have several policy implications. First, women are the main actor or contributor in livestock management and production related activities. In poor rural families, they sell milk or/and milk products to earn money, even sacrifice their part of food from milk for their family members, especially for their children, and continue undertaking activities for production and management of livestock even in a serious ailment. So, their heavy indulgence and the importance of their participation in this undertaking must be recognized and acknowledged not only in the society at local levels but in national accounts as well.

Second, all those cultural, social, and economic factors that are responsible for keeping women underdeveloped, unproductive, and curbing their progress needs to be curbed and condemned by devising and implementing policies, bringing behavioral changes in the minds of people, especially males, creating equal opportunities of gaining access to education, health, and employment to build, incorporate, and streamline the half of country's human resource into the national development process.

Third, government and other institutions must organize women-focused programs or projects to train them and to build their capacities in better and more profitable livestock farming, so

that women's contribution in family income and ultimately in the national income can be raised. Women must also be focused because in the words of IFAD (1991): women are prime movers, rather than welfare recipients, in the development process and vital agents, rather than passive bystanders, in the process of change.

Table 26 : Categories, names, labels, codes/scores of the variables/factors

Category of factors	No.	Names of variable/factor	Label	Code/Scale
1 st : Various aspects of women's status	1	Respondent's age (in years)	X ₁	18-65
	2	Respondent's level of education	X ₂	0-14
	3	Health Status (Very good=3, Good=2, Average=1, Poor=0)	X ₃	0-3
	4	Level of participation in the decision making on the matters relating to livestock management (Always=3, Often=2, Sometime=1, Never=0)	X ₄	0-3
	5	Participation in the decision making on family matters (Yes=1, No=0)	X ₅	0-1
	6	Quarrel with Husband (Yes=1, No=0)	X ₆	0-1
	7	Observing veil/Purdah (Yes=1, No=0)	X ₇	0-1
	8	Mobility (unaccompanied=1, accompanied=0)	X ₈	0-1
	9	Watching television (Yes=1, No=0)	X ₉	0-1
	10	Having experience of living in a city (Yes=1, No=0)	X ₁₀	0-1
2 nd : Husband's socio-economic status	11	Husband's age	X ₁₁	20-80
	12	Husband's level of education	X ₁₂	0-16
	13	Husband's primary occupation (Farmer=1, Non farmer=0)	X ₁₃	0-1
3 rd : Participation of family labor	14	Husband's level of participation in livestock management activities	X ₁₄	0-6
	15	Children's level of participation in livestock management activities	X ₁₅	0-6
	16	In-laws' level of participation in livestock management activities	X ₁₆	0-6
4 th : Demographic factors	17	Family size	X ₁₇	1-11
	18	Family system (Nuclear=1, Non nuclear=0)	X ₁₈	0-1
	19	No. of children below 15 years of age	X ₁₉	0-6
5 th : Livestock related factors	20	Total no. of animals	X ₂₀	1-48
	21	Type of animal (small ruminants = 1, large ruminants = 2, both = 3)	X ₂₁	1-3
	22	Place of keeping animals (house=2, haveli=1, farmhouse/dera=0)	X ₂₂	0-2
	23	No. of problems in keeping livestock	X ₂₃	0-3
	24	Income from animals (in natural log form)	X ₂₄	7.60-13.12
6 th : Economic factors	25	Land tenure status (landless = 0, tenant/share cropper = 1, own land = 2)	X ₂₅	0-2
	26	Size of own landholding (in acres)	X ₂₆	0-63
	27	Total familial income (in natural log form)	X ₂₇	9.55-14.73
	28	Family's welfare/poverty status (poor=1, non poor=0)	X ₂₈	0-1
7 th : Geographic factors	29	Distant location of the village from city (near=0, far=1)	X ₂₉	0-1
	30	Agro climatic zones (BNR=1, CKL=2, FSD=3)	X ₃₀	1-3
Scale for the dependent variable: respondent women's level of participation in livestock management activities (Y) = 1-7				

Table 27 : Descriptive statistics (averages and percentages) on the variables included in the analyses (Part 1)

Label	Variables	Low level of participation (n = 181)	High level of participation (n = 179)	Overall descriptive Statistics (N = 360)
X ₁	Respondent's age (average)	41.84	39.90	40.88
X ₂	Respondent's level of education (average)	3.73	2.89	3.32
X ₃	Health Status (Very good=3, Good=2, Average=1, Poor=0) (in percentages)			
	Poor	14.4	18.4	16.4
	Average	46.4	45.8	46.1
	Good	27.6	24.6	26.1
	Very good	11.6	11.2	11.4
X ₄	Husband Consult (Always=3, Often=2, Sometime=1, Never=0) (in percentages)			
	Never	14.9	10.6	12.8
	Sometime	25.4	23.5	24.4
	Often	30.4	20.1	25.3
	Always	29.3	45.8	37.5
X ₅	Participation in Decision on Family Matters (Yes=1, No=0) (in percentages)			
	No	43.6	31.3	37.5
	Yes	56.4	68.7	62.5
X ₆	Quarrel with Husband (Yes=1, No=0) (in percentages)			
	No	74.0	80.4	77.2
	Yes	26.0	19.6	22.8
X ₇	Observing Purdah (Yes=1, No=0) (in percentages)			
	No	73.5	88.8	81.1
	Yes	26.5	11.2	18.9
X ₈	Mobility (unaccompanied=1, accompanied=0) (in percentages)			
	Accompanied	84.5	73.7	79.2
	Unaccompanied	15.5	26.3	20.8
X ₉	Watching television(Yes=1, No=0) (in percentages)			
	No	16.6	22.3	19.4
	Yes	83.4	77.7	80.6
X ₁₀	Having experience of living in city (Yes=1, No=0) (in percentages)			
	No	81.2	89.4	85.3
	Yes	18.8	10.6	14.7
X ₁₁	Husband's age (average)	46.22	44.89	45.56
X ₁₂	Husband's level of education (average)	5.82	5.35	5.59
X ₁₃	Husband's Occupation (Farmer=1, Non farmer=0) (in percentages)			
	Non farmer	32.6	42.5	37.5
	Farmer	67.4	57.5	62.5
X ₁₄	Husband's level of participation in livestock management activities (average)	2.29	0.65	1.47
Scale for the dependent variable: respondent women's level of participation in livestock management activities (Y) = 1-7				

Table 28 : Descriptive statistics (averages and percentages) on the variables included in the analyses (Part 2)

Label	Variables	Low level of participation (n = 181)	High level of participation (n = 179)	Overall descriptive Statistics (N = 360)
X ₁₅	Children's level of participation in livestock management activities (average)	1.15	0.12	0.64
X ₁₆	In-laws' level of participation in livestock management activities (average)	0.24	0.01	0.13
X ₁₇	Family size (average)	5.09	5.64	5.37
X ₁₈	Family System (Nuclear=1, Non nuclear=0) (in percentages)			
	Non nuclear	51.9	56.4	54.2
	Nuclear	48.1	43.6	45.8
X ₁₉	No. of children below 15 years of age (average)	1.27	1.65	1.46
X ₂₀	Total no. of animals (average)	6.60	4.92	5.76
X ₂₁	Type of Animal (Small Ruminants = 1, Large Ruminants = 2, Both = 3) (in percentages)			
	Small ruminants	5.0	4.5	4.7
	Large ruminants	29.8	20.1	25.0
	Both	65.2	75.4	70.3
X ₂₂	Place of keeping animals (House=2, Haveli=1, Dera/farmhouse=0) (in percentages)			
	Dera/farmhouse	27.6	15.1	21.4
	Haveli	22.1	22.3	22.2
	Home	50.3	62.6	56.4
X ₂₃	No. of Problems in Keeping Livestock (in percentages)			
	No any	14.4	13.4	13.9
	One	54.7	55.9	55.3
	Two	26.0	24.0	25.0
	Three	5.0	6.7	5.8
X ₂₄	Average annual income from livestock (average)	60171.27	44458.10	52358.33
X ₂₅	Land Tenure Status (Landless = 0, Tenant/At Part = 1, Own Land = 2) (in percentages)			
	Landless	4.4	15.1	9.7
	Tenant/sharecropper	8.3	12.8	10.6
	land owner	87.3	72.1	79.7
X ₂₆	Size of own landholding in acres (average)	7.48	2.96	5.23
X ₂₇	Average annual income of the family (average)	272635.36	193603.35	233338.89
X ₂₈	Poverty (Poor=1, Non poor=0) (in percentages)			
	Non poor	83.4	74.9	79.2
	Poor	16.6	25.1	20.8
X ₂₉	Distance From City (Near=0, Far=1) (in percentages)			
	Near	49.2	50.8	50.0
	Far	50.8	49.2	50.0
X ₃₀	Agro climatic zones (BNR=1, CKL=2, FSD=3) (in percentages)			
	Cotton-wheat (BNR)	29.8	36.9	33.3
	Rain-fed (CKL)	43.1	23.5	33.3
	Mix-crop (FSD)	27.1	39.7	33.3
Y	Respondent's level of participation in livestock management activities (average)	2.56	6.25	4.40

Table 29 : Chi square analysis: association between X and Y variables

Variables		Pearson Chi-Square	
Label	Names of variable/factor	Value	df
X ₁	Respondent's age	271.212*	240
X ₂	Respondent's level of education	47.165**	30
X ₃	Health Status	24.970 ^{NS}	18
X ₄	Level of participation in the decision making on the matters relating to livestock management	22.143 ^{NS}	18
X ₅	Participation in the decision making on family matters	7.927 ^{NS}	6
X ₆	Quarrel with Husband	6.799 ^{NS}	6
X ₇	Observing veil/Purdah	26.645***	6
X ₈	Mobility	10.086 ^{NS}	6
X ₉	Watching television	3.704 ^{NS}	6
X ₁₀	Having experience of living in a city	15.999**	6
X ₁₁	Husband's age	262.771*	228
X ₁₂	Husband's level of education	37.959 ^{NS}	36
X ₁₃	Husband's primary occupation	9.845 ^{NS}	6
X ₁₄	Husband's level of participation in livestock management activities	469.613***	36
X ₁₅	Children's level of participation in livestock management activities	148.081***	42
X ₁₆	In-laws' level of participation in livestock management activities	58.783**	36
X ₁₇	Family size	67.383 ^{NS}	60
X ₁₈	Family system	3.015 ^{NS}	6
X ₁₉	No. of children below 15 years of age	31.372 ^{NS}	36
X ₂₀	Total no. of animals	160.080**	132
X ₂₁	Type of animal	24.280**	12
X ₂₂	Place of keeping animals	23.645**	12
X ₂₃	No. of problems in keeping livestock	19.377 ^{NS}	18
X ₂₄	Income from animals	252.707***	186
X ₂₅	Land tenure status	31.148***	12
X ₂₆	Size of own landholding	458.673***	384
X ₂₇	Total familial income	444.768 ^{NS}	450
X ₂₈	Family's welfare/poverty status	8.025 ^{NS}	6
X ₂₉	Distant location of the village from city	7.437 ^{NS}	6
X ₃₀	Agro climatic zones	75.624***	12
Y	Women's level of participation in livestock management activities		

Table 30 : Factors affecting women's level of participation in livestock management activities:

Table 4: Factors affecting women's level of participation in livestock management activities: Analyses from simple linear regression models							
Model	Label	Variable	(Constant)	Std. Error	Standardized Coefficients Beta	R Square	% Variance Explained
1	X ₁	Respondent's age	5.570	0.01	-0.140***	0.020	2.0
2	X ₂	Respondent's level of education	4.609	0.03	-0.130**	0.017	1.7
3	X ₃	Health Status	4.409	0.13	-0.004 ^{NS}	0.000	
4	X ₄	Participation in decision on livestock related matters	3.805	0.10	0.160***	0.026	2.6
5	X ₅	Participation in decision on family matters	4.015	0.23	0.142***	0.020	2.0
6	X ₆	Quarrel with husband	4.478	0.26	-0.072 ^{NS}	0.005	
7	X ₇	Observing purdah	4.586	0.28	-0.187***	0.035	3.5
8	X ₈	Mobility	4.256	0.27	0.132**	0.017	1.7
9	X ₉	Watching television	4.643	0.28	-0.058 ^{NS}	0.003	
10	X ₁₀	Having experience of living in city	4.505	0.31	-0.124**	0.015	1.5
11	X ₁₁	Husband's age	5.346	0.01	-0.112**	0.013	1.3
12	X ₁₂	Husband's level of education	4.585	0.02	-0.081 ^{NS}	0.007	
13	X ₁₃	Husband's primary occupation	4.711	0.23	-0.117**	0.014	1.4
14	X ₁₄	Husband's level of participation	5.199	0.06	-0.454***	0.206	20.6
15	X ₁₅	Children's level of participation	4.754	0.07	-0.403***	0.162	16.2
16	X ₁₆	In-laws' level of participation	4.469	0.15	-0.193***	0.037	3.7
17	X ₁₇	Family size	3.672	0.06	0.113**	0.013	1.3
18	X ₁₈	Family system	4.513	0.22	-0.060 ^{NS}	0.004	
19	X ₁₉	No. of children below 15 years of age	4.176	0.07	0.111**	0.012	1.2
20	X ₂₀	Total no. of animals	4.770	0.02	-0.161***	0.026	2.6
21	X ₂₁	Type of animal	2.940	0.19	0.149***	0.022	2.2
22	X ₂₂	Place of keeping animals	3.802	0.13	0.171***	0.029	2.9
23	X ₂₃	No. of problems in keeping livestock	4.419	0.15	-0.006 ^{NS}	0.000	
24	X ₂₄	Income from animals	7.983	0.11	-0.164***	0.027	2.7
25	X ₂₅	Land tenure status	5.484	0.17	-0.195***	0.038	3.8
26	X ₂₆	Size of own landholding	4.809	0.01	-0.299***	0.089	8.9
27	X ₂₇	Total familial income	10.540	0.14	-0.183***	0.033	3.3
28	X ₂₈	Family's welfare/poverty status	4.305	0.27	0.086 ^{NS}	0.007	
29	X ₂₉	Distant location of village from city	4.333	0.22	0.031 ^{NS}	0.001	
30	X ₃₀	Agro climatic zone	4.306	0.13	0.018 ^{NS}	0.000	

Table 31 : Multiple linear regression models determining the variances explained (R-square values) by each category of factors

No.	Multiple linear regression model	F-value (df)	R-square value	Adjusted R-square value	% of variance explained
Model 1	$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \beta_{10} X_{10} + e$ <i>Where</i> X_1 to X_{10} = regressors relating to various aspects of women's status β_1 to β_{10} = coefficients of the regressors e = error term	6.686*** (10)	0.161	0.137	16.10
Model 2	$Y = \beta_0 + \beta_{11} X_{11} + \beta_{12} X_{12} + \beta_{13} X_{13} + e$ <i>Where</i> X_{11} to X_{13} = regressors relating to husband's socio-economic status β_{11} to β_{13} = coefficients of the regressors e = error term	4.357*** (3)	0.037	0.028	3.70
Model 3	$Y = \beta_0 + \beta_{14} X_{14} + \beta_{15} X_{15} + \beta_{16} X_{16} + e$ <i>Where</i> X_{14} to X_{16} = regressors relating to participants of family labor β_{14} to β_{16} = coefficients of the regressors e = error term	155.653** * (3)	0.567	0.564	56.70
Model 4	$Y = \beta_0 + \beta_{17} X_{17} + \beta_{18} X_{18} + \beta_{19} X_{19} + e$ <i>Where</i> X_{17} to X_{19} = regressors relating to demographic factors β_{17} to β_{19} = coefficients of the regressors e = error term	2.641** (3)	0.022	0.014	2.20
Model 5	$Y = \beta_0 + \beta_{20} X_{20} + \beta_{21} X_{21} + \beta_{22} X_{22} + \beta_{23} X_{23} + \beta_{24} X_{24} + e$ <i>Where</i> X_{20} to X_{24} = regressors relating to livestock related factors β_{20} to β_{24} = coefficients of the regressors e = error term	8.483*** (5)	0.113	0.099	11.30
Model 6	$Y = \beta_0 + \beta_{25} X_{25} + \beta_{26} X_{26} + \beta_{27} X_{27} + \beta_{28} X_{28} + e$ <i>Where</i> X_{25} to X_{28} = regressors relating to economic factors β_{25} to β_{28} = coefficients of the regressors e = error term	10.419*** (4)	0.105	0.095	10.50
Model 7	$Y = \beta_0 + \beta_{29} X_{29} + \beta_{30} X_{30} + e$ <i>Where</i> X_{29} to X_{30} = regressors relating to geographic factors β_{29} to β_{30} = coefficients of the regressors e = error term	0.226 ^{NS} (2)	0.001	-0.004	0.10
<i>Y (regressand) = women's level of participation in livestock management activities</i>					

Table 32 : Factors affecting women's level of participation—A Multiple linear regression analysis

Independent variables (Xs)		Std. Error	Standardized Coefficients (Beta)	t- values	Collinearity Statistics (VIF-values)
Constant (α) = 10.545		1.759		5.996	
X ₁	Respondent's age	0.010	-0.155***	-3.062	2.593
X ₂	Respondent's level of education	0.022	-0.112**	-2.487	2.064
X ₃	Health Status	0.080	-0.009 ^{NS}	-0.265	1.164
X ₄	Participation in decision on livestock related matters	0.076	0.082**	2.126	1.526
X ₅	Participation in decision on family matters	0.157	0.031 ^{NS}	0.860	1.348
X ₆	Quarrel with husband	0.165	-0.002 ^{NS}	-0.057	1.126
X ₇	Observing purdah	0.188	-0.074**	-2.093	1.272
X ₈	Mobility	0.175	-0.013 ^{NS}	-0.368	1.182
X ₉	Watching television	0.179	0.017 ^{NS}	0.498	1.178
X ₁₀	Having experience of living in city	0.218	0.001 ^{NS}	0.018	1.395
X ₁₁ [†]	Husband's age	-	-	-	-
X ₁₂	Husband's level of education	0.019	-0.033 ^{NS}	-0.777	1.801
X ₁₃	Husband's primary occupation	0.159	0.052 ^{NS}	1.412	1.389
X ₁₄	Husband's level of participation	0.046	-0.568***	-14.699	1.516
X ₁₅	Children's level of participation	0.052	-0.544***	-14.452	1.441
X ₁₆	In-laws' level of participation	0.099	-0.292***	-8.593	1.173
X ₁₇	Family size	0.057	0.153***	3.225	2.272
X ₁₈	Family system	0.151	0.032 ^{NS}	0.888	1.316
X ₁₉	No. of children below 15 years of age	0.064	-0.035 ^{NS}	-0.752	2.234
X ₂₀	Total no. of animals	0.015	-0.023 ^{NS}	-0.607	1.475
X ₂₁	Type of animal	0.130	0.085**	2.402	1.269
X ₂₂	Place of keeping animals	0.095	0.103***	2.809	1.378
X ₂₃	No. of problems in keeping livestock	0.104	-0.032 ^{NS}	-0.856	1.434
X ₂₄	Income from animals	0.096	0.008 ^{NS}	0.189	2.031
X ₂₅	Land tenure status	0.134	-0.017 ^{NS}	-0.409	1.689
X ₂₆	Size of own landholding	0.011	-0.069*	-1.695	1.671
X ₂₇	Total familial income	0.164	-0.149**	-2.530	3.514
X ₂₈	Family's welfare/poverty status	0.242	-0.152***	-3.218	2.258
X ₂₉	Distant location of village from city	0.160	-0.060 ^{NS}	-1.556	1.493
X ₃₀	Agro climatic zone	0.106	-0.037 ^{NS}	-0.888	1.758
R-square value	0.675 (variance explained = 67.50%)				
Adj. R-square value	0.647				
F-value (df)	23.643*** (29)				
†Husband's age (X ₁₁)—this variable was dropped due to high collinearity and VIF value above 8. Dependent Variable (Y): Respondent women's level of participation in livestock management activities. *significance at 10% level, **significance at 5% level, and ***significance at 1% level					

Table 33 : Factor Analysis of indicators of Women's Participation in Livestock Management Activities

Factors	Indicators	Factors loadings	Communalities	Initial Eigen values	Variance explained† %	Variance explained‡ %
Factor 1	Income from animals	0.762	0.640	3.720	12.399	10.313
	Total familial income	0.758	0.764			
	Husband's Occupation	0.610	0.515			
	Family's welfare/Poverty status	-0.605	0.645			
	Place of keeping animals	-0.539	0.523			
	Agro climatic zones	0.462	0.666			
Factor 2	Respondent's age	0.921	0.906	3.186	10.618	10.062
	Husband's Age	0.895	0.868			
	Children's level of participation	0.543	0.616			
	Respondent's level of education	-0.508	0.689			
Factor 3	Distant location of village from city	0.671	0.680	2.176	7.252	6.406
	No. of Problems in Keeping Livestock	0.650	0.553			
	Husband's level of education	-0.567	0.706			
	Total no. of animals	0.423	0.576			
Factor 4	Having experience of living in city	0.797	0.674	1.816	6.053	6.187
	Size of own landholding	0.565	0.569			
Factor 5	Participation in decision on family matters	0.779	0.697	1.711	5.705	6.051
	Participation in decision on livestock related matters	0.718	0.596			
Factor 6	Family Size	0.855	0.853	1.645	5.483	5.390
	No. of children below 15 years of age	0.671	0.817			
Factor 7	Family System	0.744	0.643	1.384	4.614	5.281
	Type of animal	-0.531	0.665			
	Husband's level of participation	0.445	0.676			
Factor 8	Watching television	0.752	0.616	1.200	3.999	4.411
	Land tenure status	0.430	0.611			
Factor 9	Mobility	-0.839	0.755	1.079	3.596	4.367
	Observing Purdah	0.427	0.526			
Factor 10	In-laws' level of participation	-0.798	0.710	1.068	3.560	4.124
	Health status	0.380	0.560			
Factor 11	Quarrel with husband	0.741	0.669	1.001	3.337	4.026
Total variance explained (in %)				19.986	66.617	66.617
† For Extraction Sums of Squared Loadings ‡ For Rotation Sums of Squared Loadings Extraction Method: Principal Component Analysis (PCA). Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 12 iterations. Factor loading with the values larger than 0.40 in absolute terms are given in the table. (N = 360)						

Table 34 : KMO and Bartlett's Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.642
Bartlett's Test of Sphericity	Approx. Chi-Square	3124.420
	df	435
	Sig.	0.000

General Conclusion

At regional level, large family size had a negative effect on women's health. In her younger age a woman had better mobility status. Women from nuclear families were enjoying relatively better awareness status. Education of respondent's husband had no significant role in determining any aspect of women's status. Spatial variables (deprivation level of the district; agro-ecological sub-regions, and location of the village from a particular distance from the city) were significantly influencing almost all the aspects of women's status. As compared to the villages located remote from the cities, gender relation and women's mobility status were found better in the localities (villages) lying in close proximities to the cities. As compared to the less deprived districts (Faisalabad, Chakwal), gender relations and women's health status were found relatively poor whereas women's mobility and awareness statuses were found relatively better in the most deprived district (Bahawalnagar).

Respondent's education above 8, husband's occupation as "job" and "laborer", family resources (income, own land) had significant role in influencing women's awareness status at regional (Punjab) level. Various age groups of the respondents, husband's occupation as "laborer", and family income were the variables significantly determining women's mobility status. Similarly, at regional level, family size was determining her health status and respondent's education, her job status, occupation of her husband, and the type of her family, were the socio-demographic variables significantly determining gender relation.

As the spatial or geographical variables have shown significant influence in determining various aspects of women's status, so the study suggests in the words of (Sathar and Kazi, 2000) that: "...because women's empowerment and status are multi-dimensional, several measures have to be utilized to gauge women's status in various settings. Greater power or autonomy in one dimension and in one community is not expected to amount to the same in another".

In determining the nature and level of participation of the family labor in livestock management activities, cultural norms (women's restricted mobility, and practice of observing veil (purdah)), theory of masculinity & femininity (participation in soft and hard natured activity), availability of family labor (number of helping hands), and physical condition of the participant (old or young age, health condition) seems to matter the most than the other factors, that is, agro-climatic and geographical/spatial variations. In the context

of Punjab, the activities like, fodder serving, serving water, dung collection, and milking are considered soft-natured activities and can be performed inside the four walls of home, so are mostly women's job. Activities like, fodder cutting, bathing the animals, milk selling are generally hard-natured and outside home activities, so are mostly performed by the men. Women's participation was low in the activities (like, milk selling) where more chances were there for them to interact with unknown males. So, cultural restriction of purdah (seclusion) and confined mobility were dynamic in Punjab. Bathing of animals was the most performed activity by respondent's son. Amongst the female in laws, the most of the activities were performed by respondent's mother in law and her maximum participation in milking activity seems justified in terms of her old age and relatively soft-nature of milking activity. Out of total seven major livestock management activities, in cotton-wheat zone, rain-fed zone, and mix-crop zone the average number of activities being carried out by women/respondents were 4.43, 3.72, and 4.34 respectively. After the respondent, the second person whose participation was the maximum in managing livestock was her husband. Though he comes second in undertaking livestock management activities but in comparison with his wife, his participation was approximately three times less than that of his wife. In the rural families of Punjab, children were found as the third major contributor in livestock management activities. Amongst the family labor, in the livestock management activities, the participation of respondent's in laws was the lowest. At each of the three geographical levels (regional, sub regional, and local), women respondent's participation level was multiple of that of their husbands' level in livestock management activities. Wife-to-husband participation ratio was raising as the distance of a village from the nearest city was increasing. The level of participation, for a husband with his primary occupation farming, was high in livestock management related activities. The women-to-men participation ratio served as a measure to capture the gap between the both genders in terms of carrying out the number of activities. Women-to-men participation ratio measured for our study was ranging from the minimum 1.74 (calculated for rain-fed zone) to the maximum 3.40 (calculated for mix-crop zone). Amongst the agro-climatic zones, the largest gap was seen in mix-crop zone followed by the cotton-wheat zone, while the least gap was calculated for the rain-fed zone. As per our expectations, the wider gap was recorded amongst gender participation in the villages located at far off distances from the cities. Respondent-women's non physical participation in the livestock management was relatively better in rain-fed zone followed by mix-crop zone, whereas the situation was poor in cotton-wheat zone. Our findings show that women's level of participation in livestock management activities empower rural women in terms of better

gender relations or increased decision-making power on the matters relating to the livestock management.

In rural Punjab, women, in the families which keep livestock, are taking a large part in livestock management activities, and their families are getting benefits from livestock in the form of income, food, and fuel. But the amount of benefits enjoyed by a rural family, irrespective of the extent of women's involvement in the livestock management activities, was dependent on the welfare status of that family. As compared to the resource poor families, the economically well-off rural families by having more resources were getting more benefits from livestock and the women from those families had also less level of participation in livestock management activities due to their affordability to hire labor and due to the more commercial nature of livestock farming. Whereas, the families which were not in a better state of welfare were getting less benefits from livestock due to lack of resources, but women in these families, by participating in a maximum number of livestock management related activities, were putting their best to reap the utmost benefits from scarce resources for their families. It is also a considerable fact that nearly 60% of the total poor (per capita income below the poverty line) families were those where women's level of participation in livestock management activities was the highest.

For the families with small herd size, we have recommendation that government must initiate the projects for small farmers—who are already resource poor but a large share of total livestock production comes from the small farmers, to enable them to make their farming more productive and profitable. This step will help them come out of poverty, hence will raise their standard of living, and at country level it will contribute in raising the share of livestock in GDP. If through better farm practices or by other means the yield per animal is increased in just small units, at country level it will be an increase in production in very large units.

The findings obtained in this study indicate that, the factors associated to participation of family labor, various aspects of women's status, livestock related matters, and economic resources are the most important determinants of rural women's participation in livestock management activities in Punjab (Pakistan).

Availability of family labor, that is, the levels of participation of respondent's husband, children, and her in-laws in livestock management activities have substantial role in

determining the level of women's engagement in livestock management activities. Socio economic status of women (respondent's age, her level of education), gender relations (her level of participation in the decision making on livestock related matters), and cultural norms (practice of observing veil) have confirmed their role as well in determining the extent of women's involvement in livestock management activities in rural Punjab. Finding the scope of women's workability in managing livestock kept at homes and out of the homes, has also the cultural interpretations. Respondent's family size, type of the herd, land ownership status of respondent's family in terms of number of acreage of farmland, total familial income, and the welfare/poverty status of respondent's family are also amongst the determinants of women's partaking in the activities relating to livestock management.

The availability of land resources and livestock management related infrastructure can facilitate the rural families in keeping livestock. Majority of the respondents belonged to the families engaged in crop farming, hence livestock keeping provide them an opportunity to diversify their livelihoods, that is, rather than relying solely on crop farming, livestock farming assure for them at least the food security and a source of continuous income in case of crop failure due to its exposure to the natural calamities or due to any other reason(s). Women's participation in livestock management can be enhanced if the sphere of their participation in the decision making process can be broadened. Prevailing traditions and cultural settings towards assigning roles or making division of labor between husband and wife in agricultural activities have strong implications for determining women's participation in livestock management activities. As in our study, it was seen that in 47%, 24%, 21%, and 8% cases (families) husband's participation in managing livestock was respectively, none, low, medium, and high. So, women remained to shoulder for the bulk of the rest of the activities.

Our key findings are: in economically deprived areas, women's awareness and mobility status are better; husband's socio-economic status is the main determinant of a woman's status; husband's level of participation in livestock management activities is the main determining factor of a woman's level of participation; the families where women's participation is high are relatively resource poor; productivity of livestock resources managed by large farmer is high; a woman's high level of participation in livestock management activities empower her in terms of better gender relations. We also conclude that geographical differences matter in determining: the various aspects of women's status; the

trends and levels of participation of family labour in livestock management activities; and the welfare status of farm families along with their shares of benefits getting from livestock.

These results have several policy implications. First, women are the main actor or contributor in livestock management and production related activities. In poor rural families, they sell milk or/and milk products to earn money, even sacrifice their part of food from milk for their family members, especially for their children, and continue undertaking activities for production and management of livestock even in a serious ailment. So, their heavy indulgence and the importance of their participation in this undertaking must be recognized and acknowledged not only in the society at local levels but in national accounts as well.

Second, all those cultural, social, and economic factors that are responsible for keeping women underdeveloped, unproductive, and curbing their progress needs to be curbed and condemned by devising and implementing policies, bringing behavioral changes in the minds of people, especially males, creating equal opportunities of gaining access to education, health, and employment to build, incorporate, and streamline the half of country's human resource into the national development process.

Third, government and other institutions must organize women-focused programs or projects to train them and to build their capacities in better and more profitable livestock farming, so that women's contribution in family income and ultimately in the national income can be raised. Women must also be focused because in the words of IFAD (1991): women are prime movers, rather than welfare recipients, in the development process and vital agents, rather than passive bystanders, in the process of change.

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APPENDIX

II Mathematical Modeling of Ordered Probit Regression

When the response variable is ordinal and has more than two levels, researchers have a choice between ordered logistic regression (ordered logit) and ordered probit models. We are presenting the introduction, need, and mathematical construct of the ordered probit regression through an example that is given below.

One may ask a question: “what predicts health status?” the answer (outcome) will be lying within a monotonic ordering of the qualitative responses as: very good, good, average, and poor. This range of outcomes follows a natural ordering but has no quantitative interpretation. To represent the qualitative responses on self reported health status, we can model these responses as: very good = 4, good = 3, average = 2 and poor = 1. The numbers or codes (from 1 to 4) assigned to the responses mean nothing in terms of their values but to show an ordering from the lowest to the highest status of health.

Model

Let

y_i^* = latent index of self reported health status

This latent index measures a person’s own scale of health. Once y_i^* crosses a certain value a person report as poor, then average, then good, and finally very good,

So,

$y_i = (1, 2, 3, 4)$ for health status (poor, average, good, very good)

Interval decision rule

$$y_i=1 \quad \text{if} \quad y_i^* \leq u_1$$

$$y_i=2 \quad \text{if} \quad u_1 < y_i^* \leq u_2$$

$$y_i=3 \quad \text{if} \quad u_2 < y_i^* \leq u_3$$

$$y_i=4 \quad \text{if} \quad y_i^* > u_3$$

As with logit and probit models, we assume that y_i^* is a function of observed and unobserved variables

$$y_i^* = \beta_0 + x_{1i}\beta_1 + x_{2i}\beta_2 \dots x_{ki}\beta_k + \varepsilon_i \dots \dots \dots \text{Equation (1)}$$

$$y_i^* = x_i\beta + \varepsilon_i \dots \dots \dots \text{Equation (2)}$$

The values u_1, u_2, u_3 , are unknown and called threshold values. We do not know the value of the index necessary to push a person from good to very good.

In theory, the threshold values are different for everyone. Computer will not only estimate the β 's, but also the thresholds – average across people.

In probit and logit regressions, the models are determined by the assumed distribution of error terms (ε). In practice, researchers mostly make choice for ordered probit, because its error term follows the normal distribution.

Now we generate the mathematics for the probit regression.

Probabilities

Let's do the outliers, $\Pr(y_i=1)$ and $\Pr(y_i=4)$ first

$$\Pr(y_i=1) = \Pr(y_i^* \leq u_1) = \Pr(x_i\beta + \varepsilon_i \leq u_1) = \Pr(\varepsilon_i \leq u_1 - x_i\beta) = \Phi[u_1 - x_i\beta] = 1 - \Phi[x_i\beta - u_1]$$

$$\begin{aligned} \Pr(y_i=2) &= \Pr(u_1 < y_i^* \leq u_2) = \Pr(y_i^* \leq u_2) - \Pr(y_i^* \leq u_1) = \Pr(x_i\beta + \varepsilon_i \leq u_2) - \Pr(x_i\beta + \varepsilon_i \leq u_1) \\ &= \Pr(\varepsilon_i \leq u_2 - x_i\beta) - \Pr(\varepsilon_i \leq u_1 - x_i\beta) = \Phi[u_2 - x_i\beta] - \Phi[u_1 - x_i\beta] = 1 - \Phi[x_i\beta - u_2] \\ &\quad - 1 + \Phi[x_i\beta - u_1] = \Phi[x_i\beta - u_1] - \Phi[x_i\beta - u_2] \end{aligned}$$

$$\begin{aligned} \Pr(y_i=3) &= \Pr(u_2 < y_i^* \leq u_3) = \Pr(y_i^* \leq u_3) - \Pr(y_i^* \leq u_2) = \Pr(x_i\beta + \varepsilon_i \leq u_3) - \Pr(x_i\beta + \varepsilon_i \leq u_2) \\ &= \Pr(\varepsilon_i \leq u_3 - x_i\beta) - \Pr(\varepsilon_i \leq u_2 - x_i\beta) = \Phi[u_3 - x_i\beta] - \Phi[u_2 - x_i\beta] = 1 - \Phi[x_i\beta - u_3] \\ &\quad - 1 + \Phi[x_i\beta - u_2] = \Phi[x_i\beta - u_2] - \Phi[x_i\beta - u_3] \end{aligned}$$

$$\Pr(y_i=4) = \Pr(y_i^* > u_3) = \Pr(x_i\beta + \varepsilon_i > u_3) = \Pr(\varepsilon_i > u_3 - x_i\beta) = 1 - \Phi[u_3 - x_i\beta] = \Phi[x_i\beta - u_3]$$

In short,

$$Pr(y_i=1) = 1 - \Phi[x_i\beta - u_1] \dots\dots\dots \text{Equation (3)}$$

$$Pr(y_i=2) = \Phi[x_i\beta - u_1] - \Phi[x_i\beta - u_2] \dots\dots\dots \text{Equation (4)}$$

$$Pr(y_i=3) = \Phi[x_i\beta - u_2] - \Phi[x_i\beta - u_3] \dots\dots\dots \text{Equation (5)}$$

$$Pr(y_i=4) = \Phi[x_i\beta - u_3] \dots\dots\dots \text{Equation (6)}$$

Likelihood Function

There are 4 possible choices for each person and only 1 is observed

$$L = \sum_i \ln[Pr(y_i=k)] \text{ for } k \dots\dots\dots \text{Equation (7)}$$

III Binary Logistic Regression for the Determinants of Poverty

Socio-economic variables are very often categorical, rather than interval scale. In many cases research focuses on models where the dependent variable is categorical. For example, the dependent variable might be ‘unemployed’ / ‘employed’, and we could be interested in how this variable is related to sex, age, ethnic group, etc. In this case we could not carry out a multiple linear regression as many of the assumptions of this technique will not be met, as will be explained theoretically below. Instead we would carry out a **logistic regression** analysis. Hence, logistic regression may be thought of as an approach that is similar to that of multiple linear regressions, but takes into account the fact that the dependent variable is categorical.

i) Logistic Regression Model

It has become a standard practice to analyze the determinants of poverty alternatively through categorical regressions such as Logit and Probit, the non-linear probability models. There are, however, some appropriate use of Logit or Probit regressions in poverty assessments. First, for targeting analysis, Logit and Probit regressions can be used to assess the predictive power of various variables used for means testing. Second, when panel data are available, Probit or Logit regressions can be used to analyse the determinants of transient versus chronic poverty. However, the present study is concerned with the first use of Probit or Logit regressions because it is based on the cross-sectional primary data.

According to basic principles of discrete choice models, econometric modeling consists in confronting two alternative and mutually exclusive situations, being considered as poor or not. Indeed, the observed sample is composed of two categories of households: on the one hand, those considered as poor according to the poverty line criterion, and on the other those who are not.

In simple words, in a Logit or Probit, the endogenous variable is dichotomous or dummy variable, with (1) presenting the household is poor, and (0) if the household is not poor. Under the hypothesis of normal standard distribution for the error term, the model is estimated as a Probit. If the error term is assumed to have a logistic distribution, the model is estimated as a Logit. The main problem with categorical regressions is that the estimates are sensitive to specification errors than linear regressions. With Probits, the parameters will be biased, if the underlying distribution is not normal. More generally, the model does not make use of all the information available, because it collapses, income into binary variable. This does not mean that Probit or Logit regressions should never be used. Nevertheless, categorical regressions will typically have better predictive power for targeting that is for classifying households as poor or non-poor.

Since we assumed that the probability of being in a particular welfare state (poverty, non-poverty) is determined by an underlying response variable that captures the true economic status of a household. So, in the case of a binary poverty status, taking only two values, (1) if the household is poor, and (0) if not poor.

Let the underlying response variable y^* be defined by the regression relationship, in scalar form, is

$$y_i = \beta_1 + \beta_2 X_{2i} + \beta_3 X_{3i} + \dots \dots \dots + \beta_k X_{ki} + U_i \dots \dots \dots (1)$$

Alternatively, which in matrix notation can be written compactly as,

$$y_i = \sum X_i' \beta + U_i \dots \dots \dots (2)$$

Where,

$$X'_i = [1 \ X_{2i} X_{3i} \dots \dots \dots X_{ki}]$$

And

$$\beta = \begin{bmatrix} \beta_1 \\ \beta_2 \\ \vdots \\ \vdots \\ \beta_k \end{bmatrix}$$

In equation (), Y_i^* is not observed, as it is commonly called a “latent” variable. What we observe is a dummy variable Y_i defined by

$$y_i = 1 \text{ if } Y^* > 0$$

$$y_i = 1 \text{ otherwise}$$

From equation () and () we can derive the following expression:

$$\begin{aligned} \text{Prob}(y_i = 1) &= \text{prob}(U_i > -\sum X'_i \beta) = P_i \\ &= 1 - F\left(-\sum X'_i \beta\right) \dots \dots \dots (3) \end{aligned}$$

Where F is cumulative distribution of U_i , if the distribution of U_i is symmetric, we can write

$$\text{Prob}(y_i = 0, \beta, X'_i) = F\left(-\sum X'_i \beta\right) = 1 - P_i \dots \dots \dots (4)$$

Since the observed Y_i are just realizations of a binomial process with probabilities given by equation () and varying from trial (depending on X_i). thus, we can write the likelihood function as,

$$L = \prod_{y_i=1} [1 - F\left(-\sum X'_i \beta\right)] \prod_{y_i=0} [F\left(-\sum X'_i \beta\right)] \dots \dots \dots (4a)$$

Alternatively

$$L = \prod_{y_i=1} P_i \prod_{y_i=0} (1 - P_i) \dots \dots \dots (5)$$

However, we can write equation (4a) as,

$$L = \prod_{y_i=1} [F(-\sum X'_i \beta)]_i^{1-y} [1 - F(-\sum X'_i \beta)]_i^y \dots \dots \dots (4b)$$

The functional form imposed on F in equation () depends on the assumption made about U_i in equation ().

The commutative normal and logistic distributions are very close to each other. Thus, using one or the other will basically lead to the same result (Maddala, 1983). Moreover, following Amemiya (1981), it is possible to derive the would-be estimates of a Probit model once we have parameters derived from the Logit model. Thus, the Logit model will be used in this study by assuming a logistic cumulative distribution of U_i in F (in equations () and ()). The relevant logistic expressions are:

$$1 - F(-\sum X'_i \beta) = \frac{e^{\sum X'_i \beta}}{1 + e^{\sum X'_i \beta}} \dots \dots \dots (4a)$$

$$F(-\sum X'_i \beta) = \frac{e^{-\sum X'_i \beta}}{1 + e^{-\sum X'_i \beta}} = \frac{1}{1 + e^{\sum X'_i \beta}} \dots \dots \dots (4b)$$

As before, X_i is the characteristics of the households, and β the coefficients for the respective variables in the Logit regression. Having estimated equation () with maximum likelihood (ML) technique, equation () basically gives us the probability of being poor [Prob ($Y_i = 1$)] and equation () the probability of being non-poor [Prob ($Y_i = 0$)].

We have derived a Logit model in detail, now the next stop is to identify the explanatory variables along with the dichotomous variable as a dependent variable, used in the present study. We enter some continuous variables and some binary variables from the household characteristics explanatory variables in the Logit model. The list of the variables for Logistics estimates of rural poverty determinants is given in the table below.

The ratio $P_i/1-P_i$ is called the odds ratio and $\text{Log} (P_i/1-P_i)$ is called log odds or Logit which acts as dependent variable. This ratio will give the odds that the household is poor. A positive sign of the estimated coefficients would mean that the probability of a household to be poor is higher than that in reference category and vice versa keeping all other characteristics constant.

In this study we have applied the logit model. It was assumed that for a household having per capita income below the poverty line (the criterion) the dummy assigned will be “1” and the assigned dummy for a household having per capita income above the poverty line will be “0”. In this way, we saw the probabilities of the rural households to be poor or non-poor with some change in the determinants of poverty. An odd ratio [exp (B)] value greater than 1 represents a high probability of being poor with the increase in the value of regressors. An exp (B) value less than 1 shows a low likelihood of being poor with the increase in the value of regressors (poverty determinants). The model for the present study is specified as follows:

$$\text{Log} [P_i/1 - P_i] = \beta_0 + \beta_1 X_{AGE} + \beta_2 X_{EDU} + \beta_3 X_{FYS} + \beta_4 X_{CDR} + \beta_5 X_{OLS} + \beta_6 X_{HDS} + \beta_7 X_{DCY} + e$$

Where

β_0 to β_7 = *coefficients of the regressors*

X_{AGE} = *Household Head's Age (in years)*

X_{EDU} = *Household Head's Educational Level*

X_{FYS} = *Family Size (No. of individuals)*

X_{CDR} = *Child Dependency Ratio (No. of children below 15 year age)*

X_{OLS} = *Own Landholding Size (in acres)*

X_{HDS} = *Herd Size (No. of animals kept)*

X_{DCY} = *Village's Level of Remoteness from the City*

e = *Error Term*

ii) **Pseudo-R Statistic: The Cox & Snell R Square and the Nagelkerke R Square**

The Cox & Snell R Square—this statistic is referred to as a "pseudo-R" statistic, in that it is designed to tell us something similar to what R-squared tells us in ordinary least-squares regression, that of the proportion of variance accounted for in the dependent variable based on the predictive power of the independent variables (predictors) in the model. However, it should never be interpreted exactly as one would interpret R-squared in OLS (ordinary least-squares) regression. That's why we call it "pseudo," and at best, it's an approximation to telling us something similar to R-square. Overall, high values are better than low values here, with higher values suggesting that your model fits increasingly well. The Nagelkerke R Square statistic, like the Cox & Snell R Square, is also a "pseudo" R-square value, purporting to tell us something along the lines of an OLS R-square, but not directly comparable to it. One thing that need to know is that the Nagelkerke R-square will always be less than the Cox & Snell R-square, since the Nagelkerke R-square is an adjustment of the Cox & Snell, for which the maximum value it can attain is equal to 1. The maximum value for the Cox & Snell is 0.75. Since it's tempting to simply report the larger value, for example, 0.397 looks more impressive than 0.297, but this is simply a matter of scaling, not actual "size" difference. At minimum, be sure to not equate these values one-to-one with R-squared values in OLS regression (Denis, 2010).

QUESTIONNAIRE

The Role of Rural Women in Livestock Management: Socio-Economic Evidences from Diverse Geographic Locations of Punjab-Pakistan

Area's Particulars

District: _____ Tehsil: _____

Name of Village: _____ Name of Union Council: _____

Name of the nearest city: _____ distance from the village: _____ (kms.)

Demographic Variables

Personal Information

Name of Respondent: _____ *Age:* _____

Marital Status: 1. Married 2. Widowed
 3. Divorced 4. Separated

Caste of respondent: _____ *Religion:* _____

A profile of households

Who is who and who does what in the household (including respondent)?

No.	Names of Household members	Relationship to respondent	Gender	Age (Years)	Marital Status	Education in no. of years	Profession/Activity	Monthly Income/ Salary
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								

Household Income

Kindly provide the detail of your household monthly income and sources.

Income Source	Monthly Income In 2011
Crop sector	
Livestock	
Other	

Family tenancy status

Land Tenancy Status	Size of landholding (in hectares)
Own cultivator	
Tenant	
Owner-cum-tenant	
Absentee landlord	
Total	

Livestock Management

Where do you keep the animals?

Animals	Where you keep the animals				
	Number		On Farm	Courtyard	On Farm & Courtyard
	Male	Female			
Milch Animals:					

Buffalo					
Cow					
Goat					
Sheep					
Total					

To whom you sell the following animal products?

Animal Products	Home Consumption	Within Village		Middleman		City Market	
		Quantity	@	Quantity	@	Quantity	@
Milk							
Milk Product							
Any Other							

Which of the following livestock management related activities are performed by you, indicate your rating and time allocation based on your participation.

Livestock related activities		Participation		If (2) & (3)	If (1) and not female
	Not at all (1)	Occasionally (2)	Always (3)	Who does the job: 1.Hosuse Wife 2.Daughter/D-in-law 3.Female child 4.Both Male & Female	Who does the job: 1. Male 2.Servant 3.Male child
Fodder cutting					
Fodder carrying					
Feeding of livestock					
Watering of animals					
Collecting manure					
Making dung					

cakes					
Milking					
Milk processing					
Marketing of animals' produce					
Marketing of animals					
Bathing of animals					

Approximately how much time you daily spent on livestock care and management activities?
Man Hours _____

How often you are consulted by your husband or family's head for making decisions regarding following activities relating to livestock management?

Always Often Sometime Never

In your view what are the different constraints an average farm family is facing in keeping livestock?

1. Fodder _____
2. Female man power _____
3. Male man power _____
4. Any other _____

Would you like for your daughter(s) or sister(s) to be engaged in livestock management activities? 1. Yes 2. No

Woman's Health

Please tell me about your health condition? Would you say it is:

1. very good 2. good 3. average
4. poor 5. very poor

From which kind of disease/sickness you are or have been suffering?

1. Fever/Malaria _____
2. Typhoid _____
3. Gastro-intestinal _____
4. Respiratory _____
5. Hepatic _____
6. Renal _____
7. Urinary _____
8. Cardiac _____

9. Dental _____
10. Dermal _____
11. Orthopaedic _____
12. Mental _____
13. Other _____

If and when you fall sick, from where do you get the treatment:

Consult with:	In village	In city
Qualified Doctor		
Govt. hospital/Dispensary		
Hakeem		
Homoeopath		
Wiseman		
Faith healer		
Any other (specify)		

What is the average distance of the health facility from your house? _____

What was your age at the time of marriage? _____ (years)

City's Influence (Rural-Urban Linkages)

Please indicate the place(s) of your residence and duration of stay, in your life.

Place of residence	Duration of stay (in years)
Village	
Town	
City	

What is the education of your; Father _____ Mother _____

Since how long you have been living at the present place? _____ (yrs.)

What is your frequency of going to the nearest city? _____

For what purpose you go to the city? _____

Who accompanies you to go to the city most of the time?

1. Husband
2. Son
3. Daughter
4. Any other _____ (specify)

What is your usual mode of travelling to the city? _____

Gender Relation

Which kind of domestic environment is prevailing in your house?

1. Democratic 2. Authoritative 3. Partially democratic

Do you observe purdah? 1. Yes 2. No

If yes, what is the reason of doing this? _____

Were you asked to observe purdah before marriage? 1. Yes 2. No

To what extent you are facing domestic violence:

1. very greatly 2. greatly 3. not very much 4. not at all

Are you consulted by your husband or family's head for making decisions regarding following social life related activities? Yes / No

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