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From education for sustainable development to high quality education (sdg4) : challenges and prospects for Pakistan

Faheem Uddin Khushik

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Université Clermont Auvergne, CNRS, CERDI, F-63000 Clermont-Ferrand, France



***FROM EDUCATION FOR SUSTAINABLE DEVELOPMENT TO
HIGH QUALITY EDUCATION (SDG4): CHALLENGES AND
PROSPECTS FOR PAKISTAN***

Thèse présentée et soutenue publiquement le 28 Janvier 2021 pour l'obtention du titre de Docteur en Sciences Economiques par Faheem Uddin KHUSHIK sous la direction d'Arnaud DIEMER (UCA) et Francine PELLAUD, HEP, Fribourg Switzerland

Membres du Jury

Rapporteur	Angela Barthe, Professor, University of Aix Marseille
Rapporteur	Sajid Ali, Associate Professor, Aga Khan University, Pakistan
Président	Michel Ricard, Professor, University of Bordeaux
Suffragant	Qudsia Kalsoom, Assistant Professor, Beaconhouse National University, Pakistan
Suffragant	Francesca Marchetta, Assistant Professor, Université Clermont Auvergne, France
Directeur de thèse	Francine Pellaud, Professor, HEP, Fribourg, Suisse
Directeur de thèse	Arnaud Diemer, Assistant Professor, Université Clermont Auvergne



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Déclaration sur l'honneur contre le plagiat

Je soussigné, ***FAHEEM UDDIN KHUSHIK***

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Fait à Clermont-Ferrand, le 27 Novembre 2020

List of abbreviations

ACTé	Activité, Connaissance, Transmission, éducation
AEPAM	Academy of educational planning and management
AIDS	Acquired immunodeficiency syndrome
CEE	Council for environment Education
CELE	Centre for effective learning environment
CERI	Centre for educational research and innovation
CERDI	Centre for studies and research on international development
CLD	Causal loop diagram
DDT	Diphenyl-Trichloro-ethane
DECD	Decade of education for sustainable development
ECE	Early Childhood Education
EE	Environmental education
ECC	Education for Climate Change
EFA,	Education for all
EPC	Education policy committee
ESD	Education for sustainable development
ETP	Environmental training program
FATA	Federally administered tribal areas
GAP	Global Action Program
GCI	Global Competitive Index
GDP	Gross domestic product
GNI	Gender Neutral Index
GPSDD	Global partnership for sustainable development data
HDI	Human Development Index
HEIs	Higher Education institutions
IDDR	Institut du développement durable et des relations internationales
ISCED	International standard classification of education and development
IUCN	International union of conservation of nature
KPK	Khyber Pakhtunkhwa
MDGs	Millennium Development Goals
MoFEPT	Ministry of federal education and professional training
NGOs	Non-governmental organizations
OR2D	Observatoire des représentations du développement durable
PISA	Program for international student assessment
R&D	Research and Development
REDOC	Représentations, Démarches, Outils, compétences
RL	Reinforcing loops
SDEP	Sustainable Development Education Panel
SDGs	Sustainable development goals
SD	Sustainable Development
SD	System Dynamics
SPGP	Science and Policy of Global Program
UCA	Université Clermont Auvergne
UN	United Nations
UNDESD	United Nations decade for education for sustainable development
UNDP	United Nations Development Program
UPE	Universal primary education
UDHR	Universal Declaration of Human Rights
UNESCO	United Nations education, science and culture organization
UNCED	United Nations conference on environment and development
UNCSD	United Nations conference on sustainable development
UNLD	United Nations Literacy Decade
WB	World Bank

WCED World commission on environment and development
WCC World Council of Churches



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Abstract

English

Education for sustainable development domain is considered as the dominant discourse in global educational debate in academia, national and international development policies, private sector and political affairs to achieve global sustainable development objectives for people and planet. This effort is also contributing in the domain of education from sustainable development perspective and from a multidisciplinary approach and methods. Keeping the dynamic context of south especially Pakistan for the sustainable development, this study contributes in enhancing understanding through research evidence on relationship between education and sustainable development from its three different dimensions of social, economic and environment. This study follows a principled approach, started from a policy review, conceptual understanding, exploring the general domain education for sustainable development and finally focusing on special context and issue to justify the critical questions of this research domain. Therefore, all chapters are arranged in this order to create a logical sequence to answer questions of this research. Is education for sustainable development still relevant in the discourse of education? What methodology advocates education for sustainable development? Is education for development still a robust approach to achieve global objectives for sustainable development? These questions are hypothesis than questions. First chapter is about the review of education policy in Pakistan, second chapter discuss the concept of education for sustainable development. Third and fourth discuss about sustainable development third dimension of environment. Chapter five and six are addressing specific Pakistan's context of SDGs especially SDG4. Final chapter is about the methodology used in the study. Thesis explored multidisciplinary approach in methodology to create a wider understanding and contribution in the discourse of education for sustainable development. Content analysis, comparative analysis, REDOC, system dynamics, desk review, T21 and iSDG modeling and scenario building etc are key methods adopted in study. Conclusive conclusion is consolidated here thesis that effective, well planned policies does not guarantee proper implementation. Most of the previous policies, plans, projects faced challenges to achieve set targets. Environmental challenges especially climate change can be addressed through comprehensive reform in curricula of primary to higher level studies. Apart from this, teacher training, basic facilities and community involvement can enhance and scale up the achievement of targets in SDGs. Robust modeling can well equip policy makers in robust decision making for educational objectives achievement.

Français

L'éducation au développement durable fait aujourd'hui parti des grands débats de société, et depuis 2015, elle occupe même une place prépondérante au sein des Objectifs du Développement Durable (ODD n°4, « Education de qualité »). Les débats n'agissent pas uniquement le milieu universitaire, ils sont également présents au niveau des politiques nationales et internationales (UNESCO), dans le secteur privé (formation du capital humain) et dans les actions menées par les villes (l'enseignement y occupe une place non négligeable).

Cette thèse vise à contextualiser et à cerner les rouages du passage à une éducation au développement durable dans un pays en développement, le Pakistan. Pour ce faire, elle s'inscrit dans un discours multidimensionnel, dans lequel se croisent les questions environnementales, économiques, sociales, culturelles, politiques ou encore religieuses. La revue de littérature renvoie au concept de développement durable, à l'éducation au développement durable et l'émergence d'une éducation de qualité, le tout à différentes échelles, internationale, nationale et régionale. Ce choix tient compte du découpage administratif du Pakistan en provinces (Baloutchistan, Khyber Pakhtunkhwa, Penjab, Sind, Territoire fédéral d'Islamabad, Azad Cachemire, Gilgit Baltistan). La recherche se positionne dans un cadre interdisciplinaire, qui tient compte des contraintes liées au doctorat (une partie de la thèse a été réalisée dans un laboratoire de Sciences de l'Education, l'autre dans un laboratoire de Sciences économiques). Le travail de thèse a cherché à répondre aux questions suivantes : (i) quelle la place de l'éducation au développement durable dans les discours et les politiques nationales du Pakistan ? (ii) Quelles méthodologies préconisées pour développer les futurs citoyens du Pakistan ? (iii) Quelle place l'éducation au développement va occuper dans la mise en place des Objectifs du Développement Durable (ODD), et notamment l'ODD 4 qualité de l'éducation ?

Afin de répondre à ces différentes questions, nous avons rédigé sept articles qui constituent la trame principale de cette thèse et qui introduisent à la fois la revue de littérature, une approche méthodologique intégrée (System Thinking, CLD et modèle iSDG) et les principaux résultats. Le premier chapitre précise le contexte national des politiques d'éducation au Pakistan, en soulignant les principaux écueils du système éducatif (scolarisation des filles, illétrisme, pauvreté, inégalités...). Le deuxième chapitre traite du concept d'éducation au développement durable et des challenges qu'il engendre. Les troisième et quatrième chapitre abordent le passage de l'éducation à l'environnement à l'éducation au développement durable et du basculement vers l'ODD 4 « Education de qualité ». Les chapitres cinq et six traitent du contexte spécifique du Pakistan relatif à la mise en place des ODD (en particulier l'ODD 4) et dans le cadre de l'Agenda 2030. Le septième et dernier chapitre revient sur la méthodologie utilisée dans la thèse et qui nous semble pertinente, eu égard à la mise en place des ODD.

Ce travail de recherche a permis de mettre en lumière le système éducatif du Pakistan et les enjeux d'un passage à l'éducation au développement durable, d'appréhender l'éducation dans un contexte global dans lequel les débats de société - climat, croissance économique, dommages causés à l'environnement, inégalités - jouent un rôle prépondérant, de cerner les nombreuses interactions entre l'éducation et les considérations économiques, sociales, culturelles et environnementales du pays et enfin, de poser les bases d'une transition vers une société plus inclusive (l'un des objectifs de l'Agenda 2030).

Introduction

In order to advance consistent educational evolution in the midst of contemporary uncertainties, challenges and the uncertain future of mankind and the planet, unconventional approaches are needed to address the dynamic developments happening all around us. These developmental dynamics include a rapidly changing climate, a world experiencing economic, environmental and societal evolution, human behavior, world trends such as a globalization, nationalization and localization that can include a growing nationalism, environmental degradation, natural resource depletion, and a long list of many other challenges the human race is facing both in the present and in the unforeseeable future. The scale of these challenges is unprecedented in the history of mankind and furthermore, is likely to escalate if the pattern of changes and human activity continue in the present path of degradation. Taking all of this into consideration, it is imperative that the world takes action now in order to be able to sustain a future for the generations still to come. As things stand now with regards to our planet and people, it is argued that there is a compelling need for unconventional measures that will allow us to meet the challenges we are facing both now and in the near future. Therefore, academia, society and governments around the world are convinced that education is the only sustainable and large-scale strategy available to cope with the current situation. To this end, the gradually increasing importance of education on a global scale demands positive outcomes in order to support the future needs of states as they seek to improve the quality of life and the sustainability of nations. In this sense, education for sustainable development is considered to be the clear, concise and feasible road map that can facilitate the global objective of saving the human race in a sustainable fashion for the long term. Within this context, the aim of this study is to evaluate and advance our understanding of the challenges facing quality education from a different perspective of education for sustainable development.

Countries are addressing educational challenges in terms of effectiveness, efficiency and quality, in order to improve the educational service to create a sustainable society. Each nation state places its educational strategy in its local context while seeking to meet global challenges (access to schooling, literacy, teacher curriculum, quality of education, etc.). The outcome of the educational inputs are crucial for every society. The wide interest towards the learning outcomes of Finnish schools (Niemi, Toom, & Kallioniemi, 2012); (Sahlberg, 2016) makes Finland an appealing case study in planning and developing culturally sustainable education (Laine, 2016).

According to UNESCO (2013), Education for Sustainable Development (ESD) empowers everyone to make informed decisions for environmental integrity, economic viability and a just society for present and future generations, while respecting cultural diversity. ESD requires participatory teaching and learning methods like critical thinking, imagining future scenarios and making decisions in a collaborative way to empower learners to take action for sustainable development (DESD, 2014). ESD learning also refers to:

- learning to ask critical questions;
- learning to clarify one's own values;
- learning to envision more positive and sustainable futures;
- learning to think systemically;
- learning to respond through applied learning; and,
- learning to explore the dialectic between tradition and innovation (UNESCO, 2011a, p.8).

This study is on education for sustainable development as a holistic and transformational education that addresses educational policies, development agenda's, approaches and factors related with ESD. ESD is the dominant discourse in the Agenda for 2030. Therefore, this study explores the domain of education in Pakistan as a case study in understanding ESD and the progress of Pakistan as a developing country. This study adopts a multi-disciplinary approach to understand and explore its objectives. This study believes in ESD's significant characteristics and indeed believes it to be instrumental in achieving a sustainable future as part of a global goal for mankind. If we are not prepared, the challenges and issues Pakistan is facing in the contemporary era will undoubtedly become worse.

This thesis consists of papers exploring the domain of education for sustainable development in the specific country context of Pakistan, in order to understand the phenomenon of education. There are seven papers each organized into chapters, with an introductory section to other articles focusing the same domain from different perspectives of policy, discussion of concepts and the operationalization of approaches to methodology. All are consolidated within this single document as chapters of this thesis. Every article has its own logical order and content, with a conclusion at the end. An overall conclusion is given at the end of this thesis.

Study context

South Asian sub-continent ruled by British for almost a century from 1856 to 1947. Later on, it was divided in two parts : India and Pakistan based on religious majority areas. Pakistan was raised on world map on 14th of August 1947 as a Muslim majority state where all those provinces/states/regions where Muslims were in the majority joined Pakistan. On the other hand, Hindustan/India become another state where Hindu were in the majority. Later, this type of division was called two nations theory or ideology.

Pakistan located in South Asia bordering with India in east, Arabian Sea in South, Iran in southwest, and Afghanistan in West and China in far North. Pakistan also shares its maritime border with Oman. It emerged in consequence of partition of sub-continent Hindustan in 1947 from the British rule. Till 1971, it was divided into two separate parts East Pakistan and West Pakistan. East Pakistan divided during the war with India in 1971 and become Bangladesh. It's the sixth most populous country with estimated 220 million population (Ministry of Finance, 2015 - 2016). Its literacy rate is hovering around 58% (G. o. Pakistan, 2017) in year 2014-15 (NEMIS-AEPAM, 2016). According to report during the year 2015, 19.8 million children enrolled in primary schools. Total expenditure on education as compared to GDP was 2.2 percent for the year 2015.

Administratively Pakistan comprised on five provinces or regions, Baluchistan, Khyber Pakhtunkhwa, Punjab, Sindh and Gilgit-Baltistan. The last province has been given status of de facto province in year 2010 for administrative procedure however it does not have any representation yet at Federal level. Baluchistan is the largest province in terms of geographical spread and lowest in terms of population. Punjab is the largest province in terms of population, wealth share and job share at federal level. It has tribal areas called FATA (Federally administered tribal areas – it is merged into KPK (Khyber Pakhtunkhwa) province in year 2019) adjoining with Afghanistan border. Federal capital territory Islamabad is the country capital city. Union council is smallest unit from administrative point of view and province is the highest administrative unit.

The region where Pakistan lies is very important from its geo-strategic location. This region is historically rich in natural resources and culturally diverse. All its regions and territories have different cultures, history, language, religious affiliations, weather, landscape, ethnicity, people and politics etc. Interestingly, despite these differences and diverse groups of people in Pakistan, it is integrated and living with relatively peace and harmony. Except certain segments have some reservations over the federation and its state matters with provinces/regions (Mushtaq, 2016).

Pakistan is the third largest Muslim population country in the world and has the sixth largest standing army in the world. Its political system is still evolving and there have been many eras including military rules and democratic elected political systems. Ethnic and religious differences are major challenge along with many other challenges (poverty, inequality, economic disparity and many other socio-economic problems).

Since inception, Pakistan's history regarding education remains less of a priority area. Although, some efforts have been taken since the 1947 Education conference, the outcome merely demonstrates limited results. Education priority slogans remain political agenda and empty slogan.

Pakistan's constitution provides a basic foundational requirement to fulfillment of basic education for every citizen of the country (Constitution of Pakistan). It is morally, legally and officially a state responsibility to provide a free, basic and quality education to each individual of the society. It is considered as a fundamental basic human right of every child as a citizen to access basic primary education. Article 25 of the Constitution of country is a provision of the right to education. According to this article "The state shall provide free and compulsory education to all children of the age of five to sixteen years in such manner as may be determined by law".

The notion of ESD (Education for sustainable development) is relatively new for Pakistan's educational system. Its values, principles and objectives are not yet operationalized in the state institutions. However, at policy level some changes have been made to achieve global goals such as sustainable development goals and are now part of the country's vision 2025 and 2030. The first chapter discusses a debate on it in detail.

Academia is still not giving due focus on this issue as it is struggling to find some significant evidence that could help transform the educational system and bring ESD values and principles in place. There have been some attempts made by some international organization to make ESD evident for academia, but it is still a quite challenging realm. Therefore, this study is focusing on Pakistan's educational situation from education's big challenges to the ESD perspective and High Education Quality targets (Sustainable Development Goal 4).

The context of study is interesting and important because of its history, dynamic nature and culture, population, effects from climate change, peace problems, security challenges, persistent poverty, resource depletion, food security, environmental impacts, terrorism, urbanization and so on. Therefore, the above discussed facts and information about the country context bring an important perspective of the case study to explore it from ESD's point of view. These challenges and problems are striking and provide the motivation to explore ESD in order to come up with a sustainable educational solution to address above mentioned challenges in an organized way..

The following section provides a detailed country case context to in order to understand the next chapters of the thesis.

Educational background of Pakistan

Provision of education to each citizen of Pakistan remains challenging since inception of Pakistan. Although its 1973 constitution guarantee every citizen a fundamental right of access to education. According to planning commission of Pakistan’s MDGs report 2013 Pakistan could not achieve its set target of achieving net enrollment and increase in literacy rate. Detailed discussion about the history and achievement of this subject matter is given in the first following chapter.

Table 1: MDGs target vs achievement

Indicator	National Value	Target	Status
Net primary enrollment ratio %	57	100	Off-track
Literacy rate %	58	88	Off-track

Source: Planning commission report 2013 on MDGs

According to constitution article 38(d) it is state’s responsibility “*to provide basic necessities of life such as food, clothing, housing, education and medical relief for all citizens, irrespective of sex, cast, creed or race*”. Literacy is still very critical and challenging because according to government figures it’s still around 58% (G. o. Pakistan, 2017) in country. Constitution also provides a basic right for literacy to minimize illiteracy in the country. Article 37(b) ensures that state should “*remove illiteracy and provide free and compulsory secondary education within a minimum possible period*”.

The state shall provide free and compulsory education to all children of the age of Five to Sixteen years” [Article 25-A]; Moreover the article 26-1 of Universal Declaration of Human Rights (UDHR) also mentions the right to education, it states, “*Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit*”.

Unfortunately, education remains a lesser priority area for any government; the evidence can be seen in the last budgets of every year. Even after devolution through 18th constitutional amendments some ministries went to provinces according to constitution of Pakistan for provincial autonomy. However, budget allocation for education sector throughout the country in all the provinces is below international commitment. The Federal government reserved an average of 2% (NEMIS-AEPAM, 2016) GDP for the education sector and so did the provincial governments with the exception of North West province of Khyber Pakhtunkhwa.

Some key national level educational documents have been produced by national government of Pakistan since its inception from 1947. Its chronological order is given below:

- 1) Pakistan national educational conference 1947
- 2) Pakistan education conference 1951
- 3) National commission on Education 1959
- 4) Proposals for new education policy 1969
- 5) New education policy in 1979

- 6) Education policy in 1972-78
- 7) National Education policy 1979
- 8) National Education policy 1992
- 9) National Education Policy 1998-2010
- 10) National Education Policy 2009

Before the 1947 education conference, the government of India 1935 Act was adopted as an interim constitution of Pakistan as well as an education policy. After 2009 national education policy, federal government of Pakistan passed an 18th constitution amendment. This constitutional change devolved some national level ministries and division into provinces and one of the major ministries was education. Soon after this amendment provinces were authorized to develop their own regional educational policies.

Educational System of Pakistan

Pakistan's education system is multitier, and multi-layer horizontally and vertically. There is no single uniform education system, there are several differences divided among, provinces/regions, rural urban, rich and poor, language, religious and non-religious public and private etc.

Pakistan's educational system is classified in five different tiers, starting from Primary school (grade or year 1-5), middle schools (grade or year 6-8), high school (grade or year 9-10, higher secondary (grade or year 11-12) and above is university level. Another parallel education type is religious education which is officially recognized education, which is called *Deeni* – a local word (religious) education, commonly called as *Madrasah* system. There are two types of institutions which are key stakeholder and education service providers of public (state owned) schools, colleges and universities and private institution from primary to university level. Within the public and private education system, there is another distinction between them in terms of the medium of instruction and education syllabus. The military also has its own schools, colleges and universities which also have a different syllabus. Children of officers and other non-commissioned military officials go to schools which have Cambridge (O and A) examination system as well as a matriculation system. Overall, three examination systems exist in Pakistan, O/A level (Cambridge), matriculation (Official – Public schools) and a private examination system from Aga Khan education examination board.

Education is an essential prerequisite for an efficient and equitable development process of society. It is a recognized fact that without a minimum education level for the entire population, a human centered development process cannot be sustained.

Pakistan's educational system is highly fragmented and segmented. As mentioned above, a variety of educational syllabi, medium of instruction, examination pattern, curriculum, etc is one of the reasons behind Pakistan's failed education system to produce a harmonized, peaceful, pluralistic, sustainable and flexible society. Therefore, this effort is focusing on these issues as well.

Pakistan as a state since inception took several initiatives for education under different policy reforms, training programs, local and international conventions etc. Pakistan is signatory of Millennium development goals 2000, education for all initiative 1990, Dakar framework of Action 2015.

Research question

The research question is the ultimate objective of any research to help explore and find relevant and robust answers of the questions in the contemporary era, in order to suggest possible solutions to a question or problem. This effort is addressing three questions below:

- a) Is education for sustainable development still relevant in the discourse of education in general and particular in the context of Pakistan?
- b) What methodology advocates education for sustainable development?
- c) Is System Thinking able to improve skills for better quality education?
- d) Is education for sustainable development still a robust driver for achieving objectives of high-quality education (SDG4)?

Literature review

Since the last two and half decades, education for sustainable development discourse was studied widely in multiple academic, private, national and international development arenas. There is plenty literature available on education for sustainable development in general but there is little literature available in the context of Pakistan. In this chapter literature review discussion is only about some relevant aspects of education for sustainable development. Detailed discussion on literature on each topic is given in following chapters. In this section, literature provides a foundation to establish an argument around the primary domain of education for sustainable development. Below sections are discussing multiple aspects of ESD revealed through literature review in order to understand the domain of education and sustainable development in detail.

Educational Policies

Policy is a framework to guide different stakeholders to align understanding for desired outcomes and objectives of any policy, project and program in a specific time and space. The term policy contains a wide scope and meaning for a specific objective to achieve in certain circumstances and a specific timeframe. The following debate about policy discusses specific set outcomes both in general and specific in the context of Pakistan's educational policies.

There are many policy theorists, school of thoughts, criticism etc in the education policy domain. One of the approaches is top-down theorists/approach of policy analysis suggested a framework to understand policy formulation, implementation and evaluation. Pakistan being a federal state, before the 18th amendment, policy formulation and implementation was the responsibility of federal government which was a top-down approach. It was initially inspired from an approach of implementation-gap model (Sabatier, 1979). This model was also used since inception till 2010. After the 18th amendment education was devolved and decentralized to transform education policy from top to down and towards the provincial level.

Education policy analysis can be reviewed from two distinctive features, analysis of and analysis for. Both have different characteristics to analyze education policy, however, the key is feature analysis. Therefore, the critical point here is analysis in this exercise.

One school of thought argued that global agenda's such as EFA, MDGs etc, influence policy of a country. The connection between national and global agendas creates suspicion. This connection is heavily discussed and criticized. Nation states are criticized for serving international agendas at the cost of independence and sovereignty. Critics argue that under this global pressure no one

can formulate independent, local, needs based policy. It is the case because there is always a criticism that education policy is influenced by the west. The educational policies of Pakistan, respond more to the globalization process rather than national needs (Aamir Saeed, 2015). Critics of the national educational policies derived anti-national objectives from policy documents however only recent policies address some of the international development agenda such as universal primary education (UPE). However, literature did reveal some synchronization of objectives among Pakistan's priorities with global objectives for example accessibility of schools.

There is significant literature available on education policy discussion and debates as discussed in the following sections and chapters. However, there is need of time to research on the relationship between education and sustainable development policies. Different approaches, contexts, levels, perspectives have been adopted e.g anthropocentric, environmental, social, economic and nature focused approaches, local, national, regional and global contexts, educationist perspective, to analyze education policy as well as sustainable development etc, why it is a priority and became a focused domain of every government all over the world. Its gradual and increasing importance at a global level is demanding positive outcomes from education to curtail the future needs of states to improve the quality of life and sustainability of the nation.

Education and Development

Education facilitates individuals and societies to make a better choice of their resources and to understand their potential (Malik, 2015). By doing this, nations can create a harmony among economic and natural resources and potential of any nation to create a contribution towards a sustainable world. In the context of Pakistan, the nation could be prepared for better decision making and choices so that a harmony could be created among people and planet.

More generally, the fundamental role of education in social and economic development has been recognized by international institutions such UNDP, World Bank, OECD. Education, as an essential lever of development that can be instrumental in achieving social welfare, sustainable development and good governance. Education is the key to eradicating poverty, facilitating access to decent work and higher incomes. It translates into productivity gains that fuel economic growth. Faced with concerns about social injustice, unequal participation in development, internal and international conflicts, growing attention is being paid to the central role of education in the promotion of peace and social cohesion.

Sustainable development literacy

From the point view of education for sustainable development discourse, the relationship between sustainable development, education and literacy is very important and critical. There is an argument about defining the phrase of ESD literacy as *“an active phenomenon, deeply linked to personal and cultural identity. Its power lies not in a received ability to read and write, but rather in an individual's capacity to put those skills to work in shaping the course of his or her own life”* (Ann Dale, 2005). Sustainable development addresses macro level global challenges intertwined with human activity. Its scope is larger and assesses macro level impacts of human activity. The impact is local and therefore addresses literacy on a local level because it is a multi-scale issue.

The nature of the relationship between literacy and development is complicated. However, there is a historical causal link between literacy and development. Defining literacy is a contextual and temporal concept. In the context of Pakistan, there are several definitions that have been adopted by the state to define a literate person. The definition of literacy evolved along with every new

education policy. Literacy is a broad term and can be defined from any context and has different meanings and criteria across the world according to the level of education. The definition of literacy has evolved in Pakistan and all major educational reform policies define literacy by different criteria. The latest version, according to the national education policy 2009, is “any individual who can read and write his/her name is considered as literate” and is recognized all across country. There was an argument for literacy improvement in the elitist educational system soon after the independence of Pakistan, but its ruling elite retained a separate elite education system to rule.

In Pakistan, it is a most consistent problem which is always a central focus of every political party, international organizations, think tanks, policies, projects and political regimes. At the same time, it has also been the most consistent and prolonged problem that has continued since the inception of the country. Access to education is a major challenge in Pakistan which is influenced by income distribution, urban-rural residence as well as male-female differences (ISLAMABAD, 2013). It is the primary obstacle in achieving higher literacy. Therefore, sustainable development literacy embedded with ESD values and skills will remain a challenge in coming years with current policy and programs.

It should be noted that international organizations such as OECD and United Nations define literacy differently. Here, the key to literacy is the ability to read, write, analyze basic skills of arithmetic, basic knowledge and better decision making.

The concept of quality education

The term quality is a very broad in scope and contextual term. It is connected to many other interrelated entities. It may be a process for one society but for another it is a goal. Some relate it to achievement of set objectives. It can also refer to and be calculated in qualitative and quantitative results of an intervention. It is a dynamic and flexible term in the domain of education. However, in the context of Pakistan, the term refers to an individual who can read and write his or her name and made some basic calculations. Quality is also a major obstacle for retaining and attracting students to enroll and continue their studies. It also affects literacy, despite many reforms and initiatives, and has represented for decades a substantial challenge to literacy improvement. Corruption is also a major cause involved in the last three decades along with other long lists of factors (Hallak, Poisson, 2001). Nepotism, political interference by postings, promotions, repair and maintenance budgets/projects, new recruitments, accountability of teachers, responsibility of teachers and community, a culture of compromises. All these factors ultimately affect literacy, quality and other related factors of quality education. In general, one can argue that quality represents a key challenge and obstacle to achieving educational objectives in Pakistan.

Contemporary research discusses quality education as a means for achieving a sustainable society, nation and the world. It provides effective tools to bring peace, produce productive individuals, nations and the world, foster economic growth, empower people, and broaden intellectual perspectives to create a pluralist world. There is an agreement between academia and the international education community that the concept of quality education is contextual therefore it does not have one specific definition or criteria. It evolves through time and space according to the economic and social set-up of a society. However, there are two features that remain, namely that it should be both locally relevant and culturally appropriate.

Quality education has been a dynamic concept throughout the history of education around the

world. Every nation defines its standards as per the need of the time and situation. It has been reviewed consistently to improve according to new challenges, needs and goals. In the context of Pakistan, literature in Chapter One discuss quality education as a key concept since its inception.

Despite definitional difficulties, UNESCO (2004, p. 17) has identified basic principles underlying quality education: Two principles characterize most attempts to define quality in education: the first identifies learners' cognitive development as the major explicit objective of all education systems. Accordingly, the success with which systems achieve this is one indicator of their quality. The second emphasizes education's role in promoting values and attitudes of responsible citizenship and in nurturing creative and emotional development (Laurie, 2016).

Synthesizing many studies on quality education, Nickel and Lowe (2010) proposed a framework of seven dimensions of quality that are held in dynamic tension. The seven dimensions are:

1. Effectiveness: the extent to which stated educational aims are met.
2. Efficiency: economic considerations, such as ratio of outputs to inputs, to maximize the use of resources.
3. Equity: issues of access to education for all people regardless of gender, ethnicity, disability, sexual orientation, etc.
4. Responsiveness: meeting the needs of the individual learners in classroom interactions by taking into consideration the uniqueness of the learner's abilities.
5. Relevance: the usefulness of education to the life of the learner immediately; when the learner comes of age; and to more distant future later in the learner's life.
6. Reflexivity: the ability to adjust to change, especially rapid change, which is important to engaging with an uncertain future.
7. Sustainability: 'focuses on behavior change and acceptance of responsibilities... in a process of goal setting, decision-making, and evaluation' (Nickel & Lowe, 2010, p. 599). This dimension attends to 'the longer-term future over the present and to the global as much as the local' (p. 599).

The concept of Sustainable Development

This section examines the concept of sustainable development. It is the key concept in this discussion. It is discussed in detail in the following chapter however, a brief introduction is discussed in this section.

Education is presented as a driver, aiming to include sustainable development in a national strategy. But before moving ahead, it is important to discuss the concept or term. It is observed in sustainable development literature that the discourse of sustainable development emerged when the world underwent rapid changes to the environment, in culture, in natural resources depletion, climate and so on at local and global level. In order to protect and keep diversity for a longer period of time, planet scientists initiated debate and discussions in sustainable development discourse. Much of the research discussed in this study and pathways have been suggested over the last four decades. Debate on discourse is still ongoing in order to explore more feasible and comprehensive solutions, recommendation and understanding about the term sustainable development. SDG's are considered to be the latest global roadmap for addressing sustainable development of people and planet.

Since the inception of the term, defining sustainable development has remained controversial and complex based on the literature, and the arguments and approaches to defining sustainable

development can be quite different. For example, environmentalists claim it as a sub-field, and similar claims are being made from different disciplines (Diemer, 2012). Many attempts were made to explain it in different ways and contexts, but it is still evolving with the passage of time, research and new interventions in academia. Therefore, it is still a concept of context, and is defined according to one's own context and culture.

One of the most acceptable definitions is suggested by the Brundtland commission. According to (Brundtland, 1987) the ability to make development sustainable “meets the needs of the present without compromising the ability of future generations to meet their own needs”. Initially this definition was considered as vague and without concrete suggestions. Contrary to these arguments, others argue that any resulting controversy over the definition of sustainable development has created a unique and constructive dialogue (Dale, 2001). In her book, Dale derived three imperatives - biophysical, social, and economic from the first definition of the Brundtland commission.

Sustainability accompanied by sustainable development became a central issue when the United Nations' World Commission on Environment and Development published its report called *Our Common Future* (World Commission on Environment and Development, 1987). The key point behind this report originating from competitive demands for environmental protection and economic development was actually a new approach: sustainable development. It was reported that sustainable development was dealing with both equity between generations and equity within generations (Sahin, 2016). The definition WCED suggested was that: “*Sustainable development is development which meets the needs of the present without comprising the ability of future generations to meet their own needs*” (WCED, 1987, p. 43). This brief definition of sustainable development by WCED implies that *human needs* are basic and essential. Furthermore, economic development accompanied by equity to share *limited natural resources* with poor nations should be maintained and the equity should be encouraged by effective citizen participation. In recent years, the literature reviews (e.g Kates, Parris and Leiserowitz, 2005) have pointed out the unclear points of the standard definition of sustainable development (Sahin, 2016). Other concerns highlighted in the report regarding poverty, inequality and poor and marginalized will be affected more from the increasing instability in the development phase of the world. Governments, non-governmental organizations, and international agencies quickly got used to the term “sustainable development” and it is widely used in academia and society for future global objectives.

There are several approaches to define sustainable development, such as natural and anthropocentric, along with contexts such as local, national and international country contexts or cultures. There is an interesting debate ongoing among researchers working on sustainable development (some of them are already discussed in this section and following chapters) as to how to adequately conceptualize and operationalize sustainable development for its wider acceptance. There is an argument from some critics of the concept that sustainable development that it is a complex term and that is why it is still cannot achieve its ultimate acceptance among masses. Others argued that this controversy and ambiguity created a constructive dialogue to explain the concept in more detail and provides opportunity for more discussion. “*A process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations*” (Forum for the Future, 2019).

Another criticism of the concept of sustainable development is a value-based criticism that is

focused more on sustainable development values and principles. Mix with environment and ecology criticism is not new to interchangeably environment and education mixed together and sometimes considered as same domain (Sauvé, 2016).

Another argument on the term SD is that this concept is ineffective and complex in nature therefore could not be implemented. However, some say, it is a process and like other scientific concepts, it evolves with passage of time through several stages and phases. Laurie argued for additionally defining this concept as “*Efforts began with raising awareness, moved to capacity building, then to experimentation and finally, implementation of good practice*” (Laurie, 2016). Therefore, this effort is also an effort to explain the concept through a specific country example.

The term “sustainable development” means so many different things to different people and organizations. Therefore, it has been criticized as too ambiguous and open to a wide range of interpretations, many of which are contradictory (IUCN, WWF, UNEP, 1991) (Pavlova, 2009).

A major approach to understand the sustainable development concept is an anthropocentric approach. Ganowicz-Baczyk (2015), Richardson (1997) suggested two basic approaches: anthropocentric and biocentric. The anthropocentric approach has been criticized because humans are not a separate part of the environment or economic domain. Human-centric/anthropocentric approaches are believed to observe the natural environment from its own value, our place and role within the biological systems. Therefore, it is suggested that humans should be part of this as two basic components of economic and environment, not as a separate being.

Sustainability is about the terms and conditions of human survival, and yet we still educate at all levels as if no such crisis existed (Orr, 2011). The destruction of the planet is not the work of ignorant people. Rather it is largely the result by the people with B.A’s, MA’s, MSc’s, and PhDs. This argument advocates for an environmental aspect where the human footprint is largely contributed by a segment of society which is more educated.

David Orr’s (2011) nine challenges: Orr suggested some issues as challenges to address the global objective of sustainable development. Here all three aspects of sustainable development are addressed (economics, environment and social).

- 1) Power civilisation by sunlight
- 2) Grow food and fibre sustainably
- 3) Dis-invent the concept of waste
- 4) Preserve biodiversity
- 5) Restore ruined ecologies
- 6) Reduce materials, water and land use per head
- 7) Rethink the political basis of modern societies
- 8) Develop economies that can be sustained within nature’s limits
- 9) Distribute wealth fairly within and between generations.

In the above suggested points, almost all SDGs focused areas are addressed : for example, sustainable energy through sunlight, sustainable food security, solid waste, ecology, depletion of precious natural resources such as water and land, equality in wealth distribution or social equality.

Concept of Education for sustainable development

Sustainable development education is critical in order to facilitate the acquisition of skills that enable the next generation to meet the challenges of contemporary global issues such as climate change, depletion of natural resources, demographic dynamics etc.

The sustainable development movement began with and grew out of concerns expressed in the 1970s and 1980s that production and consumption patterns as evidenced in the industrialised societies could not be sustained in terms of the planet's resources (UNESCO, 2006).

Sustainability, sustainable development and education for sustainable development are similar concepts because they underlie the same principles and basics. The only difference may be that sustainability is the end-product or goal, sustainable development is a process and education is an instrument for the implementation of sustainable development.

The primary purpose of the literature review about education and sustainable development is to discuss the relationship between Education and Sustainability debates and discourses within different schools of thoughts, since the creation of the term with the publication of the Brundtland Report (Diemer, Marquat, 2014). In this section, there is a literary evidence defining education for sustainable development. After review of much relevant literature, some relevant definitions of the concept have been consolidated for improving our understanding of the concept.

Recent research and discourses on education and sustainable development (Barthes & Alpe, 2013, Lange, 2012) maintain that there is a close causal link between education and sustainability that can reach the goal of creating a sustainable society in all its terms and objectives to keep people and our planet safe for the long term (Marquat, Diemer, 2015). Education is considered as the only powerful and effective tool through which we can bring about long-lasting sustainable change in society. Education is an effective tool for achieving the goal of prosperity, peace, and sustainability of society and improving the living standard of people in any society in the world. Education enhances and empowers each individual to become productive members of society and unlocks the potential to contribute as an individual from the local to the global level, in order to create a sustainable world. Ultimately it broadens thinking, open minds and enhances perspectives to create a pluralistic and peaceful world.

The term education is defined contextually, therefore, every society has its own definition to define it. There is no single definition of education applied at the global level which defines it either from sustainability or a sustainable development perspective (Pellaud, 2011). It is considered to be a dynamic and contextual concept and therefore every society defines education in its own way. However, despite the nature of the concept of education as contextual, there is an overall consensus among academia and education experts on its basic elements which can prevail in general. Knowledge, skill, attitude or behaviour and creativity are considered as four basic or general elements of quality education.

“Education is an indispensable element for achieving sustainable development” (UN, 2004)¹. Education is considered as a strategy or tool in the contemporary era of sustainability that can lead to sustainable development and a sustainable future for human beings on the planet earth. Here education is taken from a unique perspective of education for sustainable development.

¹ United Nations. 2004. General Assembly Resolution 58/219. New York: United Nations

This idea of education possesses a different message of locally relevant and culturally appropriate means to implement ESD objectives. This type of education ultimately enhances the quality of life or living standards of the people and improves environmental quality to save the planet. Its scope is to include not only formal but informal and non-formal education as well to scale up and cover all individuals of society.

In the above discussion we talked about education in general, but, if we are looking for a different quality education for sustainable development then it must be a different type of quality education. (Ofei-manu, 2014) argued that enhancing Quality Education can be achieved through the integration of a holistic perspective on education for sustainable development (ESD) and use of measurable SMART (Specific, measurable, achievable, realistic and time bound) learning targets/outcomes². (Ofei-manu-2014) suggested this holistic approach with the help of a Learning performance framework ESD-LPF to enhance quality education for sustainable development implementation process³. It should integrate basic components of educational content, the learning process and educational development models.

Education for Sustainable Development has some general characteristics embedded with sustainable development values and principles, promotes life-long learning, covers social, environmental and economic aspects of society, based on local level but impacts on international level, and contains content and context at the global level but prioritizes local needs, all of which enhances the scope of the ESD. Academia is still not giving due focus on this issue and is struggling for some significant evidence that would transform the educational system by bringing ESD values and principles into the academic domain. There have been some attempts made by some international organizations and academic institutions to make ESD an integral part for academia but still it is quite a challenging realm.

Uncertainties and debates regarding the term of sustainable development are still ongoing, and similarly, the notion of education for sustainable development (ESD) is open to debate (Sahin, 2016). Academia, international development organizations, governments, environmental scientists are defining ESD within their own contexts. There is a great debate among all these discourses.

One of the arguments from environmental school of thought is to interpret ESD as a science emerging from environmental science, "*ESD seems to emerge as a current issue within environmental education*" (Sauvé, 1996). ESD is continuously advocated by UNESCO and other international and local stakeholders as a road for reaching the sustainability of the planet and human beings. Education can be considered as a vehicle that will help us reach the ultimate destiny of achieving a sustainable solution for next generations. ESD is now an accepted truth and reality for all nation states to take measures to include ESD principles and recommendations to achieve sustainable development goals.

There are different educational models that have been adopted to advance in implementation of

² (n.d.). (PDF) Quality Education for Sustainable Development: A Retrieved February 14, 2020, from https://www.researchgate.net/publication/261061906_Quality_Education_for_Sustainable_Development_A_priority_in_achieving_sustainability_and_well-being_for_all

^{3 3} "(PDF) Quality Education for Sustainable Development: A....." https://www.researchgate.net/publication/261061906_Quality_Education_for_Sustainable_Development_A_priority_in_achieving_sustainability_and_well-being_for_all. Accessed 12 Feb. 2020.

the ESD agenda. One of the models is the Strength model (R McKeown, 2012) of Education for sustainability. This model of strength is an approach to deal with the challenge of ESD at global scale. In this model each teacher in every discipline can contribute to education for sustainability. In this approach, every teacher who is already in can be reoriented on sustainability challenges and objectives, he or she can then transform its values into knowledge and skills using the curriculum in a formal educational setting. For example, a history teacher may orient students about the history of forests, present deforestation and facts predicting their future sustainability. Statistics teachers and students could calculate the data and forecast the changes from past to present and propose changes for future.

The global goal of the education for sustainable education is to integrate it at all levels of education (Sterling, 2016) because this approach cannot be limited to a specific level or domain of education, therefore, it should be integrated in every level of education in formal, informal and non-formal settings of education.

Education for Sustainable Development is challenging controversial issues such as Population and Resource consumption. Population increase is directly linked with education because it affects nature through exploitation of more and more natural resources to fulfil the needs of the present by compromising future needs. A conventional education system has a higher income and therefore more consumption which will in turn lead to more energy and ultimately become a challenge for sustainability. The relationship between education and sustainable development is complex (McKeown, Hopkins, Rizi, & Chrystalbridge, 2002) but it can be easily understood through the framework of UNESCO to implement it.

The chapter 36 of Agenda 21 identified four basic major thrusts for ESD to work with:

- 1) Improve access to quality basic education.
- 2) Reorient existing education to address sustainable development.
- 3) Develop public understanding and awareness, and
- 4) Provide training programmes for all sectors of the private and civil society.

Another point of view is that education for sustainable development means working with students to encourage them to: consider what the concept of global citizenship means in the context of their own discipline and in their future professional and personal lives, consider what the concept of environmental stewardship means in the context of their own discipline and in their future professional and personal lives, think about issues of social justice, ethics and wellbeing, and how these relate to ecological and economic factors, develop a future-facing outlook; learning to think about the consequences of actions, and how systems and societies can be adapted to ensure sustainable futures.

To overcome the problems emerging with unsustainability trends, education and educational cooperation has been viewed as an important factor in the resolution of the problems regarding these global and local trends. A worldwide action plan, namely Agenda 21 accepted at the Earth Summit in 1992 proposed that education is critical for promoting sustainable development and improving the capacity of people to address sustainable development issues (UNCED, 1992). A later document, the World Summit on Sustainable Development in Johannesburg also points out the importance of education to meet the basic needs of all including future generations (Von Frantzius, 2004).

In the wide and diverse field of literature about education for sustainable development, a strong argument is discussed by Pellaud (2003) that academic knowledge should be contextual and of a

multidisciplinary nature. For example, different disciplines could demonstrate concerns about global warming as mathematics and statistics discuss data or facts, or how it affects every place on the globe as geography, or in history to study past trends in global warming. In this way, every discipline is part of it.

The knowledge, understanding, skills and attributes fostered through learning for and about sustainability are also referred to elsewhere as 'sustainability literacy'.

Fien (1993) indicated an emphasis on issues of sustainability evolving through the prioritization of the understanding of social, political and economic influences on the environment and enhancement of children's awareness, emotional bonding to nature, and responsible actions.

ESD encompasses a vision that integrates environment, economy and society (Tilbury, 2002). Education for sustainable development constituent components are education/learning, sustainability and development⁴. Sterling (2001) argues for a sustainable education paradigm that requires a different vision, image, design, and action from all concerned with achieving healthy, ecologically sustainable societies.

Another argument on education is that 'education being a good thing', the volume of education has increased and continues to increase, yet so do pollution, exhaustion of resources, and the dangers of ecological catastrophe. If still more education is to save us, it would have to be education of a different kind: an education that takes us into the depth of things (Schumacher, 1997).

In the above different discourses and schools of thought on ESD, it is observed that education is the core component however it must be a different education from a conventional educational approach. Literature indicated that education for sustainable development approach is key to bring about rapid change to save people and the planet.

Sustainability

The concept of sustainability was first introduced by a western environmentalist in the World Council of Churches in 1974 (World Council of Churches, 1974). Sustainability discussion is as important as sustainable development, because it poses the primary question of what is to be sustained? Within the ESD, there are different arguments in academia, international organizations and society which are consistently demanding a question as to what is to be sustained. There are different approaches to deal with this question, some approaches criticizing its anthropocentric approach, economic, infrastructural approach and environmental approach. Bonnet argued, "What kind of knowledge will best illuminate and equip us to deal with issues of sustainability (Bonnet, 1999)". Education is an essential tool for achieving sustainability (Daniella Tilbury, 2002).

To understand the core idea behind "sustainability", every individual has to know why our world is truly unsustainable and what the indicators are which show that our world is unsustainable. Unsustainability has diverse effects on different aspects of our life. Thus, the need for active engagement of every individual towards sustainability is very urgent (Sahin, 2016).

⁴ "Can ESD Reach the Year 2020? - Frans Lenglet, 2014."
<https://journals.sagepub.com/doi/full/10.1177/0973408214548363>. Accessed 10 Jul. 2019.

Sustainable development: A global agenda

In this section, sustainable development is discussed as a global agenda from different perspectives. Some argue it as an international instrument of capitalism to control developing states, disseminate a specific indoctrination through ESD, a tool to manage state policies, manipulate state autonomy, a neoliberal tool, cultural or political hegemony, promote a specific culture, some says it a global cause of concern to create global citizenship to sustain planet earth for next generations. The United Nations and world community has shown a commitment and concerns on every global issue effecting human being as whole for the last six decades. Collective steps and measures have been taken to tackle global challenges. There have been certain significant impacts, for example, many global mechanisms such as the Paris summit in 2015 to tackle climate change challenge, where at least a road map was shared and signed by world leaders, in health eradicating polio, human rights global guidelines of this global commitment on humanity across the globe. Still there is long way to go to achieve this goal of securing humanity from all types of suffering. Nevertheless, commitments have been taken through signing conventions, treaties, summits, projects, policies and its implementation for common goals to common causes.

Sustainable development is widely discussed from various perspectives, for example, from the energy perspective, environment friendly energy production is encouraged, from the economic perspective, degrowth is discussed. This is a broad concept but it is evolving therefore it is discussed above in detail about its definition.

Any global agenda whether it is about the environment, education, health, human rights or any global human concern is criticized by critics and protectionist school of thoughts in all segments of society at different levels. One argument is that it challenges the autonomy of state to advocate education based on its own needs and future demands of human capital. On the other hand, this argument has been taken as a support element for the state to prepare a policy which should have a broad scope not only keeping their own needs but also global scenario as well so that it could be aligned at every level which increases utility of policy. There is another school of thought, for example, in academia and the political realm which criticize ESD from a neo-liberal or neo-colonial concept to challenge or hegemonize state authority to shape education. Being part of international conventions and signatory of global agenda, states are partially controlled by a pre-set policy to produce global citizen with a specific mind set.

The only constant phenomenon is change which is consistently happening. With gradual increases and advancement in information technology, there is enhanced connectivity among human beings around the world. It shapes everything intentionally or unintentionally, culture, politics, education, the environment etc. This changing process is called globalization and it is widely under discussion among academia and the world.

It is an accepted argument that the globalization process influences everything including education and its importance. Globalization has left certain positive and long-lasting influences on knowledge sharing and the dissemination of scientific information. However, its role in this research is taken as a global agenda in order to achieve sustainable solutions for human beings around the globe. A common goal and mission is to to achieve a state of sustainability for next generations on the planet by educating them and creating a sense of being a global citizen to make them realize the responsibility. *Educational policies like other policies formed in South Asian nations respond more to process of globalization rather than local needs (Aamir Saeed,*

2015) International conferences are considered as major instruments for floating new information to introduce a global agenda to poor countries.

Aid, loans and grants are considered as important tools in achieving an agenda for sustainable development. However, once again, there is an important debate on this last point for there are controversies and arguments about aid and loans.

The World Bank has decades of experience working on education across the globe. It is advocating different strategies for education. The World Bank developed comprehensive education policies for every region of the world and specific developing countries in order to enhance educational outcomes. Evident empirical evidence is available to discuss the considerable criticism on the advantages and disadvantages of the World Bank and many other international organization's education policy. The World Bank education policy is important because the the World Bank has become the single largest source of development capital in the field of international education (Heyneman, 2003).

International agencies for example UNESCO, OECD and the World Bank are leading in an ESD advocacy campaign, policy, programming, implementation and funding all over the world to enhance global agreement on global challenges for sustainability of people and planet.

Research methodology

This study is the result of a synthesis effort based on an interdisciplinary approach and the combination of several methodologies (Systems Thinking, Systems Dynamics, Causal Loop Diagram, REDOC model) in order to identify the challenges of an education for sustainable development in a developing country such as Pakistan. The systemic approach seems to us to be a relevant method for understanding the interactions between the different SDGs and to better understand the role of education for sustainable development in a national quality education strategy (SDG 4).

Systems thinking

Systems thinking encompasses “*a large and fairly amorphous body of methods, tools and principles, all oriented to looking at the interrelatedness of forces, and seeing them as part of a common process*” (Senge, 1994). A system is a perceived whole whose elements work together because they continually affect each other over time and operate toward common purpose. In Systems Thinking, the structure of the system plays an important role. The structure is the pattern of interrelationships among key components of the system. That includes the hierarchy of the flows, attitudes and perceptions, the ways the decisions are made. For Senge (1992), systems thinking introduces four levels operating simultaneously : events, patterns of behavior (over time), systemic structure and mental models.

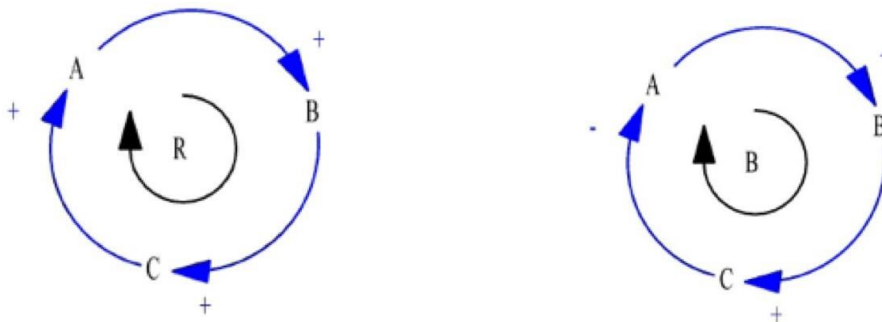
Systems thinking is useful and relevant for solving complex problems. Useful because it is a simple way to describe the purpose (in a way that can be clearly understood by everyone), the elements (characteristics of the system), and the interconnections (how the elements or characteristics feed into and relate to each other). Relevant, because it gives a clear picture of the mental process that leads us to pose the terms of a problem. First, we specify the problem or question we want to solve or ask. Next, hypotheses are made to explain the problem and tested using mental models and computer simulation models. When the result is successful, it is possible to communicate clearly what has been found and initiate a process of (behavioural)

change.

Causal Loops Diagram (CLD)

The language of Systems Thinking is “links” and “loops”. From any element in a situation (variable), it’s possible to trace arrows (links) that represent influence on another element. These links may reveal cycles that repeat themselves, time after time. Links never exist in isolation; they always comprise a circle of causality - a feedback loop in which every element is both cause and consequence. There are basically two representations of loops - reinforcing and balancing loops (fig. 6). Reinforcing loop (R) has a positive polarity (+), it generates exponential growth and collapse, which continues at an ever-increasing rate. Balancing loop (B) generates resistance’s force (which may limit the growth). Balancing loop has a negative polarity (-) and is found in situations which seem to be self-correcting and self-regulating.

Figure: 1 CLD Polarity



Reinforcing Loop (R), positive polarity

Balancing Loop (B), negative polarity

Balancing and reinforcing loops often introduce time delays. Delays may have important consequences in a system, frequently accurating the impact of other forces. Loops and delays are part of the Causal Loops Diagram (CLD). CLDs help us to visualize the structure and behavior of a system, and to analyze the system in a qualitative way. This point is important because it reminds us that a model is above all qualitative (it must be based on hypotheses that need to be tested, this is the structural model).

One form of System Thinking has become particularly valuable as a language for describing how to achieve fruitful change in organizations. This form is called ***System Dynamics*** (Forrester, 1961, 1969). System dynamics - via causal loop diagrams (CLD) and stock - flows diagrams (SFD) - is the study of dynamic feedback systems using computer simulation (using VENSIM, STELLA or POWERSIM software). It applies to dynamic problems occurring in complex social, management, economic or ecological systems - literally any dynamic system is characterized by interdependence, mutual interaction, information feedback and circular causality.

System dynamic

Jay Forrester is the father of system dynamics, during his work in MIT in 1950s. The philosophy of the system dynamics approach is as dynamic as the systems this approach studied. It is a method studied the complex, dynamic and evolving nature of socioeconomic systems of the society. “*The fundamental idea of System Dynamics is that socioeconomic and business systems can be regarded as continuous feedback control system that have self-regulating properties by virtue of the technological and accounting relationships between system variables and the policies that are used to manage the system*” (Sharp, 1977). Therefore, this approach is adopted

in this effort to assess and explore the complex, interconnected, evolving nature and scope of the educational system of Pakistan in order to understand its interconnectedness with other socioeconomic variables. This explanation is a creates clear justification of adopting this approach to study specific country context where education has close correlation with other socioeconomic variables such as poverty, budget, political interference and willingness, educational policy, system etc.

According to (Senge 1990) “*a discipline for seeing wholes. It is a framework for seeing interrelationships rather than things, for seeing patterns of change rather than static snapshots...systems thinking is a discipline for seeing the ‘structures’ that underlie complex situations, and for discerning high and low leverage change.*” (Senge, 1990). This tool is discussed in detail in following articles. Relating with this expression, this effort adopted this approach to explain the structure of education with regards to sustainable development by studying a special case of Pakistan.

The argument from Erik Pruyt (2013) is well suited to explain the method of system dynamics to explain complex phenomenon. *System Dynamics (SD) is a method to describe, model, simulate and analyse dynamically complex issues and/or systems in terms of the processes, information, organizational boundaries and strategies.* It starts from analysing the structure of a system by assuming effects of variable A to B to C then to A. Therefore, it advocates to understand the structural organization of a phenomenon. *System structure consists of physical and informational aspects as well as the policies and traditions important to the decision-making process in a system (Roberts 1988).* Hence, the desired changes could be possible through structural changes through wise decision making by decision makers. (Sterman 2000) argued about utility and scope of this approach in the private sector from oil to asset industry to financial institutions to consultants etc. It is unique approach because it uses a different method to demonstrate relationship between several internal and external variables of a specific structure which influence its behaviour. Similar understanding is used here in this study context in order to understand education sector of Pakistan and its performance in achieving certain objectives.

Causal loop diagramming or CLD is first introduced by Jay Forester an US engineer by profession in MIT during 1960s. Later, some other researcher advocated CLD such as Rosnay (1979), Richardson and Pugh (1981), Senge (1990) and Sterman (2000). The primary focus of CLD is to explore a picture of a complex system’s structure and feedback in order to understand the system. It answers some question about a structure and system that what extent one variable effects other and how the problem relates to one another. There is detailed discussion about CLD in following articles and it is used to understand and answer the questions of this study.

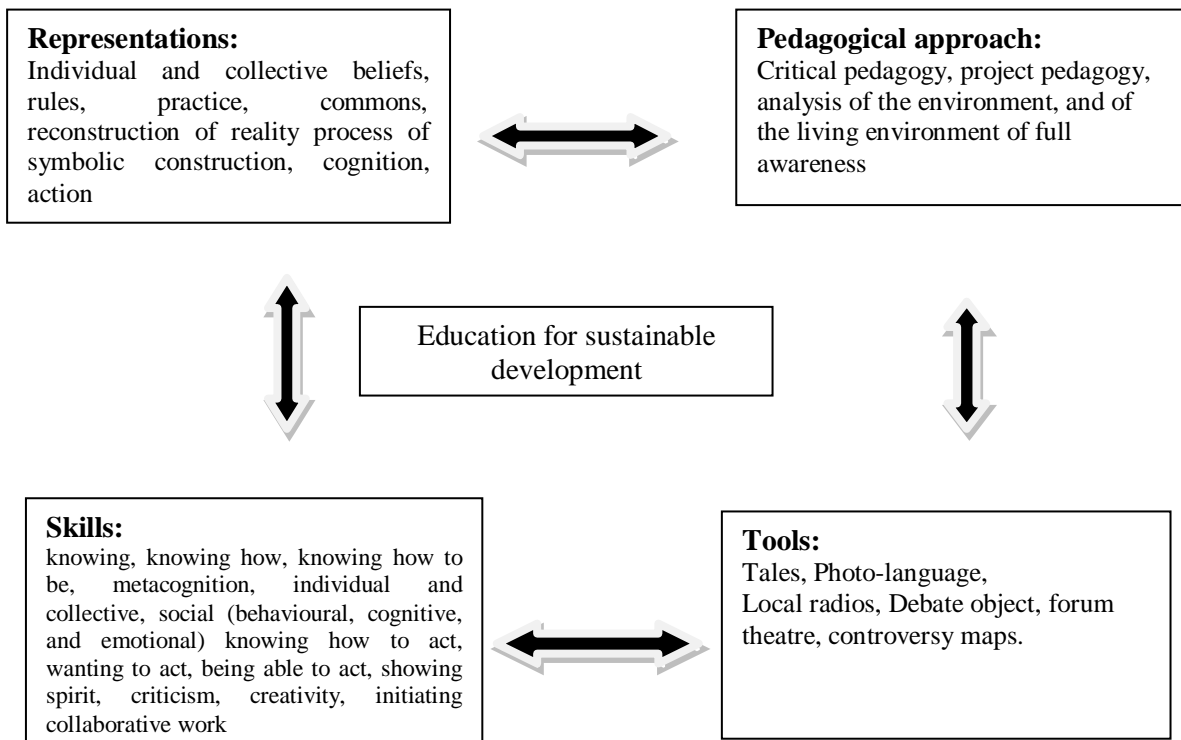
REDOC

The REDOC model (Representations, Educational approach, Didactic tools and Skills), developed by the Observatory of Development Representations Sustainable (OR2D) as part of a study carried out on behalf of IFADEM (Francophone Initiative for the Training of Masters), an operator of the AUF (Agence Universitaire de la Francophonie) and OIF (International Organization of Francophonie). This study aimed to lay the foundations for an education in sustainable development in the primary cycle of five African countries (Benin, Burkina Faso, DRC, Niger, Togo). As Arnaud Diemer (2015) points out in the preamble to the study, this work is part of an action research process. We must understand by that, "A process designed to equip

all participants in the educational scene, whether they are students, teachers and other stakeholders, ways to improve their practices thanks to enlightened experiences fueled by current theoretical knowledge”(Catroux, 2002).

As part of this project, the members of OR2D associated with each of their trips (one week in the field) in the countries targeted by IFADEM, an awareness and training module (2 days) in development education sustainable introducing debates on representations, educational approaches, didactic tools and expected skills. Thanks to the French-speaking network of AUF and with the help of the various IFADEM project managers, it was possible to bring together in each country, a group of 15 to 20 school teachers willing and willing to confront new educational practices. Therefore, all participants become willing actors in the research process.

Figure 2: REDOC framework



Source: Diemer, Kerneis, Marquat 2014

In general, the REDOC model was designed from recommendations aiming to implement education for sustainable development in education systems national.

ESD consisting in (i) integrating into teaching and learning the key themes of sustainable development, such as climate change, disaster prevention, biodiversity, poverty reduction or sustainable consumption (Unesco declaration of 8 November 2012), (ii) to be adopted participatory teaching methods aimed at motivating and empowering learners, so that they can change their behavior and become actors in sustainable development; (iii) to promote the acquisition of skills enabling learners to develop their critical thinking, imagine prospective scenarios and to take joint decisions.

The approach induced by the REDOC model (Diemer, 2009; Kerneis, Marquat, Diemer, 2014) comes back (1) from representations of individuals or groups of individuals via techniques such as questionnaires, interviews, focus group or speech analysis (use of TROPES software); (2) to

develop an Approach educational (the latter based on several components: critical reflection, collective and collaborative project, willingness to act, inventory of good practices, analysis of the environment and the living environment, mindfulness, etc.); (3) based on a certain number of innovative tools (storytelling, photo-language, debate object, local radio stations, theater forum, controversy maps...); (4) intended to bring out Skills (individual, collective, cognitive, emotional...).

We will not go further in the description of this model, because it is largely detailed in several articles that make up this thesis. However, we would like to clarify the following three points. First, the REDOC model is above all a mnemonic means to structure a project of action research. It indicates the steps necessary to produce a reference booklet for destination of primary school teachers. As a model he describes, both a thought pattern (part of a System Thinking logic) and a way to understand complex phenomena or objects. Second, our work research did not seek to test the entire REDOC model, but rather to anchor the principles of education for a sustainable development (ESD) in social and collective representations. A step which seems to us essential for both distilling knowledge and develop a critical mind and a process of self-construction of resources educational. Third, the register of knowledge mobilized, and the dynamics of complex systems have allowed to feed the REDOC model, especially when it comes to thinking about the expected knowledge and skills.

Brief outline of the papers composing the thesis

This section provides a detailed outline of the chapter or articles which are part of the single objective of an academic discussion in the shape of a thesis. It starts from a policy discussion, review of a specific country educational history, objectives, achievement and challenges.

The first article explores, from a sustainable development perspective, the vision and priority areas which have been focused on in all the major educational policy documents of Pakistan from 1947 to 2017. In this first chapter, aim was to establish an understanding through analysis of educational objectives in relation to sustainable development.

Second chapter plan to explore the domain of education for sustainable development with reference to contributing in understating the conceptual and methodological approach. For this purpose many international level platforms reviewed for example United Nations General Assembly adopted resolution 57/254, United Nations Decade of Education for Sustainable Development, Chapter 36 of Agenda 21, provision 124, United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development (Johannesburg, September 2002). There are some findings in this article ESD is not the exclusive domain of any discipline, but all disciplines can contribute to ESD; it uses a variety of pedagogical techniques that promote participatory learning and the acquisition of high intellectual skills" (UNESCO, 2005, p. 35-36).

In 2018, UNESCO placed ESD at the heart of the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (United Nations, 2015). The SDGs recognize that all countries should stimulate action in the following key areas - People, Planet, Prosperity, Peace, and Partnership (the Five Ps) - in order to tackle the global challenges that are crucial for the survival of humanity. ESD is explicitly mentioned in target 4.7: *“By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence,*

global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development" (UN, 2015, p. 19). For UNESCO, the five priority action areas (policies to support ESD, transforming learning and training environments, building the capacity of educators and trainers, empowering and mobilizing young people, accelerate the search for solutions at the local level) are intended to increase the number of countries that have integrated ESD into education and sustainable development policies, and so to catalyze ESD's capacity to help achieve global commitments (as part of the Paris Agreement on Climate change ESD introduced the Education for Climate Change (ECC). ESD requires changes in education systems, including strengthening curricula, innovative pedagogies and teacher training, but above all a model for transforming education systems.

It is difficult to imagine a universal model of education for sustainable development, as each country must define its objectives, priorities, programme of action, and how they are to be assessed. Economic, environmental, social, religious, and cultural conditions are such that ESD can take different forms. Nevertheless, it is possible to specify the essential characteristics of education for sustainable development and to define the contours of its theoretical framework. Firstly, it is part of the field of Education for (e.g. Education for biodiversity, Education for Health, Education for Environment). Secondly, it refers to a conceptual framework of sustainable development. Thirdly, it uses a methodological approach, the REDOC model.

After policy discussion and concept clarity and methodological approach, third article aims to to adopt a perspective of environmental education approach to education for sustainable development approach. This article tries to interlink and explore how much the environmental education contributed in sustainable development so that ESD can encourage changes of participatory methods to enhance critical thinking and collaborative decision making.

In this fourth chapter, two country's Pakistan and Senegal studied to explore how both countries are advancing towards achievement of targets set by SDG4. The MDGs, and now the SDGs, continue to be the subject of attention. States are trying to achieve the targets set by the 17 MDGs by 2030, the UNDP aims to help countries which have difficulty staying on course, and NGOs are working to understand the challenges associated with these new goals. Among the SDGs, SDG 4 Education Quality is of the highest importance. Beyond the fact that education is a key variable in a country's development, SDG4 is positioned as a key factor for change, a change which is more qualitative than quantitative because it assumes that sustainable development (and its education) leads to real changes in individual behaviour.

In the fifth chapter, Pakistan's country context is reviewed from ESD and SDG4 perspective to create more evidence. It explores the context of developing countries with a case study on Pakistan. Education for Sustainable Development and SDGs are inclusively targeting the improvement of people's quality of life through quality education, as defined in SDG4. Implementation of SDGs in Pakistan is very important because of its dynamic nature, which can be a learning exercise for the literature in ESD and SDGs. Pakistan is not ranking high in the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI). Pakistan, Kenya and Bangladesh have the same MPI but inequality in Pakistan is twice that in Kenya and once that in Bangladesh. The Human Development Index and other indexes are reviewed in order to understand the link between SDG-1 and SDG-4 in order to achieve objectives of not only country but global agenda as well. This effort highlights the importance and link between different SDGs, policies, quality education and ESD. It is concluded that living standard of people of Pakistan can be improved by improving the quality education with the objectives of

education for sustainable development and prioritizing the SDGs keeping the local context of the country in mind.

Sixth chapter objective is to operationalize the concept of ESD in Pakistan. Every nation state is struggling hard to improve the living standard of its people so that Pakistan is looking for its people. It is believed that education can bring long lasting and sustainable transformation or change in any society towards better living standards and improve socio-economic conditions. There is consensus among the majority of nations and academia that quality education with inclusiveness and equity is the only tool which can bring a desired change. Education has a very close relationship with the contemporary paradigm shift of education for sustainable development to create critical thinking mindset of the nation to create healthy minds. Literature on sustainability and education demonstrates a causal link with socio-economic development. Academia, society, researchers, scientists, industry and all folks of society are convinced that education is the key tool to bring a change from local to global level in order to curtail contemporary challenges human beings and the planet is facing. A system analysis approach is used to understand logical links among loops. The causal relationship is demonstrated in the form of a Causal Loops Diagram (CLD) reinforces the idea that education is not only a key driver for introducing more sustainability into the development process, it is also a set of leverage points that should be gradually removed. Therefore, it is understood that quality education is affected by multiple factors to achieve.

Last chapter inclusively proposed an approach of CLD through T21 model in order to implement education for sustainable development. Over the decades, educational systems around the globe evolved in their complexity, with increase in their scope, spread, access and dynamic nature. Developing robust education strategies requires tools that can capture, analyse and quantify the interrelation between education and other sectors, particularly in the perspective of achieving the Sustainable Development Goals (SDGs). This article reviews such a tool, namely system dynamics (SD) modelling, by examining the development of two widely used development models: the T21 and the iSDG. A case study analysis on Pakistan is then carried out through the use of literature review and Causal Loop Diagrams (CLD), followed by a discussion on the main dynamics that are central to the achievement of SDG 4 for the country. We find that, over the years, SD models have significantly evolved in complexity and accuracy, following a decades long track-record of real-life application with governments around the world. In Pakistan, we find that economic activity, adult literacy rates, effective government spending and average years of schooling for new adults are essential factors in the development of the education sector. The results suggest that implementing the use of SD models in Pakistan can contribute to the creation and subsequent evaluation of holistic education programmes, which would not only contribute to achievement of SDG 4, but have a higher impact on the achievement of the overall SDG agenda in the country.

Table 2: List of reviews

Sr No	Title	Name of review
1	Critical Analysis of Education Policies in Pakistan: A Sustainable Development Perspective	Social science learning educational journal
2	Education for sustainable development: A Conceptual and methodological approach	Social science learning educational journal
3	Environmental Education to Education for sustainable development: Challenges and Issues	International Journal of Humanities and Social Science
4	SDG 4 “Quality Education”, the cornerstone of the SDGs: Case studies of Pakistan and Senegal	Journal of Economics and Development Studies
5	Sustainable Development Goals and Education in Pakistan: the new challenges for 2030	Published as chapter in Book - Paradigms, Models, Scenarios and Practices for Strong Sustainability, Oeconomia Editions
6	Education and sustainability, how SDG4 contributes to change the representations of developing issues? The Case Study of Pakistan	International Journal of Management and sustainability
7	How Systems thinking and system dynamics may achieve high quality education (SDG4) in Pakistan	Modern Economy

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Chapter 1

Critical Analysis of Education Policies in Pakistan: A Sustainable Development Perspective

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Social science learning educational journal

Abstract: This article explores, from a sustainable development perspective, the vision and priority areas which have been focused on in all the major educational policy documents of Pakistan from 1947 to 2017. Firstly, the study presents some results from a literature review of the links between education and development. We analyse different Pakistan national education policy documents from 1947 to 2017 and discuss the post-2009 scenarios (after the 2010, 18th Constitutional Amendment, education became the responsibility of provinces). Secondly, the study focuses on the results of the Decade of Education for Sustainable Development (2005–14) in Pakistan. If education for sustainable development means allowing every human being to acquire the knowledge, skills, attitudes, and values necessary to shape their own sustainable future, it also means including key sustainable development issues (climate change, energy, food security, biodiversity, peace, tolerance, etc.) into the teaching and learning methods to change behaviours. Education for Sustainable Development could be a key driver for higher education.

Key words: Education, Pakistan, Policies, UNESCO, Sustainable Development

Introduction

Investment in education is often seen as a key element of the economic development process (Strumilin, 1929; Walsh, 1935; Schultz, 1961; Psacharopoulos, Woodhall, 1985). Since the early 1960s, the World Bank has committed developing countries to building human capital in order to reduce poverty and improve health, gender equality, democracy, and political stability. Most of the time, the link between education and development is directly connected to the relationship between school and the labor market (Psacharopoulos, 1988). As education is promoted, the illiteracy rate and the unemployment rate reduce. In Pakistan, several studies have been undertaken to analyse the country's education policy documents, five-year plans, reforms, projects and programmes (Ali, 2017; Ashraf, Hafiza, 2016; Ahsan, 2003). Many policies aim and objectives were focused on “character building” of the nation from an Islamic ideology perspective. However, an economically poor country like Pakistan needs to improve its human resources in order to develop a productive labor force and to identify sustainable solutions for its economy and environment.

Since the 1990s, education has been associated with the concept of *sustainable development*. The term sustainable development was first used in 1980 in the World Conservation Strategy (IUCN, 1980), and introduced in 1992 at the Rio Earth Summit. This was the result of the growing awareness of the global links between increasing environmental problems, socioeconomic issues to do with poverty and inequality, and concerns about a healthy future for humanity. It is now a prominent paradigm of development (Diemer, 2017). Sustainable development links environmental and socioeconomic issues (Hopwood, Mellor, O’Brien, 2005). Even if hundreds of definitions of sustainable development exist (Dale, 2001), the official definition is in the Brundt Commission report (1987). The definition suggested in this report is widely accepted: “Sustainable development is development which meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Education for sustainable development (ESD), promoted by UNESCO (2005-2014), supports the idea that there is a form of education dedicated to Sustainable Development. In its international plan for the implementation of the United Nations Decade of Education for Sustainable Development (2005), UNESCO took the view that education for sustainable development should “integrate into the teaching and learning process the key themes of sustainable development, such as climate change, prevention of natural risks, biodiversity, poverty reduction or sustainable consumption. It involves the adoption of participatory pedagogical methods aimed at motivating and empowering learners to change their behavior and become actors of sustainable development. Therefore, education for Sustainable Development promotes the acquisition of skills that enable learners to develop their critical thinking skills, imagine prospective scenarios and make joint decisions”. Education is not merely concerned with implementing knowledge, skills, attitudes, values, behavior change, so on, it proposes also to transform individuals into responsible citizens. This role falls particularly into the realm of Primary and Higher education. Primary education lays vital foundations, and Higher education is the essential preparation to best ensure that human capital may contribute usefully to a nation. In Pakistan, education occupies an important place in the constitution. In 2010, the Assembly of Pakistan (House of Representatives) passed the 18th amendment to rephrase article 37-B of the 1973 constitution. In the 1973 constitution: “State shall be responsible for eradication of illiteracy and provision of free and compulsory education up to secondary level, within minimum possible time” (Article 37-B, 1973 Constitution of Pakistan). The constitution of Pakistan in pursuance of the right to education in Article 25A: “The State shall provide free and compulsory education to all children of the age of five to sixteen years in such manner as may be determined by law” (N. A. o. Pakistan, 2012). In the past few decades, education in Pakistan has been improved continuously, even if some indicators show a mixed situation. The adult literacy rate is 58% (G. o. Pakistan, 2017). The gross net enrolment rate of primary level (age 5 to 10, male and female) is 91% (Statistics, 2014-15), keeping children in school is a challenge at the secondary level. On the Human Development Index, Pakistan is ranked at 147, with a value of 0.0550 points (UNDP, 2016). Pakistan with a population of 180 million people has a population growth rate of 2.4%. The size of the population is one of the major problems of Pakistan and because of its population size it faces a long list of other challenges in striving to develop its human resources for a better quality of life. Potentially an unexploited population may be a liability on the state because of its under utilization. Under-development is the direct cause and effect of educational and environmental challenges. A bigger population also increases the already high illiteracy rate.

Since the founding of Pakistan, both civilian and military regimes have undertaken initiatives for preparing educational policies. Several studies (Academy of Educational Planning and Management, AEPAM) have been undertaken to analyse policies, plans, projects, and programs to measure achievement and educational outcomes. Countries' commitments to deal with the increase in global challenges for the economy, poverty, environment, global warming, climate change, social issues, or terrorism are inter-related. Global efforts are being taken under the Education for Sustainable Development umbrella to induce social change.

This paper reviews how Pakistan's educational policies play a vital role in producing responsible global citizens. A policy document is a written framework to guide the different stakeholders to harmonize their understanding of the desired outcomes for any project or program. In this exploratory research, our primary question is - what are the key priority areas of Pakistan's previous education policies in the context of Sustainable Development? The two following sections identify the educational challenges for Pakistan. We focus on the

education/development relationship to identify the key drivers to the transition towards sustainable development, then, we present the history of Pakistan's education policies and link them to the UNESCO Decade for Education of Sustainable Development

Education in a developing country, case study of Pakistan:

For developing countries, education is increasingly the cornerstone of public policies. Although this quest for a better future is subject to the whims of the structural adjustment policies of international institutions, the burden of public debt, or economic conditions, many countries have engaged in national programmes to eradicate poverty and illiteracy. This part of the study seeks to recall the links between education and development in the literature. We also present the position of international institutions, which are often instigators of rupture or change in public policies in developing countries. Finally, we highlight how the concept of sustainable development is likely to bring about some changes in the perception of education.

Education and Development, a literature review:

There is a lot of literature available on education policy. However, there is a clear need for research into their relationship between education and sustainable development policies. Different approaches, contexts, levels, and perspectives have been adopted to analyze education policy linked to sustainable development, why is it a priority, and how has it become a focus for each and every government all over the world. Sustainable development has gradually increased in importance at the global level demanding positive outcomes from education to curtail future needs of states to improve quality of life and sustainability of the nation. The education policy preparation process is mostly considered as a politically influenced process (Lee, 1995). An important factor for determining the outcome of education is the policy formulation context, because education policy does not exist in a vacuum (Skolnik, 2010). It is influenced by the contemporary context of cultural and global challenges faced by human beings as a whole. Policy is drawn from the nature, context, and culture of the country in question. Economic, political, cultural, historical, regional and global contexts influence the process of policy preparation. There are both micro and macro level factors which influence education policy. Here we look at Pakistan's education policy at the micro level to address global sustainable development challenges in the Pakistan context, to analyze Pakistan's education policy from a sustainable development perspective.

Education development is a dynamic and continuous process to deal with contemporary and future challenges. Education and Development have a pivotal and complex relationship with each other. There are many schools of thought which argue that education is a tool for development. In this paper by development we mean an education which by its content, method, and pedagogy is framed by the policy for the development of the people. Also, this paper defines development as a quality of life from a learning outcome point of view. On the one hand education propagates development, which increases purchasing power and quality of life, which ultimately demands more consumption of resources and a bigger environmental footprint. On the other hand, education is considered as an instrument to produce sensible citizens who can wisely decide their environmental footprints.

The primary purpose of education policy is to develop the knowledge economy ⁱⁱⁱ in order to compete in the contemporary world (Braban, Harmsen, 2016), and this is true for Pakistan's education policy. Education investment by governments is also a method of analysis to evaluate the importance of education. Investing in human capital is another tool to explain education policy ^{iv} (Dissou, Didic, Yakautsava, 2016). Education facilitates individuals and societies efforts to

make better use of their resources and to understand their potential (Malik, 2015). By doing this, nations can create a harmony between economic and natural resources and meet the potential of any nation to make a contribution towards a sustainable world.

In the debate about educational policy and its implementation many scholars have discussed its different phases. According to Pressman and (Wildavsky, 1984), the key to effective implementation lies in the ability to devise a system in which the causal links between setting goals and the successive actions designed to achieve them are clear and robust. Historically, many approaches have been adopted to analyses policies. The top-down theorists' approach to policy analysis has suggested a framework to understand policy formulation, implementation, and evaluation. This was initially inspired by the implementation-gap model. Later "top-down" theorists devised a list of 6 necessary and enough conditions for effective policy implementation (Sabatier, 1979), indicating that if these conditions were realized, policy should be implemented as intended:

- Clear and logically consistent objectives.
- Adequate causal theory (i.e. a valid theory as to how particular actions would lead to the desired outcomes).
- An implementation process structured to enhance compliance by implementers (e.g. appropriate incentives and sanctions to influence subordinates in the required way).
- Committed, skilful, implementation officials.
- Support from interest groups and legislature.
- No changes in socio-economic conditions that undermine political support or the causal theory underlying the policy.

On the other hand, there have been some critic top-down approaches who suggested the opposite approach, that of bottom-up. Education policy analysis can be reviewed from two distinctive stand points: analysis of and analysis for. They have different methods for analyzing education policy. According to Taylor, the connection between national and global agendas creates tensions. This connection has been much discussed and criticized. National governments have been criticized for following international agendas at the cost of independent and sovereign policy. Critics argue that under this global pressure no-one can formulate an independent, local, needs-based policy. Therefore, there is an argument that "the educational policies of Pakistan, respond more to the globalization process - rather than national needs" (Aamir Saeed, 2015). Local needs could be synchronized with global challenges in order to deal with the future problems people will face resulting from human activity. However, the policy document content tells a different story, because almost 80% of educational policies do not address the global agenda. Critics of the Pakistan national educational policies have derived anti-national objectives from policy documents. However, it is only recently that policies genuinely address some of the international development agendas such as Universal Primary Education.

For the common cause of sustainable development and its relationship with education, there are many proponents of the global agenda of education for sustainable development to ensure a safe future for future generations (Ramdoo, Rumjaun, Bhai, 2017). For this purpose, the term Globalization may be referred to as a global common cause. Although, the term "Globalization" is used for different connotations and contexts - here it is used to mean the global to local links between the concept of globalization and education. Its meaning, nature, and impact are contested in the educational research community. Globalization is used amongst the educational community to determine the relationship between the common global objectives and the systematic concepts of sustainable development. Keeping the above different ideas in mind, we can analyze the relationship between education and development in Pakistan's education system.

This is outlined in the sections below.

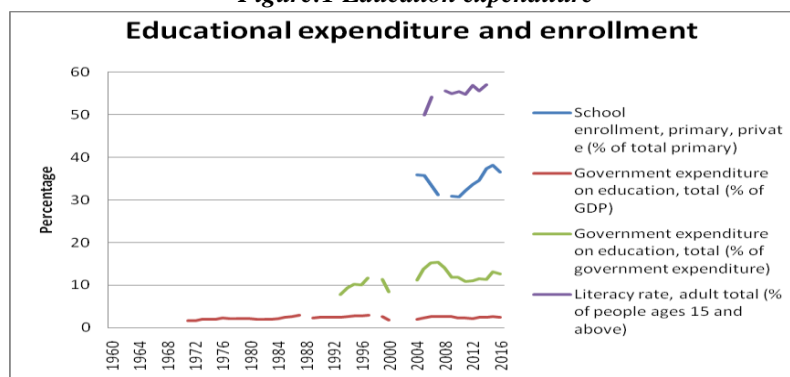
International Development Agencies Perspective:

If the link between education and development has some theoretical basis, an important challenge concerns the adjustment structural policies (Belassa, 1982) recommended by international organizations. The fundamental role of education in social and economic development has been recognized by many international institutions such as UNDP, World Bank, OECD, etc. Education, as an essential lever of development, is seen as a means of achieving social welfare, sustainable development, and good governance. Education is seen as the key to eradicating poverty, and to facilitating access to decent work and higher incomes. It translates into productivity gains which fuel economic growth. Faced with concerns about social injustice, unequal participation in development, and local and international conflict, growing attention is being paid to the central role of education in the promotion of peace and social cohesion. Sustainable Development Education is critical to ensure the acquisition of skills which will enable future generation to meet the challenges of contemporary global issues such as climate change, scarcity of natural resources, population growth, etc.

The World Bank has decades of experience working on education around the globe. It advocates a range of strategies for education. It has developed comprehensive education policies for every region of the world, and specific developing countries, to enhance educational outcomes. Empirical evidence is available to show the advantages and disadvantages of World Bank education policy. A mix of arguments is available to discuss its importance at global and local level. The World Bank education policy is important because the World Bank has become the single largest source of development capital in the field of international education (Heyneman, 2003). In this paper both Primary and Higher education are considered because both have a vital importance for, and relationship to, sustainable development. Primary education is the foundation to build a future generation with all the basic characteristics of sustainable development and prepare future school-leavers to become leaders. International agencies, for example UNESCO, OECD, and the World Bank lead the ESD advocacy campaigns, policy, programming, implementation, and funding globally to promote agreement on the global challenges to sustainability of people and the planet.

Pakistan is one of the Top 10 Aid, loan, and grant recipients from World Bank, IMF, USAID, and other aid international organizations. A big part of its budget is used in repayment of loans and Defense. The graph below gives a picture of the literacy rate and expenditure on education.

Figure:1 Education expenditure



Source: World Bank data

The purpose of presenting the enrollment, literacy rate, and expenditure above is to give an overview of educational priority in terms of expenditure and literacy. These basic facts from World Bank data illustrate the fact that government of Pakistan expenditure is not meeting the

requirement to at least achieve literacy. In this situation Education for Sustainable Development is a big question mark. This scenario is a similar situation to that of 2015 for achieving MDG's. The World Bank, through its educational strategy focuses on increasing access, improving quality, creating equality equity, discourage disparity, inclusion, learning outcomes, and lifelong learning.

The World Bank strategy is to ensure access to, and a high- quality education for, the lifelong learning objective SDG-4 and the “learning for all” World Bank aim. In its framework for education 2030, the World Bank drafted a strategy for countries to implement for achieving SDG-4 targets.

In the next section there is a discussion of education policy - Pakistan's educational policy of 2009 focuses on almost the same objectives as the World Bank framework, although previous policies had prioritized some of its objectives but did not cover the main goal.

Sustainable Development and education policies:

It can be seen in the sustainable development literature that the ideas of sustainable development emerged when the world saw it was faced with rapid change at the local and global level of environment, culture, natural resources, climate and related issues. For the protection and maintenance of diversity, and for the planet's long-term survival, scientists started to debate and to discuss sustainable development. Much of the research and identification of the subsequent pathways has been done over the last four decades. Debate on this essential topic is still ongoing, and more feasible and comprehensive solutions and recommendations are being explored. The Sustainable Development Goals (SDGs) are the latest global agenda for addressing sustainable development for the earth's population and the earth itself.

The brief definition of sustainable development by the World Commission on Environment and Development implies that human needs are basic and essential. Furthermore, economic development accompanied by equality of sharing of resources with poor nations should be maintained and ensuring equality should be encouraged by effective citizen participation. Until recently, the literature reviews (e.g Kates, Parris and Leiserowitz, 2005) have pointed out the unclear points of the standard definition of sustainable development (Sahin, 2016). Governments, non- governmental organizations, and international agencies quickly got used to the term “sustainable development”. Since the United Nations Conference on Environment and Development (UNCED) which took place in Rio de Janeiro in 1992, the terms “sustainability” and “sustainable development” have been used interchangeably (McKeown, 2002).

Defining sustainable development remains controversial and complex. Many attempts have been made to explain and interpret it comprehensively in different ways and for different contexts –in order to ease the arguments between academia and other stakeholders, so that it can be an accepted and feasible solution for a majority of the partners. Jickling (1994) considered that sustainable development education requires an adequate conceptualization of sustainable development. The conceptual framework of sustainable development should be clear and easy to understand for all. Jukker (2000) argued that “*our approach to sustainable development education must be complex, transdisciplinary, and broad*”. Sustainable human societies are characterized by social justice, economic equality, and enhanced human capabilities. Filho (2011) proposed a definition of applied sustainable development “*An action- oriented and project-based approach, which uses principles of sustainable development and applies them to*

real contexts and to real situations, yielding the benefits which can be expected when methods, approaches, processes and principles of sustainable development are put into practice". The basic premise of sustainable development is that human and natural systems are dynamically interdependent and cannot be considered in isolation when trying to resolve critical issues (Ann Dale, 2005). Lenglet (2014) argued that *"Sustainable development can be understood and acted upon through an appreciation of the dynamic, complex and systemic relationship between the planetary ecological substrate and human societies in their social, economic and cultural make-up"*. A sustainable society is one that can persist over generations, one that is far-seeing enough, flexible enough, and wise enough, not to undermine either its physical or social systems of support.

At the same time, some have argued that sustainable development is an oxymoron which itself contains a controversial connotation. On the one hand, we want development, but on the other we want a sustainable future without exploiting resources for development. Serge Latouche (2003), a pioneer of de growth, insisted on the fact that sustainable development is *"still a conceptual tinkering aimed at changing words if not to change things, but this time, we are dealing with a verbal monstrousness because of the mystifying antinomy of the expression"*. An argument supported by many authors is that sustainability and development are contradictory concepts, and that sustainable development is just economic growth dressed up in the language of deliberate obfuscation, used knowingly, or not, by those who care nothing for the earth in order to fool us into thinking that they are taking its concerns seriously (Harding, 2006). Thus, the usual definition confuses sustainable growth - an oxymoron, and sustainable development - a possibility: *"Ambiguities notwithstanding, the concept of sustainability has become the keystone of the global dialogue about the human future. But what exactly do we intend to sustain, and what will that require of us?"* (Orr, 2006).

Another important argument from neoclassical economists is to try to define development from an objective point of view in that *"it is an increase in social welfare"*. For them, the key question is to measure social welfare in terms of economic output and point out that economic growth does not necessarily increase social welfare. For them this proves that there is no contradiction between sustainability and development.

There is another school of thought about Sustainable Development which states that *"it is a process of social change"*. *"A holistic or systemic view of sustainable development sees it as a process of change guided by a number of values or principles"* (Daniella Tilbury, 2002). Therefore, an argument from Lele (1991) that *"Sustainable Development is understood as a form of societal change that is in addition to traditional developmental objectives"*. Following this idea, sustainable development can be more logically linked with the education system to bring change in society via education.

The Organization for Economic Cooperation and Development considers that sustainable development consists of reconciling the economic, environmental, and social dimensions of development in a global and long-term perspective. It considers human well-being in a broad sense, takes into account the long-term consequences of today's activities, and implies the full participation of civil society to find viable solutions. Six major thematic areas are on the agenda: sustainable consumption and production, climate change and sustainable development, sustainable foreign trade and investment, subsidy reform and sustainable development, education for sustainable development (ESD), environment and health. The OECD and UNESCO are two

international institutions involved in ESD programs and practices.

Higher Education and Sustainable Development:

The education system is the instrument which a society uses to equip its people to lead productive public lives, and to live personal lives according to their talent and interests. Higher education faces the same challenges as Primary education. Higher education plays a vital role in high level progress in any nation through its research and innovation. “*An important function of higher education is research through which it contributes to the innovation process, economic growth, sustainable development and social cohesion*” (Ministry of Education, 2009, Pakistan). In early Pakistan policy documents, Higher education was firstly taken as an instrument to provide factory workers to enable more production for economic growth of the country. The initial four educational policy documents propose this as one of the objectives for higher education. Also, Higher education was to do research and innovation to support those economic units in using state-of-the-art technology to enhance productivity. Economic growth was the central issue in Higher education, rather than general progress in all disciplines to meet all the needs of society. Later, the Pakistan 2009 education policy discussed some of the challenges and highlighted a strategic vision for education. Since the founding of the nation, Higher education has faced many challenges to develop productive graduates who can not only contribute to the economy, but also act as responsible citizens. Challenges hamper the achievement of set objectives. Some key challenges were funding, teacher quality, development of best practice curricula, infrastructure, up-to-date technology, and equipment. Actions were suggested in the 2009 document to cater for these challenges. Many of these actions have been achieved, but the expected results are still awaited. Future educational policies need a strategy to transform the educational system from not just a knowledge economy but also beyond it. Higher education for sustainable development can be considered to be more than creating the knowledge economy, it is also to orient graduates to think critically for future decisions by being a local as well as global responsible citizen of planet earth by protecting people and the planet. It should operate to create a sustainable society via long-term learning outcomes.

In all the educational policy documents of Pakistan, Higher education still faces similar challenges. Currently, it is merely addressing the demands of the market to produce skilled, knowledgeable, and visionary graduates. It has not advanced in terms of research, innovation, and technological growth and this is perceived as hampering economic growth. Every document produced addresses the importance, nature, challenges, and potential of sustainable development education and demonstrates commitment by proposing solutions, but the set outcomes have not been fully realized yet.

Education policies in Pakistan: historical pathways and challenges:

Education policy is a priority agenda for every nation state across the globe. Local, national, regional, and global awareness and focus on education is increasing among nations. Educational outcomes are demanding more attention from every segment of society to create a sustainable future for future generations. Many policies have been devised for educational advancement since 1947 by every ruling civilian and military regime in Pakistan. Reviews, monitoring processes during implementation, evaluation studies, and „lessons learnt’ exercises have been undertaken to evaluate policy success and failure against set objectives.

In order to analyze education policy formulation processes in Pakistan, it is important to understand their defined objectives and how these policies are intended to support the

achievement of those objectives (Aamir Saeed, 2015). This article is a modest effort to review policies and analyze the set objectives.

A major national event, the First Pakistan Educational Conference, was organized in November 1947, less than four months after independence. This indicated the importance of education for the newly born state. However, these initial months were very difficult for the leadership, who were simultaneously managing multiple challenges - dealing with millions of migrants and refugees, and the problems of resettlement as well as poor infrastructure, security, and violence. Trauma affected the nation, as well as the questions of the taking over of power and governance. Despite this, high level forums were organized in the early months to discuss the urgent issue of education.

The educational advancement initiatives of Pakistan can be divided into four periods. The first is from the 1947 Pakistan education conference until 1970, the second is from 1970 to 1990, the third is from 1990 to 2009, and the last is post 2009. These periods are characterized by their different policy agendas created to achieve set objectives.

From the policy documents from 1947 to 2009 the Pakistan national education policy, content and context seems to have had similar objectives and challenges. However, the periods can be distinguished by their separate approaches. Early policies were designed in terms of an 'agenda approach', but in the period from 2009 onwards a 'policy sectoral approach' was adopted.

First period: 1947 to 1970

Within the first four months of the nation coming into being, the political leadership organized an important high-level event to discuss the future nation of Pakistan. The first forum organized, the Pakistan Educational Conference, was held in November 1947. It was held in Karachi, chaired by Mr Fazul Rahman, Minister for the Interior, Broadcasting, and Education. Political leaders, academic experts and educators were invited from East Pakistan^{vi} and West Pakistan.

The event focused on setting broad goals, emphasizing moral values driven by Islamic ideology – because the leadership of that time considered this newly-born state to be a separate state for Muslims. Its basic objectives for education, can be seen to be the same as today, 70 years later. But not one of these objectives had been achieved by 2017. Pakistan's education policy failure is one of the classic examples of not being able to achieve set objectives even after seven decades of independence.

During the conference committees were formed to discuss different domains of education. These were focused on compulsory Primary education, spiritual, vocational, technical and Higher education. The conference expressed concerns about the poor infrastructure of schools. In order to achieve equitable treatment in marginalized segments of society, new initiatives were suggested for developing separate schools for girls, and incentives were devised in the form of scholarships for remote area students. It was recommended to the conference that the educational ideology should be based on the Islamic concept of the brotherhood of man, social democracy, and social justice. Students should be compelled to learn fundamental religious principles. Teacher training was also part of the policy for educational development. To enhance skilled teaching, human resource policy stressed the development of short-term courses to improve teaching skills. Physical education was also discussed to create a healthy generation. Daily, routine physical activity was proposed, and scouting, rifle clubs, and

mountaineering were also given special emphasis. Interestingly, from the beginning the integration of Madarsah (religious schools) into mainstream education was stressed in line with the existing educational system. After the division of the Indian sub-continent into India and Pakistan, huge migrations from the different areas created an imbalance in education. The literacy rate was lower in the areas which became Pakistan and therefore it was proposed in the 1947 conference that in order to enhance literacy, new means should be adopted for adult literacy.

Another conference was held in 1952, as a follow up meeting, to discuss the 6-year education development plan. It was followed by a special National Commission set up in 1959. A series of special plans to deal with the increasingly complex situation of education were prepared in the years from 1955 to 1970: The first Five Year Development Plan was prepared for 1955-1960, the second for 1960-65, and the third for 1965-70.

Initial policies and plans were focused on the morality and values development of the nation. So much so, that morality and values development were set as goals of the policy. However, that was the moment when the country was struggling for economic growth. For this purpose, the country required skilled technical human capital. Nation building was driven by Islamic ideology. Urdu was introduced as the national language in areas where the diverse geographical ethnic groups did not speak it. East Pakistan expressed concerns about the areas where Bangla (Bangli Language) was the dominant and common language. Primary level schooling (grade 1 to 5) was introduced as compulsory and free, and due to financial issues, local communities were asked to share in kind to donate land, labor and construction of school infrastructure. Revision of targets was a requirement that is common to all the education policy documents. The conference of 1951 set a target to achieve 100% universal primary education by 1971, unfortunately that target remains unfulfilled. The targets changed from one policy to another, demonstrating the inconsistent approach within the education policy arena.

The initial discussions proposed a strategy to deal with inequality by appointing female teachers in separate girls' school starting with Primary and gradually increasing to Middle schools, in order to increase access and the retention rate of girl students at the Primary level, a goal which to this day remains unfulfilled. Girls may study in co-education with boys in Primary level from grade one to five, but girl students are required to be separated in Middle and High schools.

Stipends and facilities were provided to impoverished area students and lower castes. These students' study in public school facilities. Scholarships for castes continue to give them equal opportunities in terms of access to public or private schools for fulfillment of their basic right to education in the country.

The 1959 National Commission on Education was asked to prepare a new education policy document keeping in mind the previous initiatives and policies and programmes (President General Mohammad Ayub Khan was president at that time).

Education that meets the needs of the nation, said Ayub Khan in his inaugural speech to the participants of this conference announcing the new policy. Apparently, the needs of the nations were very similar to those of the 1960's. However, in some respects its agenda was different from today.

The 1959 report stressed the need to develop an education system which creates a skilled labor force to exploit natural resources for economic development. Interestingly, in this document (chapter five, point five) it unwittingly and simultaneously established the aims of producing productive, intelligent, constructive, and capable individuals. This is very much in keeping with one of UNESCO's broad aims. Keeping in mind the latest international developments of universal compulsory education, the conference report proposed this aim from Primary school level to Middle school level, and the first 5 years of Primary education was made compulsory. However, planners faced the same challenges as today in relation to the retention rate of the enrolled students.

The main objectives of the 1959 document were related to character building of the next generation. Three aspects of a child's personality development were focused on: moral, physical, and mental. Interestingly, this is very similar to the SDGs which aim to develop knowledge and skills to equip children to deal with the demands of life. Civic sense and becoming individual, responsible citizens were also a focus area. The reforms were also key a domain in which to discuss quality education. Today the issues remain the same as 70 years ago: -teacher training, teaching methods, class- room aid, infrastructure, textbooks, equipment, finance, administrative problems, corruption, and political interference. Science and social studies were 2 main domains of curriculum in this policy document to develop necessary basic skills and knowledge in pupils in order to achieve the above objectives. Teachers relied too much on textbooks which were prepared at the national level. Good teaching practice demanded that teachers explore local materials for use in their teaching methods to create clearer understanding in their pupils.

Second period: 1970 to 1990

The 1970 educational policy document gives a sense of urgency to the importance of education as the country needed to transform its economy from agriculture to industrialization, and industry needs more skilled human capital. 5 areas were prioritized - Islamic values as an instrument for education, re-orientation of the education system according to economic needs, the role of education in social change, the quality of education, and the decentralization of educational administration. Its principles were changing gradually to accommodate the economic development of the country driven by Islamic values and quality education. It is accepted in this policy document that the Primary education system had been highly inefficient and had serious deficiencies. Measures recommended included increasing literacy, for example compulsory attendance, girl's enrollment, new facilities, separate girls' schools etc.

It was noted in the document that there was a universal consensus that the quality of education was deteriorating. Many reasons were highlighted in the policy document to address the urgent need to produce quality education to ultimately achieve the stated objectives. An imbalance prevailed, there was a serious gap in resource allocation and outcomes between different academic disciplines, especially in the arts and sciences.

Religious education was also promoted as an important aim. It was made compulsory until year 10. The syllabus of Islamic teaching was re-organized and 3 points, relating to democracy, and a tolerant and just society, were addressed. This raises the important question of why Pakistan is still so far from achieving these aims to create a moderate society. Non-Muslims were also given consideration, allowing them to learn according to their own religious beliefs. At university level, Islamic studies departments were established to ensure that compulsory

Islamic study courses met contemporary needs and challenges via Islamic education.

The curriculum development emphasized Pakistan's national objectives via linguistic, numerical skills, daily life problem solving skills, becoming more responsive to society, and a better understanding of nature and the environment. Science and technical education stressed enhancing the national economic situation. In order to aid curriculum development, various committees were formed for preparing and reorganizing curricula for each level of education to address the needs of the nation. The policy document recommended reform of the examination system because it was failing to achieve the prime objective of quality learning for pupils. Libraries were established at all levels, to provide at least basic textbooks and other reading material to enhance the reading habits of pupils. Language was considered as a basic educational and instructional instrument to motivate and develop a conducive environment for pupils to take interest in their academic activities.

The 1972 policy document stressed building on national ideology and harmony by the conscious use of education. Illiteracy was to be eradicated within the shortest possible time according to national needs, economic development and equality was promoted to reduce disparities and to minimize differences. This document also proposed to increase access to universal Primary education for boys in 1979 and for girls in 1984, which has not yet been achieved. Even elementary school (from grade six to eight) was proposed for universal access: 1982 for boys and 1987 for girls.

The education policy formulated in 1970 was the first to put forward a stronger emphasis on educational improvements. The decade of the 1970s was a crisis period for Pakistan. During the 1971 war with India, Pakistan lost East Pakistan and economic growth decreased; there was an increase in poverty and many other problems. In 1977, a military coup toppled the elected Prime Minister and triggered general political instability. General Mohammad Zia ul Haq proclaimed himself chief martial law administrator, and later President.

Soon after his takeover, another policy document was prepared and recommended various new initiatives and concepts to achieve the desired objectives. For the first time, Islamization was stressed in this policy document, and required the revising of curriculum and textbooks according to Islamic principles. Mosque and Mohala school concepts were introduced in order to improve the literacy rate. Non-formal schools were required to improve literacy. Decentralization of school administration was proposed to improve quality. Some administrative improvements were subsequently observed by the decentralization of roles and responsibilities to district level.

An interesting new educational aim was introduced for the first time in this policy document: that each Pakistani national should be educated to become a Muslim ummah for the welfare of other Muslim brothers across the globe and spread the message of Islam. It was also stressed that literacy should be increased, the maximum potential of each and every citizen exploited for productive purposes, and the promotion and propagation of scientific and technological training and research for the socio-economic growth of the country.

In the first section relating to Primary education, numerous issues were highlighted. The document demonstrates a clear understanding of the vital issues. However, all of those issues are still the same today, perhaps even more complex. The key question raised here is: „Why has it taken so long to resolve these issues? Why have politicians or administrations never taken

concrete measures to genuinely implement all these proposed policies? Unfortunately, virtually the same targets exist today as those originally set for Primary school education.

In keeping with the Islamization concept of education, this document was prepared under the rule of a Martial Law administrator who had a professed Islamic mindset. This led to education concepts being completely influenced by Islamic ideology. The mosque schools' concept was driven by this mindset. Behind this concept there was a principle concerning the Mosque and its role in Muslim society, the idea being that this public sphere could be used to increase literacy, especially for girls in rural areas, because of the inherent respect given to religious affiliation. It was decided to use the mosques to educate the masses so as to increase enrollment in Primary level education.

A survey carried out in 1986 showed that at that time 21,983 mosque schools were established which had 631,465 children (Afzal, 1988, p. 82). Another research study found that mosque schools had a positive impact on girls' access to schooling in rural areas (Anderson, 1989, p. 23). However, this innovation faced quite a number of problems related to the administrative, social, and religious environment which hindered its implementation and the achievement of quality education (Afzal, 1988, pp. 85-93).

Another concept, Mohala schools, was initiated for girl students to learn basic skills for running households, and to learn to read and write with the help of a house mother who would manage teaching in the home. This concept was new and more difficult to implement because of multi-faceted issues.

Village workshop schools were also introduced to deal with the students who had dropped out of the system. In these workshop schools, students were given certain basic skills to make them productive individuals. A course of one year's duration was introduced and trained teachers in specific subjects were engaged to produce skilled workers to meet the emerging industrial needs of the country.

Despite the various political periods, and all the policies and plans giving due consideration to the importance of female education, the situation today remains as challenging as ever. The problem is arguably worse because of the population explosion in the three decades since 1990. All aspects of female education were addressed in the various policies produced, but Pakistan has still not achieved even the minimum of the set targets. According to the policy document, people derive values from Islam, however most cultural values are driven by the cultural history of a region. In order to promote Islam, learning Arabic was introduced in order to learn the Koran and Sunnah. Islamiyat (Islamic studies) were made compulsory from primary to higher secondary school.

Third period: 1990 to 2009

In the 1992 policy document, 4 values: educational, economic, social, and institutional were focused on. Like the previous ones, in this document certain issues and challenges were acknowledged, and it was accepted that these frameworks did not significantly impact on individuals nor benefit society as a whole. The conceptual framework of this policy document is much the same as previous ones. It continues to end or see Islamic values as the prime principle of education. Its foundation also rests on the same values. The only difference in this one is to use the new term *Islamization of education* "Inculcating Islamic education through the educational

system in order to create a Muslim society". Equality, quality, and efficiency were taken as principles of this document. Disparities and inequalities were also considered as the major challenges of this effort to implement this new policy initiative.

Moral values driven by Islamic ideology were adopted to create an egalitarian Muslim society. Deeni Madaris (Religious institutions) were financially supported and recognized. The condition of Deeni Madaris was improved through financial assistance, provision of library books and equating the prestigious degrees of these Madaris with M.A (Master of Arts) in Islamiyat and Arabic (Ministry of Education, 1992).

This policy document mostly focused on character building in the context of Islamic values. It did not place significant value on science and technology as the means to improve economic and scientific research and work. The notion of character building has been a big question mark over the decades. The world view in this document is completely different in relation to whether science enhances human welfare and development. Strategies included comprehensive training programs for teachers, reorganization of administration, textbooks, teaching methodology, curriculum etc. Prominent themes in this policy document were primary education, religious and moral education, the quality of education, literacy, development of social sciences, budget, private partnerships for education, computer education.

A criticism of the 2009 educational policy document is that it makes compulsory Education for all and some sections of Education for Sustainable Development, but it does not recommend resources and an implementation strategy. The 2009 policy document, compared to previous policy documents, was criticized by Aamir Saeed (2015) who suggested that it is unrealistic, overly ambitious, and establishes no formal accountability, nor time frames within which to achieve objectives.

1999 was a year of political turmoil. An elected Prime Minister's government was again toppled by a military chief in October 1999. This change of government and political scenario also affected the education sector. Again, priorities were changed, and education became a subject which received less priority relative to bringing about political and governance stability in the country. At the end of 2005 a review was due and accordingly a review committee was formed under the supervision of Mr Javed Hassan Aly. The review team consisted of a diverse group of individuals, education experts, consultants etc. This exercise was done in several stages by taking on board as many stakeholders as possible to contribute to the formulation of a new policy document. This process was supposed to end in 2007 with its final recommendations, but due to change of government, the process was delayed for 2 years, and it was approved and announced in August 2009. This exercise adopted a different thematic approach compared to the sector al approach of previous policies.

Fourth period: after 2009 to the present:

Another era began after a new policy document was approved with the 2010 18th constitutional amendments by national/federal government in Pakistan's national Assembly Parliament. At that time, the party in power was the Pakistan's People Party in the federal capital: Islamabad. With the consensus of the majority of the political parties, the 18th constitutional amendment was passed and was implemented in April 2010. There was a key agenda in the amendment that power should be devolved from the center to the provinces to ensure effective and efficient service delivery and accountability. Theoretically, key departments were handed over to the provinces, but due to some delayed administrative procedures, a number of ministries and

departments remain in the center.

The Education ministry was one of the departments devolved to the provinces and after this amendment, Education was the responsibility of the provinces. However, this development resulted in a huge implementation gap which created extensive confusion about roles and responsibilities, which over time, was gradually clarified.

This period was considered as key to fulfill international commitments at all levels because of the increase of global environmental, population, health, and educational challenges. However, it has engendered a separate debate about the actual situation. Almost 5 years were wasted clarifying roles and responsibilities, an incompetent bureaucracy and a lack of priority by political regimes still prevail within the education authorities. This provides an easy escape and excuse to avoid fulfilling the 2015 MDG targets. The situation is still not very encouraging with respect to the estimates and facts leading to similar concerns regarding the achievement of the 2030 SDG targets.

Table 1: Education policies and Objectives

Education policies/Reports	Key set objectives of Education policies/Reports
National education policy 1947 Education Conference	Islamic Ideology, Social Democracy, character building
The Commission National report Education	Reorganization and reorientation of the education system, spiritual, moral and cultural values. Higher Education coordination, developing agriculture and technology
Education policy 1970	Islamic values, economic needs, emphasis on scientific and technical and vocational. Social change for democratic society and equal access to education. Quality education. Strengthen educational institutions, dignity of labour.
Education policy 1972-1980	Ideology of Pakistan, National cohesion, dignity of labour, Equal access to education for all, Participation of all stake holders, Skill development for economic activities.
National education policy 1978	Islamic principles of life and commitment to the ideology of Pakistan was its primary aim, Adult education.
National Education policy 1992	Educational, economic, social and institutional. Islamic principles, equity, quality and efficiency, Universal primary education. Harmony with nature.
National Education Policy 2009	An education which caters for social, political, spiritual needs of society. Pakistan ideology, Nationhood, social cohesion, equality. Responsible individuals and global citizens. Sustainable development.

As discussed above, some key highlights of the 2009 policy document are its response to the sustainable development agenda, which only the 2009 policy document addresses. The 2009 policy document discusses globalization, competitiveness, social exclusion, and social cohesion, International development partnership, ECE Early childhood, development agencies, and addresses some international development agenda points. It is acknowledged that there is a deficit in the benefits arising from the phenomenon of globalization. Pakistan ranks 122 in the current Global Competitive index 2016/17 overall ranking.

Pakistan's education system has consistently faced the same challenges since its inception. All the major policy documents rightly identified and recognized all the major challenges the education system was facing. However, little improvement has been observed mitigating those challenges. The major challenges are corruption, lack of political will, political interference, lack of merit, financing education, infrastructure, development of quality teachers, regular training of teaching and other administrative staff, the bureaucratic working environment, development of a quality curriculum, accessibility, different types of educational systems, overcrowded classrooms, unequal opportunities, lack of interest from political regimes in education, prioritizing the problem etc.

Education for Sustainable Development:

Agenda 21 highlighted the phrase “*Education for sustainable development*”. It was the first time that this term was introduced formally at an international level where education is taken as a tool for action on sustainable development issues at a large scale across the globe. Since the inception of the concept at the Rio Conference in 1992, it has become prominent in the global development agenda of the political domain.

The debate and discussion are on-going in order to create a relationship between education and sustainable development. An argument from McKeown (2002) is “The relationship between education and sustainable development is complex”. Many proponents advocate ESD as it is considered to be a key and comprehensive strategy to deal with future generations’ challenges in terms of the sustainability of human beings. It has gradually become more important because education for sustainable development can provide some characteristics to deal with future disasters in a proactive and preventive strategy.

Human beings are facing large scale challenges at different levels: both local and global. The upsurge of social, economic, and environmental issues has mobilized us to rethink human activity and find sustainable solutions to protect the earth and its people. Some examples of social issues which hamper social growth are human rights, inequality, poverty, peace, health, justice, violence, terrorism etc. These social issues are present in Pakistan. An education system is needed which deals with these critical social issues to create a sustainable society. Economic growth has improved in some parts of Pakistan, but its impact is not significant at a mass level. Environmental challenges increase as the population increases. Climate change, global warming, and uneven weather patterns are affecting us more than ever. Despite technological advances, we still have a long way to go to deal with the forecast future challenges we will face if we continue at our current pace. Pakistan is currently facing massive economic, environmental, and social issues such as temperature increase, uneven weather patterns, longer duration periods of smog, air pollution, deteriorating ground water, deforestation, urbanization, population, industrialization, installation of more coal plants etc. The only solution seems to lie in education for sustainable development for Pakistan.

After decades of discussion, debates, pilot projects and programmes, there is wide acceptance that the strategy to deal with the above-mentioned global challenges is education for sustainable development at a large scale with a simultaneous and rapid reduction in the causes. The following discussion is about the scope of ESD, its definition, nature, utility, impact etc.

ESD is considered to be an applied aspect of SD, and therefore as Laurie (2016) said “Efforts began with raising awareness, moved to capacity building, then to experimentation and finally, implementation of good practice”. An important argument concerning ESD is the need to enhance evidence-based research in order to expand ESD implementation. In spite of widespread implementation and success stories of ESD, the expansion of ESD in primary, secondary and higher education will require the ESD community to provide evidence that ESD is effective and contributes to the overall quality of education (Laurie, 2016). Therefore, the argument in this regard is to reinforce advanced academic and institutional research to create concrete scientific evidence to justify the logical outcomes of ESD. That is why education at all levels is critical in order to achieve sustainable development goals.

As well as these different interpretations of ESD, in 1998 the Council for Environmental Education published a strategy report (CEE, 1998) entitled “*Education for Sustainable Development in the Schools Sector*” in the Sustainable Development Education Panel (SDEP) which is particularly significant for teachers. ESD was defined in this report (p.3) in the following way: “*Education for sustainable development enables people to develop the knowledge, values, and skills to participate in decisions about the way we do things individually and collectively, both globally and locally, that will improve the quality of life now and without damaging the planet for the future* (Sahin, 2016).

Another argument for the ESD approach is that we have utilized human-centric approaches to understand our value, our place and role within the biological and environmental eco-systems. Such an approach which overemphasizes human beings has brought about depletion of natural resources, damage to the natural environment, and created a challenge to the long-term sustainability of our planet by breaking the chain of eco-systems on earth (Tillmanns, Holland, Lorenzi, and McDonagh, 2014) (Sahin, 2016). On the other hand, other advocates argue for environmentally sensitive approaches to deal with the challenge.

There is another key question for debate on education for sustainable development -Is education a good thing? The volume of education has increased and continues to increase, yet so does pollution, exhaustion of resources, and the dangers of ecological catastrophe. If still more education is to save us, it needs to be education of a different kind: an education that takes us into the depth of things. It has been comprehensively proven that developed countries have a higher ecological footprint than less developed nations. Developed countries use more resources, consume more, and exploit more than those who have not enough resources. Some developed countries are now rapidly transforming their nation through ESD educational strategies to adopt sustainable development lifestyles to protect people and the earth.

A very important argument comes from Selby (2007, p249) who is also concerned with the concept of ESD and argues that “the heating is happening” and calls for “education for sustainable contraction” in which we accept the climate change threat, move away from the current denial or the “business as usual” mindset (Selby 2007, p 265) and respond to the need for transformation. This argument stresses the need for rapid action to respond to the rapid changes in the environment in order to mitigate its effects.

Education for sustainable development is the process of equipping students with the knowledge and understanding, skills and attributes, needed to work and live in a way that safeguards environmental, social and economic wellbeing, both in the present and for future generations.

Other than environmentalists, some researchers and educators are looking at ESD from other points of view, such as Sterling (2001) who argues that ESD can be recognized as sustainable education in which there is a movement toward the renewal of education systems and institutions “*doing better things*” and *seeing things differently* (Sterling, 2001).

Uncertainties and debates regarding the term Sustainable Development (SD) are still on-going, and similarly, the notion of Education for Sustainable Development (ESD) is open to debate (Sahin, 2016). Academia, international development organizations, governments, and environmental scientists are all defining ESD within their own contexts. There is considerable debate in all these fields.

The goal of the UN decade of education for sustainable development 2005 – 2014 was to integrate the values inherent in sustainable development into all aspects of learning in order to encourage changes in behavior that allow for a more sustainable and just society for all. This involves learning the values, behavior and lifestyles required for a sustainable future and for positive societal transformation.

A more urgent need, however, arises from the observation that ESD remains poorly researched with little evidence for its efficacy (Tilbury, 2011). It is widely accepted among academia that ESD needs more evidence for it to be integrated in education at a large scale so as to impact within a minimum time frame. More research is needed to support this global agenda to protect both people and the earth. This paper may contribute at a small scale to increase arguments for the advancement of ESD in Pakistan.

ESD Policies from UNESCO:

In December 2002, the United Nations General Assembly adopted resolution 57/254 proclaiming the United Nations Decade of Education for Sustainable Development. This initiative completed a series of texts (chapter 36 of Agenda 21, provision 124) adopted at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development. (Johannesburg, September 2002). UNESCO was entrusted with the task of leading the Decade and drawing up a draft program of international implementation.

In its international plan for the implementation of the United Nations Decade of Education for Sustainable Development (2005), UNESCO considered that education for sustainable development should “*integrate into the teaching and learning process the key themes of sustainable development, such as climate change, prevention of natural risks, biodiversity, poverty reduction or sustainable consumption. It involves the adoption of participatory pedagogical methods aimed at motivating and empowering learners to change their behaviour and become actors of sustainable development. This is why education for sustainable development promotes the acquisition of skills that enable learners to develop their critical thinking skills, imagine prospective scenarios and make joint decisions*”. The authors of the report did not hesitate then to provoke by concluding that education for sustainable development implied “*a profound change in teaching as it is generally practiced today*”.

If education for sustainable development seems well defined in the International Plan for the Implementation of the Decade, 3 areas were given special attention: (1) sustainability issues, (2) the role of values (3) the links between the various United Nations initiatives.

1) Education for sustainable development must prepare “people from all walks of life to plan, respond and find solutions to the issues that threaten the sustainability of our planet” (UNESCO, 2005, p.7). Most of these issues were discussed at the Earth Summit (Rio de Janeiro, 1992) and redefined at the World Summit on Sustainable Development (Johannesburg, 2002). There is the problem of access to water (source of conflicts), the energy issue (more precisely the slow pace of the establishment of renewable energies), biodiversity (definition of property rights in the face of bio-piracy of large pharmaceutical companies in the South), and health (many populations exposed to malaria and AIDS). In its point 5, the Johannesburg Declaration states that all these issues are the responsibility of States, are part of a spatio-temporal scale, and are linked to the 3

pillars of sustainable development - the environment, society, and the economy. "As such, we assume our collective responsibility to advance economic development, social development and environmental protection at the local, national, regional and global levels as independent and complementary pillars of sustainable development". The action plan - as specified in point 11 of the same declaration - specifies that "the elimination of poverty, the adaptation of consumption and production methods, as well as the management of the stock of necessary natural resources economic and social development are overriding goals of sustainable development, and are also prerequisites". The sphere of sustainability is thus both complex and protean (waste management is mixed with the defence of human rights, the reduction of poverty, population migration, climate change, etc.). To deal with all these issues, it is necessary to implement innovative educational strategies (here the aim is no more or less than an education reform), likely to bring about profound changes in the behaviour of citizens.

2) To bring about this change of mentality and to move into the twenty-first century, States have to rely on the values that forged their identity. The challenge of education for sustainable development does not mean making a clean sweep of its history and culture, of contrasting traditional society with techno-society, but of understanding its own values, those of the society in which we live, and those of other societies. This is an essential aspect of education for sustainable development, "every nation, every cultural group and every individual must develop the capacity to recognize their own values and evaluate them in the context of sustainability" (UNESCO, 2005, p.8). It is difficult to draw up an exhaustive list of values, some of them refer to ideas of justice (human rights, equity, and equality), respect (of others, nature), emotions (sympathy, empathy, apathy), on principles (participation, solidarity, precaution, responsibility). Moreover, we could discuss for a long time the values that should be introduced into educational programs. Education for sustainable development emphasizes the issue of the transmission of values; this intergenerational heritage must enable us to identify locally relevant and culturally appropriate values. This touches on the fourth pillar of sustainable development, culture.

3) Education for sustainable development must be placed among the other initiatives of UNESCO. These include the Millennium Development Goals (MDGs), Education for All (EFA) and the United Nations Literacy Decade (UNLD). All these initiatives give a large place to basic education, wishing to extend it to all continents (especially Africa) and to improve its quality.

If ESD is central to UNESCO's initiatives, it is because it is not limited to education alone. Indeed, it refers to the social, cultural, and institutional dimensions of each country. It emphasizes the values and principles conveyed by sustainable development. It induces a profound reform of pedagogical practices. Finally, it introduces the participation of partners at all levels (local, regional, national, and international) and from all spheres (governments, civil society, NGOs, private sector). The notions of governance and stakeholders are thus emerging as the 5th pillar of sustainable development. At the national level, ministries of education provide a policy framework for ESD (formal education) and mobilize resources (including providing educators and trainers with the knowledge and information to put ESD into practice); NGOs facilitate exchanges on good practices (informal education); the media promote public awareness of sustainable development and ESD.

The overall assessment of the actions carried out during the United Nations Decade of Education for Sustainable Development has yet to be made, but initiatives from countries of the

South have revealed some key points (UNESCO, 2014).

- i Education for sustainable development has stimulated educational innovation. Education policies (including curriculum reform) have promoted learning for sustainable development in many countries, from early childhood education to training in the private sector. Siraj-Blatchford (2014) refer to the case of the Matarajio project in the Rift Valley (Kenya), which was based on the ecological legacy of Wangari Maathai, environmental activist and Nobel Peace Prize winner. Children were able to learn and exchange about environmental issues, while participating in various practical activities on appreciation, preservation and management of woodlands. Ackbarally (2013) notes that nearly 250,000 primary and secondary school students in Mauritius are learning about climate change and the environment. Higher education is not left out, the regional network Mainstreaming Environment and Sustainability into the African University Partnership Programme (MESA) brings together nearly 77 universities in 32 African countries.
- ii Education for Sustainable Development succeeds in investing and bringing together all levels and fields of education, particularly between formal, non-formal and informal education. Tostan (2013) described the Solar Power project, carried out by the NGO Tostan in Africa, which gives rural women the means to go to the "Barefoot College" to follow a training programme in solar energy engineering. On their return, these women can train other women from neighbouring communities, multiplying the effects of the programme (58 solar engineers trained) and giving each of them a livelihood. Thanks to this project, women have access to a renewable energy source and are establishing themselves as entrepreneurs in their communities, which contribute to strengthening community-driven development (452 solar panels installed in 9 villages in Senegal).
- iii Development education highlighted the role of stakeholders and partnerships in the implementation of education programmes. In the public sector, the Government of Mongolia and the Swiss Department for Development and Cooperation have signed a cooperation agreement to promote a sustainable future through ESD. This project involves 752 schools, teacher training institutions and education departments, 500,000 children and 26,000 teachers are involved in the project (SDC, 2013).

These achievements do not, however, exhaust the subject and there are still many challenges to be faced: Education for sustainable development is not yet integrated coherently into sectoral policies; the place of ESD in early childhood is very heterogeneous across countries (wide gaps in accessibility and quality of programmes); educators in ECCE (Early Childhood Care and Education) do not always have the skills to incorporate ESD into their teaching; much remains to be done to integrate ESD into technical and professional education and training in both formal and informal contexts; the compartmentalization of disciplines continues to impede the analysis of complex problems and prevent learners from developing the capacity to address complexity; accessibility to adult learning and education remains difficult, which hampers the diffusion of concepts and practices of sustainable development among adult learners; it is essential to reorient private sector education and training so that education defines the skills needed for critical analysis, decision making, and collaborative problem solving. Finally, there is a need to build the capacity of all stakeholders to work in partnership and, in particular, to better understand the social learning process and measures to assess and improve outcomes.

In November 2014, the Nagoya Conference reiterated this commitment, while initiating the beginning of a new period, a post-2014 strategy based on the Global Action Program.

The Aichi-Nagoya Declaration of 12 November 2014 stated "*ESD's ability to help learners to transform themselves and the society in which they live by developing knowledge, skills, attitudes, and values needed to address global citizenship and local challenges of the present and the future, such as critical and systemic thinking, problem solving through analysis, creativity, collaborative work, and decision-making in a world of uncertainty, as well as an understanding of the interdependence of global tasks and responsibilities that emanate from this awareness*". In other words, education for sustainable development must invite us to change our behaviour; it is both an opportunity to seize and an encouragement to show responsibility to engage developed and developing countries to intensify their eradication of poverty, reduction of inequalities, and protection of the environment. Of course, the implementation of ESD depends on local, regional, national, and international contexts, it also recognizes the contribution of culture to sustainable development and the need to respect a set of key principles (e.g. human rights, working conditions, gender equality, democracy, social justice).

The road map proposed by UNESCO in the Post 2015 agenda renewed the commitment of the international community to ESD, with particular emphasis on the following 2 objectives:

- (1) "reorienting education and learning so that everyone has the opportunity to become acquainted with the knowledge, skills, values and attitudes necessary to have the means to contribute to sustainable development";
- (2) "to increase the place of education and learning in all action plans, programs and activities that promote sustainable development" (UNESCO, 2014, p.14).

The Global Action Program pays great attention to groups that are particularly vulnerable to "unsustainable" development: *Girls and women* (participation in decision-making, ESD policy, and program development); *Small Island Developing States* (those hardest hit by climate change) and *Africa* (one of the continent's most vulnerable to drought, further desertification, and severe storms). 5 areas of priority action have thus emerged: (i) policies to support ESD; (ii) a transformation of the learning and training environments; (iii) capacity building of educators and trainers; (iv) empowerment and youth mobilization; (v) acceleration of the search for durable solutions at the local level.

Education for sustainable development thus constitutes a response for the countries of the North and the South to meeting certain essential needs, notably by strengthening the synergies between the school and the civil community, and by rehabilitating education in local contexts (in a sense, ESD could counteract the idea that globalization would be reduced to the imposition of a new "commercial" school system, Lange 2003, Akkari, Payet, 2010).

Education for Sustainable Development in Pakistan:

Pakistan is one of the countries which has always showed an active role in committing to most of the global goals, for the development of the people of Pakistan. On the contrary, Pakistan has remained in last place in achieving most of the global goals, such as education for all, polio eradication, and climate mitigation according to the Paris agreement in 2015 (UNFCCC conference). As for HDI and GNI, Pakistan is a long way from devising a strategy to deal with the upsurge of many challenges on different fronts. Solving all these threats to sustainability of society is based on education. For this, at national level the Pakistan federal government has taken some initiatives to review previous programmes, policies and projects to learn lessons from the past and plan for the future, which is a normal exercise of any government to review

situations and project for future situations. In this case, the planning commission is taking the lead in Pakistan to devise a strategy to deal with the goals of education for sustainable development from a sustainable development goals perspective. They have put some priorities on a list for the next 15 years in the policy document Vision 2025.

Pakistan in its Vision 2025, pillar one, People First, addresses the pressing need of human development and increase investment in social capital. To achieve this objective, this document prioritizes Primary education enrolment at the top of the list. It aims to increase the rate up to 100% (P. c. o. Pakistan, 2015) by 2025. It aims to increase the literacy rate to 90% (P. c. o. Pakistan, 2015), and increase the rate of secondary and tertiary education.

Pillar-1	Links with MDGs	Links with SDGs
People First: Developing social and human capital and empowering women	This pillar encompasses poverty eradication (MDG1), access to health and education services (MDGs 2, 4, 5 and 6, and gender empowerment (MDG 3)	SDGs1 (Poverty), 3, (health), 4 (Education) and 5 (gender)

Table 2 Pakistan vision 2025 document

The above-mentioned recent documents demonstrate an interest of the state to align every future strategy or plan with sustainability in all segments of society. According to this document “The vision of a *“knowledge economy”* cannot come about without promoting quality education in Pakistan (P. c. o. Pakistan, 2015)”. The focus is on the science and technological domains of education. Higher education is given attention in order to focus on producing a human resource with the knowledge and skills to create a knowledge economy to compete in the world. In this Vision 2025 document the government of Pakistan gives focus to all three dimensions of sustainable development – economic, social, and environment. In the social domain, this vision presents the social trends. Demographic changes are discussed to understand the population dynamics, especially the youth segment of society. “Pakistan will have one of the youngest workforces in the world by 2025 (P. c. o. Pakistan, 2015)”. This vision aims to build skillful youth to optimize the high youth bulge in the next three decades. Population increase is considered to cater for the challenges of youth employment, urbanization, quality of life, and basic infrastructure to improve the overall living standard of the nation. This population is an asset if it is utilized as an opportunity, otherwise this will raise more challenges in an already poverty-stricken country. Environment is also discussed in this document. Climate change is considered to be a threat to the nation’s sustainability. Its impacts are occurring all over the country. This document accepts the urgent need to address the issue of Climate Change. It is recommended that new alternatives should be adopted to avoid deteriorating the climate more, such as renewable energy, education, increasing adaptation of capacity for the poor and vulnerable, etc. Sustainable natural resource use is also stressed in this vision. Sustainable practices to use water and other natural resources through education will save the planet earth.

This document indirectly addresses the key features of Education for Sustainable Development. It is mentioned that education needs reforms and a different approach.

Curriculum, pedagogy, technology, assessment and governance will be reformed to improve quality in education. Vision 2025 states “These reforms will ensure that the educational system helps individuals in acquiring/sharpening of creative and analytical abilities and problem-solving skills” (P. c. o. Pakistan, 2015). Critical thinking and responsible citizenship will enhance sustainability of not only a sustainable nation but also a sustainable planet.

There are some examples of education for sustainable practices highlighted by UNESCO booklet in Pakistan. This special publication of UNESCO documented some good practices in educational institutions in capital Islamabad high school (from grade 6 to 12), especially in girls' schools and the north west province of Khyber Pakhtoonkhwa.

The Islamabad College for Girls Sector G-7/2 introduced solar panels to transform its computer lab from electricity to solar energy. This innovation and transformation are a start of adoption of alternative energy sources. It created an urge among children to think about future energy sources to save planet earth from climate change. The same school installed drains to save rainwater for the school garden. This helps to create an idea of resilient societies to equip children with skills to prepare for any future disasters to minimize risk to life and assets by adopting certain basic habits and ESD principles.

Some ingredients of education for sustainable development have been envisioned in the national level official document of Pakistan Vision 2025, but there is no official document which discuss educational for sustainable development as a strategy or a priority for transforming the society in order to increase quality of life of the people and planet.

Conclusion

It is imperative that Pakistan transforms its education system in order to create a sustainable society. Its education policies are still failing to address urgent local, as well as global needs to protect people and the planet. Many of Pakistan's previous education policy documents addressing the creation of a better society were driven by Islamic ideology with its values and norms. More recent policies addressed economic issues as well as national character building. All previous policy documents failed to achieve their objectives for a range of reasons. Only the 2009 document identified and used the term "sustainable development" and discussed global citizenship through the reorientation of the education system. In the 2009 document economic growth is also considered while advancing the role of education at Higher education level.

This paper observed to create a link between education for sustainable development, sustainable development, and Pakistan's education policies from a global sustainable development perspective. There is a question mark with respect to Pakistan's education system and its policies to address local as well as global issues. The limited scope of the paper cannot cover the future challenges that future generations will face in terms of a sustainable society, most of the policy discussion is devoted to the general educational challenges and possible policy solutions. Higher education, along with Primary school education has not so far demonstrated encouraging outcomes. Higher education faces many complex challenges and because of this has been unable to achieve innovation for the betterment of Pakistan people and the planet.

Overall lesson is learned from this effort is to prioritize sustainable development objectives to synchronized with local and national objectives. Without this basic changes, the dream of sustainability cannot come true.

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Chapter 2

Education for Sustainable Development: A Conceptual and Methodological Approach

Social science learning educational journal

Arnaud Diemer, Abdourakhmane Ndiaye, Faheem Khushik, Francine Pellaud

University Clermont Auvergne, CERDI, European Excellence Center Jean Monnet on Sustainable Development (ERASME) HEP Fribourg

Introduction

In December 2002, the United Nations General Assembly adopted resolution 57/254 proclaiming the United Nations Decade of Education for Sustainable Development. This initiative completed a series of texts (Chapter 36 of Agenda 21, provision 124) adopted at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development (Johannesburg, September 2002). UNESCO was entrusted with the responsibility of leading this Decade and developing a draft international implementation programme. Education for Sustainable Development thus became a political project, which was formalized by the major international and national institutions. As such, the International Implementation Scheme for the United Nations Decade of Education for Sustainable Development considers that ESD is based on the principles and values that underpin sustainable development; concerns the good health of the three spheres of sustainability (environment, society and economy); promotes lifelong learning; is locally relevant and culturally appropriate; is based on local needs, attitudes and conditions, but recognizes that meeting local needs often has international implications; mobilizes formal, non-formal and informal education; adapts to the evolving concept of sustainability; addresses content taking into account context, international issues and local priorities; builds citizens' capacities in the areas of community decision-making processes, social tolerance, environmental management, labor flexibility and quality of life; and is interdisciplinary. ESD is not the exclusive domain of any discipline, but all disciplines can contribute to ESD; it uses a variety of pedagogical techniques that promote participatory learning and the acquisition of high intellectual skills (UNESCO, 2005, p. 35-36).

In 2015, UNESCO placed ESD at the heart of the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (United Nations, 2015). The SDGs recognize that all countries should stimulate action in the following key areas - People, Planet, Prosperity, Peace, and Partnership (the Five Ps) - in order to tackle the global challenges that are crucial for the survival of humanity. ESD is explicitly mentioned in target 4.7: “By 2030, *ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development*” (UN, 2015, p. 19). For UNESCO, the five priority action areas (policies to support ESD, transforming learning and training environments, building the capacity of educators and trainers, empowering and mobilizing young people, accelerate the search for solutions at the local level) are intended to increase the number of countries that have integrated ESD into education and sustainable development policies, and so to catalyze ESD’s capacity to help achieve global commitments (as part of the Paris Agreement on Climate change ESD introduced the Education for Climate Change (ECC). ESD requires changes in education

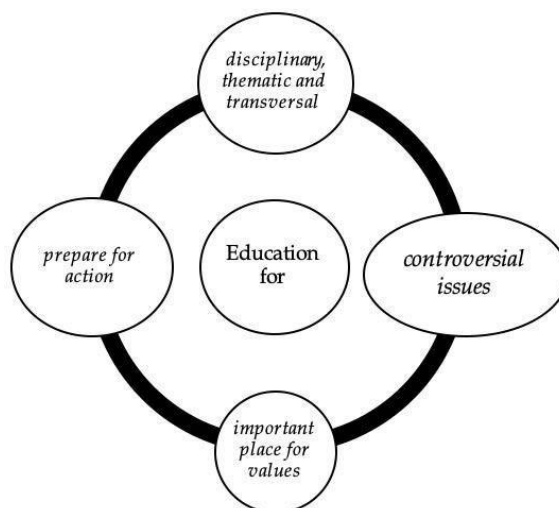
systems, including strengthening curricula, innovative pedagogies and teacher training, but above all a model for transforming education systems.

It is difficult to imagine a universal model of education for sustainable development, as each country must define its objectives, priorities, programme of action, and how they are to be assessed. Economic, environmental, social, religious, and cultural conditions are such that ESD can take different forms. Nevertheless, it is possible to specify the essential characteristics of education for sustainable development and to define the contours of its theoretical framework. Firstly, it is part of the field of Education for (e.g. Education for biodiversity, Education for Health, Education for Environment). Secondly, it refers to a conceptual framework of sustainable development. Thirdly, it uses a methodological approach, the REDOC model.

ESD and education for....

In recent years, education for sustainable development has entered our educational system. This phenomenon has become widespread, in France and in Europe, and the list continues to grow with incursions into inter- or transdisciplinary taking place (Giordan, Souchon, 1991). How can such a phenomenon be explained? Is this a fashion or is it a real desire to transform our education systems? Lebeaume (2004), Lange and Victor (2006), Simonneaux (2006), Legardez and Alpe (2013), Lange (2015) oppose these educational forms to traditional teaching. Unlike traditional teaching, which refers to compartmentalized disciplinary content (scientific knowledge is stabilized) and places the teacher at the heart of knowledge transmission, education for is based on the knowledge of the various actors in formal/informal education, proposes to build a model of social and ethical competencies, uses a trans-disciplinary approach (Diemer, 2014) and aims at a critical and committed form of pedagogy (Diemer, Marquat, 2014; Diemer, 2015). Legardez and Alpe (2013) have specified the four important features of this difference from classical education: their thematic, non-disciplinary and "transversal" nature (according to the terminology of the French Ministry of National Education); their close relationship to present social issues; the important place they give to values; and their objective of changing behavior, to prepare for action.

Fig 1. The four components of Education



Source: Diemer (2015, 2016)

This change in education has challenged the relationship of teaching to education and is a challenge for institutions in charge of teacher training. In what follows, we look at the four characteristics of Education in order to identify the challenges for education systems (Diemer,

Marquat, 2016) and for education for sustainable development. At the international level, UNESCO states that ESD "consists in integrating into teaching and learning the key themes of sustainable development, such as climate change, natural risk prevention, biodiversity, poverty reduction or sustainable consumption. It involves the adoption of participatory pedagogical methods to motivate and empower learners to change their behavior and become actors in sustainable development. Therefore, education for sustainable development promotes the acquisition of skills that enable learners to develop their critical thinking skills, imagine future scenarios and make common decisions" (2005, p. 35). Education for sustainable development implies a fundamental change in teaching as it is generally practiced today.

Education for ... is a-disciplinary, thematic and transversal

Education for requires decompartmentalization and transdisciplinary. It involves the mobilization of various types of knowledge and their linking to understand the complexity of problem. It is a question of reconnecting disciplines long divided into classes and subclasses (Bodin, Diemer, Figuière, 2014). While education calls for a transdisciplinary approach, it does not mean that it abandons the need to mobilize disciplinary knowledge. Thus, even if the question of knowledge is peripheral to the objective, disciplinary skills are fundamental to developing critical thinking skills about social practices. A disciplinary scientific culture is an essential basis for the analysis of facts. Contrary to what Alain Beitone (2014) suggests, the positioning of "education for" does not consist in "challenging the scientific approach", but rather in supplementing the theory of the general fact with an approach to particular facts (Diemer, 2013), to associate value judgments with the observation of facts. "Education for" and especially Education for Sustainable Development requires the creation of a conceptual framework to observe and understand the phenomena that cross the world. In its report, United Nations Decade of Education for Sustainable Development (2005-2014), UNESCO outlined the framework: "Education for sustainable development is interdisciplinary. ESD is not the exclusive domain of any discipline, but all disciplines can contribute to ESD" (2005, p. 36).

In France, the Bregeon report (2008) confirmed this position: "Education for sustainable development is not a discipline. It calls for integration into existing pedagogical processes, invites partnership actions and calls for a variety of approaches, as well as pedagogical innovation".

Education for...refers to controversial issues

The production of scientific knowledge is subject to power and meaning relationships, according to Bourdieu's field theory (1979). The more rigorous the science is, the more accurate its objectification and effects will be. The close interaction of the world of science with those of politics and the media, which do not, however, obey the same rules, creates strong pressures that generate positions that are not subject to any scientific rigor. However, by influencing people's knowledge of the world, we can, according to Bourdieu, influence the social world (Bourdieu, 1980). The teacher therefore faces a double challenge. On the one hand, the teacher must escape the quarrels and political compromises to which scientists are subjected and which distort the theory of the general fact. On the other hand, the teacher must adapt his/her practice in order to develop in the students the skills necessary for their civic construction, in particular an autonomy of analysis that encourages them to act in a critical and responsible manner. This is the case for scientific fields which are exposed to the media that are part of national education programmes such as the issue of energy and climate (Diemer, 2015) or the production of GMOs (Diemer, 1999, 2001, 2002). These fields are subject to emotional tensions and strong positions that require appropriate teaching. These areas, sometimes termed controversies (Latour, 1989; Albe,

2011; Diemer, Marquat, Rafaitin, 2014) and other socially relevant issues (Legardez, Simonneaux, 2006, 2011), are the subject of research and are at the origin of the development of innovative educational practices. According to Raynaud (2003, p. 8), "a scientific controversy is characterized by the persistent and public division of several members of a scientific community, whether coalitionized or not, who support contradictory arguments in the interpretation of a given phenomenon". According to Legardez and Simonneaux (2011, p. 16), a socially lively issue has the following characteristics: (1) It is alive in society: it raises questions about the social practices of the actors, and their social representations. It is considered as an issue for society and gives rise to debate (disputes, conflicts), it is the subject of media coverage. (2) It is highly relevant to reference knowledge: it gives rise to debates (controversies) between specialists in disciplinary fields or between experts in professional fields. Controversies can be subject to paradigm shifts (e.g. the treatment of inequalities according to redistributive or commutative justice). (3) It is alive in school (or even university) knowledge. Controversies can arise within institutional knowledge (programmes) and intermediate knowledge (manuals). Teachers are directly confronted by it.

Teaching about scientific controversies means addressing the question of scientific rationality in a changing and tense societal context that challenges knowledge and creates uncertainty. The teaching of Life and Earth Sciences and Economic and Social Sciences are particularly exposed to the question of controversy since these disciplines must address such issues as gender, global warming, genetically modified organisms, social protection, inequality, participatory democracy, etc. Education for sustainable development is an excellent place for addressing societal issues and controversies.

Education for... gives an important place to values Education for brings us into the field of values. Introducing values into the educational field does not necessarily refer to subjectivity. Such an approach makes it possible to associate principles (e.g. solidarity, participation, etc.) with the analysis of facts while opening new perspectives in terms of skills. Life skills (attitudes), know-how (skills and approaches), knowledge in terms of knowledge and finally knowledge about knowledge (which is equivalent to metacognition) are in turn mobilized at school (Giordan, Pellaud, 2001). Combining the autonomy of reasoning with a constructive critical spirit (Freire, 1996), these four types of knowledge in a broad sense make it possible to make well-considered decisions, based as much on a "scientific" understanding of the problems as on ethical reflection. In the case of ESD, the questions may concern the relationship between man and his environment, and more generally, our relationship with the world. People have a diversity of cultures and ethical relationships with the environment and sustainable development, which makes us oscillate between two extreme philosophies (Clément 2004), materialism (nature results from evolution) and spiritualism (nature is a gift from God). Between these two extremes, there are many positions. Implementing ESD requires positioning oneself at the intersection of these extreme positions, decentralizing from these representations to better understand those of others, and building shared representations. This posture leads to questions about the relationship between principles, values, and ethics.

The principles are based on fundamental propositions, they serve as a basis for reasoning and position papers, they define a way of action. In the case of Education for Sustainable Development, the principles of responsibility, precaution, and solidarity allow individuals to conform their conduct to a set of predefined rules regardless of the circumstances of the action (Diemer, 2013). Principles are values in the sense that if they were worthless, if they had no meaning, an individual would not make them his/her own. However, values are on a different level, they affect the intimacy of the individual and enter into the construction of his/her psycho-

social identity (Malewska- Peyre, 1991). Any direct questioning of these values is therefore likely to create cognitive blockages. Both the field of education and the field of the environment are 'undermined' by values (Sauvé, 2009), which requires teachers to be clear-sighted, rigorous and of the highest integrity. Generally, values are socially constructed and culturally determined (Diemer, Marquat, 2016), which gives them a universal character (Sauvé, Villemagne, 2005). Understanding our own values, the values of the society in which we live, and the values of other societies around the world (Dewey, 2011), is an essential aspect of Education for Sustainable Development. While the history of the United Nations has been accompanied by the promotion of a large number of values related to dignity and human rights, equity and respect for the environment, sustainable development, and more specifically education for sustainable development, goes further by extending them to the inter-generational level (Caravita et al, 2008). Of course, the values to be taught and learned in each ESD programme can be debated, however, the objective of ESD is to "create locally relevant and culturally appropriate values" based on the principles and values inherent in sustainable development (UNESCO, 2005, p. 8). Ethics, on the other hand, can be seen as an attempt to answer the Socratic question: how should we live? (Williams, 1985). It is a reasoned reflection with a view to "doing the right thing". Ethics refers to action (Fortin, 1995), specifically it proposes to question the values and principles that tend to guide our actions, in order to act in accordance with them (Legault, 1999, Pellaud, 2011).

Education for...prepare for action

Traditional education is not the preferred place for action. It is intended to prepare minds by providing them with the knowledge they need to understand the world and to train responsible citizens. Nevertheless, schools are evolving. Initiatives and citizen actions are being developed in partnership with local actors. Hence the importance of developing forms of education that prepare successive generations to build the society to come. Schools are beginning to open up to this perspective by drawing inspiration from the principles of popular education. Education tends to answer the question of the individual and collective construction of a common future by working in three directions (Christian Maurel, 2011): emancipation of individuals so that they are able to leave the place - social, gender, cultural - that has been assigned to them; action to regain control of their destiny; and involvement in the transformation of social and political relations.

Education for... allows the development of processes of empowerment and choice of education through a critical analysis of the issues at stake. It is part of the emancipation process by allowing a critical and analytical mind to flourish. Emancipation, which in the strict sense of the term means freedom from specific constraints, can only be achieved in a democratic context. Emancipation means access to free will, to a judgment of situations by oneself. It is a capacity to think, to elaborate and to consider oneself at the origin of one's judgments (Pasquier, 2013). The emancipation necessary for the preparation of action is one of the roles of school. Learning to live together (Pellaud, Giordan, Eastes, 2007), which begins with the ability to live with oneself, requires first the clarification of one's own values in order to be able to confront them with ideas. This dialogue (internal and external) between values, principles of life, and the rules of collaborative action requires the development of the skills of understanding and listening to oneself and others. To foster the development of these skills necessary for collective action, it is also useful to diversify pedagogical practices by considering the representational universes and organizational concepts (knowledge anchorage point) of each person. Beyond traditional formal education, non-formal and informal education should not be neglected. Their advantage is that they are most often anchored in reality, that

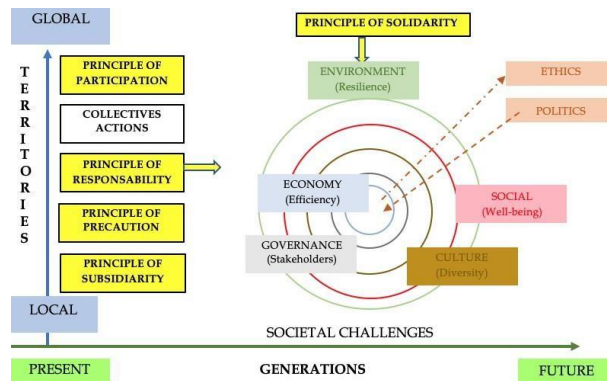
they are in synergy and network with other actors, that they encourage imagination because they are unconstrained, and that they are part of the action (Diemer, Marquat, 2016).

Education for sustainable development:

A conceptual framework of sustainable development:

Education for Sustainable Development (ESD) refers to a conceptual framework of the sustainable development concept (Diemer, 2013, 2017) characterized by (i) societal challenges (also referred to as controversial issues); (ii) an introduction to complexity and system thinking; (iii) a transdisciplinary approach; (iv) five pillars of sustainable development (environmental, social, cultural, economic, governance); (v) spatial and temporal scales; (vi) a system of values and broad principles (responsibility, precaution, participation, solidarity).

Fig 2. Thinking ESD in the Sustainable Development Framework

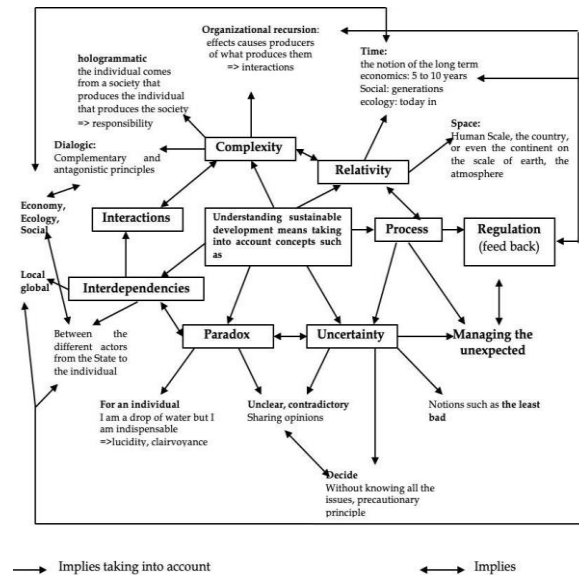


Source: Diemer (2015)

(i) Sustainable development asks us to consider a growing list of societal issues (biodiversity, climate change, energy, water, production patterns, consumption patterns, food, human rights, human health, governance, urbanization, sustainable mobility, etc.). ESD is integrated into many global frameworks and conventions: Article 6 "Education, training and public awareness" of the United Nations Framework Convention on Climate Change (1992); Article 13 "Public education and awareness" of the Convention on Biological Diversity; point 18 "Education and training" of the Hyogo Framework for Action 2005 - 2015 for Disaster-Resilient Nations and Communities; and the 10-year framework of programmes on sustainable consumption and production 2012 - 2021 "Lifestyles and sustainable education.

Sustainable Development invites us to consider complex thinking and systemic analysis. A complex situation requires a global vision of the context, which means considering all the factors involved in the problem being addressed, while placing the problem within a broader framework (Morin, 2005). Complexity introduces the concepts of interactions, interference, and uncertainty. It involves the use of system dynamics (Meadows Report, 1972) which focus on interacting elements (feedback loops) and irreversible processes.

Fig 3. Complexity of Sustainable Development



Source: Pellaud (2011)

(ii) Sustainable development requires a transdisciplinary approach. Education for sustainable development is fuelled by the explosion of disciplinary research (the importance of fundamental knowledge related to sustainable development), advocates openness between disciplines (interdisciplinarity), and research to bring knowledge together across disciplines (transdisciplinary). Transdisciplinary is situated between disciplines, across disciplines, and outside disciplines (Nicolescu, 1996). Transdisciplinary constructs its own content and methods in order to capture a multidimensional reality, structured at multiple levels. It is a cognitive paradigm whose main mission is to build bridges between disciplines (Piaget, 1972).

Sustainable Development is based on a set of 5 pillars of sustainable development. In addition to the three well-known pillars of the Brundtland Report (environmental, social, and economic), the cultural and governance pillars must be added. Culture, and more specifically cultural diversity (UNESCO, 2001, 2005), plays an important role in the understanding, acceptance, and diffusion of sustainable development. This signifies the need to apply a culturally sensitive educational model so that local populations can both take ownership of it and contribute to its enrichment. Governance, on the other hand, introduces the notion of stakeholders (Freeman, 1984). It reminds us that education for sustainable development actions are the result of an awareness of the central position given to meaningful action. Governance rehabilitates the intentionality (competence to act) and justifications of actors in a reciprocal process of doing and saying (Boidin, Diemer, Figuière, 2014). In this representation of sustainable development, it is important not to go beyond the boundaries of the planet (the environment is characterized by biodiversity, climate, water

– which are challenges for society), so that the ecosystem can be resilient. Above all, society must respect the environment and focus on the notion of well-being (Buen vivir). Culture is part of the social sphere; it uses diversity to enrich human relationships. Governance involves all stakeholders in the decision-making process. The economy is reduced to its purest representation, a place of exchange, and it concerns only a small part of our lives (the relational goods that are shared by all citizens replace the material goods, obtained under the sign of private property).

(i) Sustainable Development has spatial and temporal scales. Time introduces the generational effect (as defined in the Brundtland report), but also looks at the past (refusal to forget), and the

future (a prospective approach that must be based on medium- and long-term planning [Sachs, 1997]). Space must articulate global and local levels (Zuindeau, 2000) based on the principle of subsidiarity (this point is particularly important when talking about territories and the enhancement of indigenous knowledge).

(ii) Sustainable development introduces a system of values and four principles of sustainability. These values, respect for the environment, empathy, respect for others, and self-esteem, should (?) make it possible to empower individuals, to train responsible citizens (education for eco-citizenship) capable of projecting themselves into the future, to become involved in a genuine social project, to understand the full complexity of the socio-economic, ecological, cultural, and ethical factors that determine the entire sustainability of development (UNESCO, 2009). ESD also integrates the basic values of environmental education, whether it is Goffin's STAR (Solidarity, Tolerance, Altruism and Responsibility) model (1992, 1997) or Alaya's CARTAS (Citizenship, Autonomy, Responsibility, Tolerance, Altruism and Solidarity) model (2010). Principles such as responsibility, solidarity, precaution, and participation now define the philosophy of sustainable development. Education for sustainable development thus refers to the art of living together. Based on this conceptual framework, it is possible to propose a methodological framework for integrating ESD into the learning process.

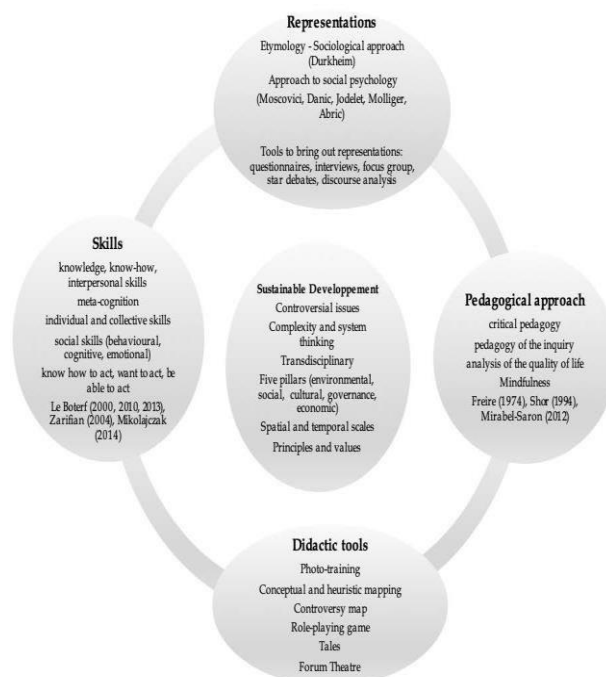
ESD as a methodological framework, the REDOC approach

Below we present a methodological framework for education for sustainable development. This framework is associated with a model called REDOC, Representations, Pedagogical Approach, Tools and Skills (Diemer, Kerneis, Marquat, 2014). We used this framework for our study on Education for sustainable development for African Countries (Diemer, 2015).

Step 1 - Representations - the aim is to bring out the representations of sustainable development of teachers, pupils, and citizens by using different techniques such as questionnaires, interviews, focus groups, or the analysis of speech proposed by software (TROPES). The notion of representation refers to the mental elements that are formed by our actions and that inform our actions. It is characterized by a process of construction and functioning that is distinct from other ways of thinking (Danic, 2006). The notion of social representation includes a certain number of features such as symbolism, imagination, cognition, action, conception, interaction, etc: "Social representation is a process of perceptual and mental elaboration of reality that transforms social objects (persons, contexts, situations) into symbolic categories (values, beliefs, ideologies) and confers on them a cognitive status allowing them to grasp aspects of ordinary life by reframing our own behaviors within social interactions" (Fischer, 1987, p. 118).

Step 2 - Pedagogical approach - there is a broad consensus that the pedagogical practices of education for sustainable development are based on the teacher's active construction of his/her own skills (Vygotsky, 1934; Piaget, 1937; Meirieu, 1987, Astolfi, 1997), and his/her ability to help students build their own skills (Eastes, 2013). Socio-constructivism is a relevant theoretical framework for studying ESD (Doise and Mugny, 1981; Cole, 1991). Each teacher builds his/her own knowledge, skills, attitudes and values in a socialized context (family, village, friends, colleagues, working conditions, social pressures, etc).

Fig 4. REDOC Framework



Source: Diemer, Marquat, Bigohe (2014), Diemer (2015, 2017)

ESD invites us to pay attention to cultural and educational contexts in cognitive processes (therefore concepts and representations are so connected). However, as we have already pointed out, the theory of didactic situations (Brousseau, 1998) can also be used here, particularly for problem situations, debates, socially lively questions, surveys, and collective actions.

In a previous study (Diemer, 2015), we sought to show how, through specific pedagogies, it is possible to develop in teachers (but also in students) skills specific to understanding sustainable development. We identified four pedagogical modalities: critical pedagogy (Freire, 1974), project-based pedagogy (Hubert, 1999), exploration of the living environment (Sauve, 1997), and mindfulness (Hant Thich Nhat, 2011).

Step 3 - Use and design of didactic tools - ESD uses innovative tools which enable teachers to interact with their students. Use of photographs, storytelling, comic strips, theatre, discussion topics, concept mapping, heuristics, and debates were proposed in a framework aimed at (i) collecting teachers' representations (both to free-up speech and to facilitate exchanges during focus group sessions), (ii) identifying whether certain tools resonated with local practices, (iii) analyzing the possibilities of integrating the tools into a phase of accompanying teachers in education for sustainable development. In the case of Benin and Togo, three didactic tools were tested: storytelling (use of the book Justine and fire stone Ogress which speaks of Western overconsumption), photographs (writing a story from three images referring to a certain idea of Nature), and debate (use of a puppet to provoke a discussion on the nuisance of plastic bags which is a big pollution problem in African countries).

Step 4 – Skills - a fundamental issue in education for sustainable development. Several of the competences targeted by ESD are derived from the key competences for education framework, namely: acting autonomously, interacting with one's environment, interacting effectively with others. UNESCO's work on competences is based on the report Learning: the Treasure Within (1996), which contains the following pillars: (i) learning to know, (ii) learning to do, (iii) learning to be, (iv) learning to live together, (v) learning to transform oneself and society. Of

course, each country will seek to give priority in its education system to skills that are consistent within its specific cultural, social, environmental, and economic framework. However, there are skills that are related to the pedagogical objectives and modalities of ESD: critical analysis (ability to ask questions, seek answers, debate, choose, argue), systemic reflection (ability to analyse and understand complex situations, to accept several points of view and partial solutions), transdisciplinary approach (ability to mobilize several fields of knowledge, know how to connect and discuss them), collaborative decision-making (know how to collectively build an optimal solution for all, motivate stakeholders to converge, develop a common vision of a project), a sense of responsibility (act responsibly, ability to assume responsibilities and take charge of missions). It should be noted that in all these skills, there are interactions between mobilized knowledge, attitudes, and values.

Conclusion

Education for sustainable development has been implemented by the resolution 57/254, proclaiming the United Nations Decade of Education for Sustainable Development (2004-2015). In 2018, UNESCO placed ESD at the heart of the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (United Nations, 2015). ESD is explicitly mentioned in target 4.7: *“By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development”* (UN, 2015, p. 19). Beyond the good practices and guidelines, the success of ESD requires a strong conceptual and methodological foundations. From the conceptual point of view, ESD involves controversial issues, complexity, transdisciplinary approach, system thinking method, principles and values. From the methodological point of view, ESD introduces a new framework. The REDOC model is an educational model which analyses people’s representations, uses pedagogical methodology, proposes didactic tools and suggests new skills. As education seems to be the new vehicle for better sustainability, it is necessary to engage world’s citizens in order to change their behavior and accept more responsibility.

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Chapter 3

Environmental Education to Education for Sustainable Development: Challenges and Issues

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Abdourakhmane NDIAYE, Arnaud DIEMER, Faheem KHUSHIK, Francine PELLAUD

University of Clermont-Ferrand, CERDI, France

HEP Fribourg, Switzerland

Abstract

If the implementation of Education for Sustainable Development national educational policies and strategies has taken place in a context in which Environmental Education was already well established, it has been widely institutionalized by the United Nations Decade of Education for Sustainable Development a UNESCO programme. The aim of ESD is to encourage changes in education so that it can effectively contribute to the reorientation of societies towards sustainable development. It proposes participatory methods of teaching and learning such as critical thinking, the imagination of future scenarios, and collaborative decision-making to enable learners to take the actions necessary for sustainable development.

Keywords: Environmental Education, ESD, UNESCO, Sustainability, Values

If Education for Sustainable Development (ESD) has been implemented in most countries (UNESCO, 2018), we must not forget that Western and Southern countries had gone through the "environmental education" phase before applying the international framework for "education for sustainable development" agreed by UNESCO. This historical trajectory explains in large part why sustainable development is very often associated with the emergence of the concept of the environment. It also makes it possible to identify two educational projects with different outlines.

Environmental Education (EE) emerged in 1977 at the Stockholm UNCED. It was conceived as a process in which individuals and the community become aware of their environment and acquire the knowledge, values, skills, experience, and the willingness to act individually and collectively, to solve current and future environmental problems. Lucie Sauvé (1998, p. 15) points out that "*EE is considered as this dimension of contemporary education that is concerned with rebuilding the network of relationships between people - social group - environment*". The environment is taken to be an eco-socio-system, characterized by the interaction of its biophysical and social components. Environmental education is first and foremost a project concerned with "society".

Education for Sustainable Development has taken a different path. In December 2002, the United Nations General Assembly adopted resolution 57/254 proclaiming the United Nations Decade of Education for Sustainable Development. This initiative completed a series of texts (Chapter 36 of Agenda 21, provision 124) adopted at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development (Johannesburg, September 2002). UNESCO was entrusted with the responsibility of leading this Decade and developing a draft international implementation programme. Education for Sustainable Development thus became a political project, which was formalized by the major international and national institutions. As such, the International Implementation Scheme for the United Nations Decade of Education for Sustainable Development considers that ESD "*is based on the principles and values that underpin sustainable development; concerns the good health of the three spheres of sustainability (environment, society and economy); promotes lifelong learning; is locally relevant and culturally appropriate; is based on local needs, attitudes and conditions, But recognizes that meeting local needs often has international implications;*

mobilizes formal, non-formal and informal education; adapts to the evolving concept of sustainability; addresses content taking into account context, international issues and local priorities; builds citizens' capacities in the areas of community decision-making processes, social tolerance, environmental management, labour flexibility and quality of life; and is interdisciplinary. ESD is not the exclusive domain of any discipline, but all disciplines can contribute to ESD; it uses a variety of pedagogical techniques that promote participatory learning and the acquisition of high intellectual skills" (UNESCO, 2005, p. 35-36).

In what follows, we will look at the history and epistemology of Environmental Education and Education for Sustainable Development to identify the major trends facing our education systems up to 2030. The SDGs initiated by the United Nations give ESD a key role in the *Quality Education Goal* (SGD 4). The good practice promoted by UNESCO should not let us forget that ESD can only truly change education systems if it offers a real methodological approach to learners. First, it is difficult to educate people about the environment (purists talk mainly about environmental education) without going back to the notion of the environment. From a historical point of view, this concept refers mainly to the debates about the conservation and preservation of biodiversity (Muir/Pinchot) in the 19th and 20th centuries. In the 1960s, the concept gained new momentum with the work of Carson and Commoner. It was only in the 1970s that environmental education gained its present status.

The Environmental Issue




Initially introduced as part of the study of Geography, the concept of environment has gradually become nomadic and polysemic (Matagne, 2003). Both complex and incorporating different fields of knowledge (architecture, ecology, etc), it currently refers to very diverse practices, values and representations. According to Theys (1992), the environment is the subject of permanent social negotiation about the boundaries of private/public, culture/nature, technical/logic ideas of life, and its reality is contextualized. These multiple dimensions associated with the environment emanate from different schools of thought based on different visions because they are based on very different representations of our perception of the environment. They question how we, as human beings, view ourselves within nature. Are we living beings who have a vocation to dominate nature? Or are we living beings among others, integrated into the laws of nature and dependent on our natural environment? These representations are strongly linked to the history of peoples, religions, and science.

From its beginning, Christianity has endeavoured to propose a vision of Man as master of nature, and therefore of divine creation. Nature is at the service of man, but man is at the same time responsible for it: Genesis 1:26: *"Then God said, "Let us make man in our image, according to our likeness, and let him rule over the fish of the sea, over the birds of the air, over the cattle, over all the earth, and over every creeping thing that creeps on the earth. God created man and woman. And said to them, be fruitful, multiply, fill the earth, and subdue it; and rule over the fish of the sea, over the birds of the air, and over every beast that moves on the earth."*

In recent centuries Science has dethroned religious power while continuing to convey a degraded image of nature. Nature is reduced to a stock of resources from which we happily draw by developing increasingly sophisticated techniques. The scientific progress of the industrialized countries has led to the imposition of its vision of world development. This purely instrumentalized representation of nature, radically anthropocentric, has been challenged in recent years by the recognition of the environmental disaster that progress generates. This recognition makes us humbler because our control of anthropogenic impacts on ecosystems is

very limited. The anthropocentric concepts are nuanced. According to B. Kalaora (1992), "man's struggle is no longer between himself and nature, but with himself, with the ultimate goal of survival for both". The representation of double decentralization (J. Davallon, G. Grandmont, B. Schiele, 1992) illustrates this vision. Man, no longer appears at the centre of nature or even in front of it; but both inside and outside it. This decentralization resituates Man in time, and makes it possible to revisit his biological origins, his kinship with the living, his animal dimension; and to put Man in perspective with his human, cultural and scientific history, thus revealing his double belonging: natural as a biological animal, cultural as a human capable of knowing and controlling (J. Davallon, G. Grandmont, B. Schiele, 1992). It challenges entrenched identity reflexes to propose a composite identity. Lucie Sauvé (1991) proposed a typology of representations of the human/environment relationship (cognitive approach, sensory approach, emotional approach, pragmatic approach, moral or ethical approach, spiritualist approach, experiential approach, cooperative approach, interdisciplinary approach, critical approach, reflective approach).

Using the Boillot test (following Chapuy), she said that it was possible to distinguish, among other things, environment/nature or environment/biosphere representations (biocentric vision), environment/problem and environment/resource (eco-sociocentric vision), environment/living environment and environment/community (sociocentric vision). These typologies are not designed to lead to reductive thinking about representations because the representations are multiple and nuanced. The typologies make it possible to decode some of our human behaviour in terms of the environment, and to move towards a more precise understanding of the ambiguous and complex relationship we have with nature. These typical representations are part of fundamentally different world views, inform our decision-making, guide our future directions, and ultimately question our dominant place as a species in the biosphere. The visions outlined in the table, which are widely developed in the literature, coexist in each of us. They guide our choices and actions at the individual and collective level. They are part of our system of representation of the world, a model which is derived from our social and cultural experience. *Table 1: Typology of representations Human/ Nature*

Visions	Dominance Relationships	Conceptual Map	Practices of ERE
<p>Objective object relationships BIOCENTRIC qualitative approach to nature Purpose: conservation and knowledge, belonging to nature</p>	<p>N ↓ H</p>	<p>ECOSYSTEM</p> 	<p>ENVIRONMENT NATURE Study of the environment, sensory approach ENVIRONMENT BIOSPHERE living together, planetary consciousness</p>
<p>Recursive object - subject relations TECHNOCENTRIC Purpose: sustainable development, management, expertise</p>	<p>N ↻ H</p>	<p>ECOSOCIO SYSTEM</p> 	<p>RESOURCE ENVIRONMENT resource management SYSTEM ENVIRONMENT Industrial ecology</p>
<p>Subjective subject's relationship to the object ANTHROPOCENTRIC Purpose: quality of life, cultural heritage, social utility</p>	<p>N ↑ H</p>	<p>SOCIO SYSTEM</p> 	<p>ENVIRONMENT CULTURE creative individual culturally rooted ENVIRONMENT POLITICS politically anchored creative individual ENVIRONMENT COMMUNITY</p>

Source: Theys (1993), Sauvé (1991), Diemer, Marquat (2014, 2015)

When the environment goes hand in hand with Nature protection

The emergence of the concept of the environment historically is rooted in two types of debates. The first debate is the division of views that has animated the American ecological movement since the end of the 19th century (Boidin, Diemer, Figuière, 2014). This debate is about two different visions of nature protection: that of *preservation* associated with John Muir (1838 - 1914) and that of *conservation* associated with Gifford Pinchot (1865 - 1946). This schism between preservation and conservation still appears today as the backdrop to all major biodiversity debates. The various conferences and reports of international organizations oscillate between these two visions. The second debate has been inspired by the positions taken by the Nature Writers in the 1960s and 1970s. Rachel Carson (*Silent Spring*, 1962) and Barry Commoner (*Closing Circle*, 1971) embody this scientific approach to inform and educate the general public about the damage caused to the environment by human activities.

Origin of the schism in nature protection movements

At the end of the 19th century, the American ecological movement was the scene of a split between supporters of nature preservation (John Muir) and those of nature conservation (Gifford Pinchot). The relationship between the two men had started well. They met for the first time in New York in 1893, and they participated three years later in a Forestry Commission. The members of this commission travelled throughout the American West and observed the damage inflicted by humans on nature. It was this love of nature that led Pinchot and Muir to take long walks together in forests (Larrère, 2007). Their friendship ended in the summer of 1897 when Pinchot published a statement in the *Seattle Journal* encouraging domestic sheep grazing in forest reserves. Muir strongly opposed this position, stating that “hoofed locusts” should not be allowed to trample the forest. The opposition between the two men fueled the columns of many popular magazines (*Outlook*, *Harper's Weekly*, *Atlantic Monthly*, *World's Work*, and *Century*), and even took on a national character when the American government decided to build a dam on the Tuolumne River to supply water to the city of San Francisco. John Muir opposed the flooding of the Hetch Valley (he wrote an open letter to Theodore Roosevelt imploring him to cancel the project), but Gifford Pinchot supported the construction of the dam. After several years of debates that divided the country, Roosevelt's successor, Woodrow Wilson signed the decree authorizing the construction of the dam on December 19, 1913.

The Pinchot/Muir schism symbolizes the history of nature protection movements (the exploitation of natural resources and more specifically of forests - Smith, 1998). On the one hand, John Muir, is one of the first modern naturalists. His essays and travel diaries are both novels of adventures in hostile regions (Alaska, Great Sierra, Cuba, etc) and true hymns to nature (sketches of forest trees, meadows, lakes, glaciers, moraines, mountain passes, etc). Reproaching men for their utilitarian approach, Muir intended to preserve nature and its resources for their intrinsic and spiritual value: *"None of the dogmas professed by contemporary civilization seems to form a more insurmountable obstacle to a healthy understanding of the relationship that culture has with the wild state than one who considers that the world has been made especially for human use. Any animal, plant or crystal contradicts it in the most formal way. Now it is taught from century to century as something precious and always new, and in the darkness that results from it this monstrous claim can go freely its way"* (Muir, 2011, p. 23). The notion of preservation means protection from destruction or degradation (Larrère, Larrere, 1997). Nature must be preserved in its original purity. The term “wilderness”, which has no equivalent in French, refers to pristine natural environments which cover vast areas (which is the case in North America and Canada). Largely uninhabited, these environments sometimes

harbor scattered, non-sedentary groups of humans with so-called primitive cultures. According to the Wilderness Act (1964), man is "at most a visitor who does not stay". Paul Arnoult and Eric Glon (2006, p. 228) point out that it was "the Anglo-Saxon settlers and their descendants who founded this idea of wilderness according to their own beliefs and cultural references". Wilderness is outside the social sphere because this nature is not part of the civilization and mental universe of its inhabitants. Deeply influenced by the work of Henri David Thoreau and his book *Walden ou la vie dans les bois*, Muir challenged the predatory exploitation of natural resources and defended the idea of an ethics of nature. His efforts to improve the protection of natural areas led him to create the Sierra Club (1892), one of the most important environmental associations in the United States (the first non-governmental organization concerned with environmental protection, which today has over 700,000 members), and to initiate a vast movement to recognize national parks in the United States (e.g. Yellowstone). His writings and philosophy have influenced the modern environmental movement.

On the other hand, Gifford Pinchot, was an American forester with a background in European forest management methods. Pinchot was influenced by Carl Shurz, American Secretary of State for the Interior from 1871 to 1881, who was very fond of forest management, and Bernhard Fernow, who was appointed Head of the Forest Division at the Department of Agriculture in 1886. Both were trained in scientific forestry developed in Germany, their country of origin. It is under this influence, as well as that of the French school, that Pinchot "draws the ferments of his conservationism" (Glon, 2006, p. 251). Pinchot saw conservation as an intelligent way to manage the country's resources. Conservation is the desire to defend, keep resources in good condition, and prevent their destruction. In his book *The Fight for Conservation* (1910), Pinchot promotes scientific forestry and promotes the profitable (but controlled) use of forests and other natural resources. Its approach is based on three fundamental concepts: economic development, utilitarian reasoning, and nature protection. First, the forest is considered as a vast reservoir at the disposal of the American nation's economic development, and not of a minority of forestry companies: "The first great fact about conservation is that it stands for development" (1919, p. 27).

Pinchot advocates a wise use of forest resources and condemns the short-term selfishness of those who make the forest disappear for their personal interest. Catherine Larrère (2007, p. 4) notes that his utilitarian reasoning can be summed up as "the greatest good of the greatest number for the longest time". An expression that is reminiscent of Bentham's formula: "the greatest happiness of the greatest number". While Pinchot prefers the rhetoric of the market economy to the expansion of the government's role in protecting nature, he advocates setting aside forests for future needs. By laying the foundations for conservationism in the United States and Canada (first conference in 1906), Pinchot's ideas found a favorable echo within the American Forestry Association which was created in 1875. The creation of forest reserves for future exploitation and to protect agricultural areas, the creation of forest fire-fighting services, and reforestation after logging are some of the many illustrations of forest management from a conservationist perspective. In addition, Pinchot founded the Yale University School of Forestry in 1900 and became the first head of the American Forest Service (part of the Department of Agriculture) in 1905. As an advisor, Pinchot inspired Theodore Roosevelt's environmental and natural resources policy from 1901 to 1909.

In the second half of the 20th century, these two currents took contrasting directions. On the one hand, John Muir inspired the environmental ethics movement (Larrère, 2007) which developed around two questions: that of the intrinsic value of nature (as opposed to the instrumental value), and that of wilderness as a model of nature to be protected. A moral philosophy has been

built around the concepts of anthropocentrism (man is considered as the central entity, reality is apprehended through the sole human perspective), biocentrism (all living beings have an intrinsic value, which gives them the right to respect), ecocentrism (the emphasis here is on the interconnection of life forms within a complex and harmonious whole, all living beings are part of a biotic community), socio- centrism (seeing in the environment only one way of problematizing society and in nature only one place to walk), or pathocentrism (taking into account a centrality of suffering or suffering common to all living beings). The preservation current saw its hours of glory with the creation of the IUPN (International Union for the Preservation on Nature) in 1948 (Bordeaux International Conference), and the proclamation of the US Wilderness Act in 1964. This federal law on the protection of nature, drafted by Howard Zahniser of the Wilderness Society, defines wilderness as "a space where the earth and the community of life are not hindered by man, where man himself is only a passing visitor". On the other hand, Pinchot's ideas and the conservationist vision of nature are still very much alive in the debates about sustainable development and biodiversity protection: this is the case of the IUPN renamed in 1956 the International Union for the Conservation of Nature (IUCN) and the findings of the Brundtland report, in which the banking of forests for future needs is considered to be for future generations.

Environmental degradation: The Nature Writers' warning message

The contributions of the Nature Writers seem play a key role in the perception and representation of damage to the environment. With an international scientific reputation, they took up writing in the 1960s and 1970s to alert public opinion to environmental degradation. Rachel Carson and Barry Commoner are the emblematic figures. Their struggle is now part of the history and epistemology of the environmental movement.

Figure 1: The Nature Writers, alarming the world



Rachel Carson

Barry Commoner

Rachel Carson (1907-1964), an internationally renowned marine biologist, referred in her book *Silent Spring* to the environmental problems caused by DDT. The introduction of the book entitled "A fable for tomorrow" imagines a town in the heart of America where all life seemed to live in harmony with its surroundings: "*The town lay in the midst of a checkerboard of prosperous farms, with fields of grain and hillsides of orchards where, in spring, white clouds of bloom drifted above the green fields*" (1962, p. 1).

Then, a strange blight crept over the area and everything began to change. Some evil spirit had settled on the community: mysterious maladies swept the flocks of chickens; the cattle and sheep became sick and died. There were several sudden and unexplained deaths, not only

among adults but even among children, who would be stricken suddenly while at play and die within in few hours. After a long description of the scene, Rachel Carson admitted that this town does not actually exist, but it might easily have a thousand counterparts in America or elsewhere in the world. The book is an attempt to explain how we have arrived here. One species, man, has acquired enough power to alter the nature of the world. Man's power has not only increased to a disturbing magnitude, but also it has changed in character. The most alarming of all man's assaults upon the environment is the contamination of air, earth, rivers, and seas with dangerous and even lethal materials: "*In this now universal contamination of the environment, chemicals are the sinister and little recognized partners of radiation in changing the very nature of the world – the very nature of its life*" (1962, p. 6).

Rachel Carson tells us that since the mid-1940's over 200 basic chemicals have been created for use in killing insects, weeds, rodents, and other organisms described as "pests". These sprays and powders are now applied almost universally to farms, gardens, forests, and homes. The whole process of spraying seems caught up in an endless spiral. Since Dichloro-Diphenyl-Trichloro-ethane (DDT) was released for civilian use, a process of escalation has been going on in which ever more toxic materials must be found. For Carson, the central problem has therefore become the contamination of man's total environment with such substances which have an incredible potential for harm – substances that accumulate in the tissues of plants and animals, and even penetrate germ cells to alter the material of heredity upon which the shape of the future depends. In the USA the production of synthetic pesticides increased from 124,259,000 lbs in 1947 to 637,666, 000 lbs in 1960 (more than a fivefold increase). So, if pesticides are part of our life, if we are going to eat and drink them, allowing them into the marrow of our bones, we have to know something about their nature and their power. *Silent Spring* is both a wake-up call and an investigation of the workings of the chemical industry. The book points out how DDT and related chemicals are passed on from one organism to another through all the links of the food chains. It also accuses the chemical industry of intentional misinformation, and public authorities of accepting the industry's claims without question. Rachel Carson's battle against the chemical lobby, and the scientific arguments she used to describe the situation, inspired the creation of the US Environmental Protection Agency, and she was posthumously awarded the Presidential Medal of Freedom.

Barry Commoner (1917-2012) was a committed opponent of nuclear tests by showing the presence of strontium 90 in children's teeth. Director of the Centre for Biology and Natural Systems Studies at Queens College (New York), he received the International Humanist Award in 1970. Barry Commoner is the author of two best-selling books: *Science and Survival* (1966) and *Closing Circle: Nature, Man and Technology* (1971). In *Closing Circle*, Commoner presents what he calls the environment crisis and the purpose of his writings: "*Earth Week convinced me of the urgency of a deeper public understanding of the origins of the environmental crisis and its possible cures. That is what this book is about. It is an effort to find out what the environmental crisis means*" (1971, p. 11). Commoner traced the environmental crisis back from its overt manifestations in the ecosphere to the ecological stresses which they reflect, to the faults in productive technology (and its scientific basis) that generate these stresses, and finally to the economic, social, and political forces which have driven humankind down this self-destructive path. *Closing Circle* discusses the rapid growth of industry and technology and their persistent effect on all forms of life. It suggests that we can reduce the negative effects by sensitizing, informing, and educating ourselves about our connection to the natural world. It also presents the basics of ecology in what Commoner termed "Laws of Ecology". A way to propose simple statements that help us understand and remember our connections to nature.

The first law of ecology- Everything is connected to everything else – to remind us of the existence of an elaborate network of interconnections in the ecosphere, between different living organisms. An ecosystem consists of multiple interconnected parts. Our ability to understand the behaviour of such a system has been improved by the development of ecology and cybernetics. *The second law of ecology* - Everything must go somewhere – means that in every natural system, what is excreted by one organism as waste is taken up by another one as food. This is the trophic chain - carbon dioxide captured by plants which excrete oxygen, which is used by animals, and so on. *The third law of ecology* - Nature knows best –holds that any major man-made change in natural system is likely to be detrimental to that system. The example of DDT can be used here: the fact that the DDT is not found in nature, that somewhere, at some time in the past, some unfortunate cell synthesized this molecule – and died.

Given these ideas, Commoner proposes to treat man-made changes, especially chemical ones, prudently and cautiously. *The fourth law of ecology* – There is no such thing as a free lunch – warns that nothing can be gained without cost. Any exploitation of nature involves an ecological cost “*Because the global system ecosystem is connected whole, in which nothing can be gained or lost and which is not subject to over-all improvement, anything extracted from it by human effort must be replaced*” (1971, p. 46). These four laws form the basis for studying and understanding the relationships and interdependencies found in communities and ecosystems. They also indicate that humankind is only one part of the biotic community and that people are shaped and nurtured by the characteristics of the land. These laws do not explain everything, mysteries will remain, but the laws give a clearer understanding and appreciation of ecology.

While Barry Commoner and Rachel Carson’s books demonstrate a certain scientific rigor (collection and processing of information), they also highlight the commitment of scientists to the environmental cause. They are powerful pedagogical works aimed at denouncing human errors and blindness in the face of technology. They are a call to vigilance and action. It is no longer possible to say that we did not know. It is also a first step towards a change in behavior, synonymous with environmental education.

Environmental education, an inspiration from the 1970s

Even if environmental education was influenced by the opposition between Muir's preservationist thinking (biocentric and based on the representation of a wild and unspoiled nature) and Pinchot's conservationist thinking (more eco-centred and based on a rational use of its resources), it only obtained its true nobility in the early 1970s. Of Anglo-Saxon inspiration, it has led to the emergence of different currents of thought that are grouped under the banners of positivism (the field of quantitative research that excludes any subjective analysis, that relies on observed phenomena, that rejects any form of doubt or ambiguity); constructivism (this places the individual and his representations at the centre of the construction of reality); and critical theory (L. Sauvé 1997, p. 170), which highlights the very close link between theory and action, reveals the predominant influence of the individual's social and historical context, insists on the need to clarify theories, and proposes a critical approach to social realities). UNESCO defined environmental education in 1972 (Giordan, Souchon, 1991), in France, it was a circular of 1977 (August 29th) that specified the contents and methods of environmental education. The definition of the environment is quite broad, referring to “*all, at a given time, to the physical, chemical, biological and social and economic aspects likely to have a direct or indirect, immediate or long-term effect on living beings and human activities*”. Philippe Mérieu (2001, p. 3-4) evokes four types of reasoning to justify the need to educate people about the environment: “*It is a contemporary concern*”, “*behaviourist logic: children must be allowed to acquire reflexes, to adopt behaviours that have become necessary for the very survival of the planet*”,

"Environmental education makes it possible to introduce a new approach, an original way of thinking about the world as a complex system constituted by a multitude of interacting elements", "its function of social criticism".

Environmental Education (EE) emerged in the same year at the Stockholm UNCSO. It is conceived as a process in which individuals and the community are made aware of their environment and acquire the knowledge, values, skills, experience and also the willingness to act, individually and collectively, to solve current and future environmental problems. Lucie Sauvé (1998, p. 15) points out that *"EE is considered as this dimension of contemporary education that is concerned with rebuilding the network of relationships between people - social group - environment"*. The environment is thus an eco-socio-system, characterized by the interaction of its biophysical and social components.

The originality of EE lies mainly in the conflict inherent between the two interpretations of environmental education. The first one focuses on people, the second on the environment. The challenge is to work at the heart of this conflict to create new social dynamics that are located in time and space. EE analyses a contextualized reality and is defined by goals and values (Sauvé, 1991). The environment, being a social object, unlike nature, exists only through the way we look at it. The study of the environment is therefore fundamentally anthropocentric because it explores man's cultural and contextual relationship with the environment. *"The individual is part of the system he perceives and the strategies he adopts become an integral part of the environment, which he in turn sees as external to himself. Ways of looking at the environment are therefore, in a very broad sense, a function of what is done there, including the strategies deployed to explore and understand it. And what is done in the environment is in turn one of many possibilities"* (Ittelson, 1991). The environment only exists when man is present and concerned, so it is anchored in our cultures and social systems (Theys, 1993).

The environment can be summarized as the space in which we live, in which we evolve, which provides us with our resources, our well-being and for which we are responsible; it can be open to the notion of community, when it is associated with a particular territory, a particular local or more distant identity. Man becomes an active subject and shares values with his community neighbors (Giolettito, Clary, 1995). The environment then takes on a solidarity dimension, generating social cohesion, carrying a present and future life project. Environmental Education has this ambition because it embraces the dimensions of identity (autonomous self and individual responsibility), social (social self and responsibility to others), and earth (being alive and responsibility towards other living beings), and of Man as interrelated spheres contributing to his personal and social development (Desautels, 1998; Sauvé, 2012). Popular education networks such as CPIEs are part of this educational movement. They reflect the emergence of new pedagogies, such as project pedagogy, which has the aim of developing responsible skills based on strategies of citizen engagement.

Education for sustainable development, more transversal

It is difficult to imagine a universal model of education for sustainable development, as each country must define its objectives, priorities, programme of action, and how they are to be assessed. Economic, environmental, social, religious, and cultural conditions are such that ESD can take different forms. Nevertheless, it is possible to specify the essential characteristics of education for sustainable development and to define the contours of its theoretical framework.

In a decade, Education for Sustainable Development succeeded in establishing itself in the educational landscape at national and international levels. In December 2002, the United Nations General Assembly adopted resolution 57/254 proclaiming the United Nations Decade of Education for Sustainable Development (2005 – 2014). This initiative completed a series of texts

(Chapter 36 of Agenda 21, provision 124) adopted at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development (Johannesburg, September 2002). UNESCO was designated as the lead agency for the promotion of this Decade. As early as 2005, UNESCO's expectations were clearly defined: *“Throughout the Decade, education for sustainable development will contribute to enabling citizens to face the challenges of the present and future and leaders to make relevant decisions for a viable world. These actors will have acquired various skills (critical and creative thinking, communication, conflict management and problem solving strategies, project assessment) to take an active part in and contribute to the life of society; be respectful of the Earth and life in all its diversity; and be committed to promoting democracy in a society without exclusion and where peace prevails”* (2005b, p. 4). To implement the objectives mentioned above, the Decade proposed to focus on four targets.

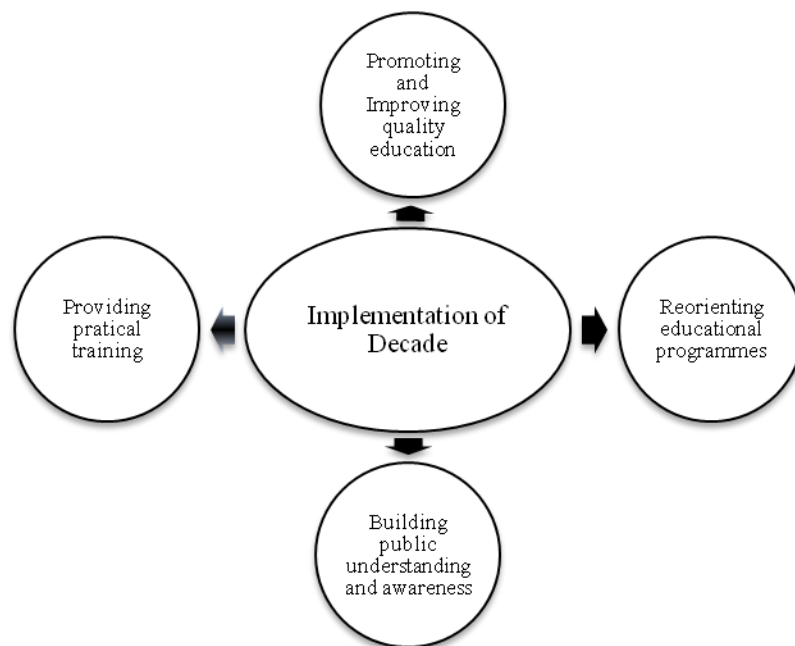


Figure 2: Implementation of the Decade

Promoting and improving quality education reminds us that basic education needs to focus on shared knowledge, skills, values, and perspectives through a lifetime of learning. *Reorienting educational programmes* means rethinking and revising education programs from nursery school to university to improve sustainability. *Building public understanding and awareness* is a means of achieving the goals of sustainable development and encourage active citizenry. *Providing practical training* engages all the sectors develop the knowledge and the skills necessary for sustainability. The challenges were to go beyond environmental education, to draw up an inventory of what exists in the world, to mobilize all the actors and especially the media, to establish partnerships and create synergies between the initiatives and programmes.

The three challenges of ESD

An international implementation scheme was designed. Three challenges were given particular attention: sustainability issues, the role of values, and the links between different United Nations initiatives.

- ***Sustainability issues:*** Education for sustainable development must prepare *"people of all walks of life to plan for, cope with, and find solutions for issues that threaten the sustainability of*

our planet" (UNESCO, 2005a, p. 7). Most of these issues were addressed at the Earth Summit (Rio de Janeiro, 1992) and then redefined at the World Summit on Sustainable Development (Johannesburg, 2002). These include the problem of access to water (source of conflict), the energy issue (more specifically the slow implementation of renewable energies), biodiversity (definition of property rights in the face of bio-piracy activities by major pharmaceutical groups in the South (Vogel and al, 2000), and health (many populations are exposed to malaria and AIDS). In its point 5, the Johannesburg Declaration recalls that all these issues are the responsibility of states, are part of a spatial and temporal scale, and refer to the three pillars of sustainable development - environment, society, and the economy: "*As such, we assume our collective responsibility to advance at the local, national, regional and global levels economic development, social development and environmental protection as independent and complementary pillars of sustainable development*". The action plan, specified in point 11 of the same declaration, specifies that "*the eradication of poverty, the adaptation of consumption and production patterns, as well as the management of the stock of natural resources necessary for economic and social development are key objectives of sustainable development, and are also its preconditions*". The concept of sustainability is both complex and multifaceted (waste management is mixed with the defence of human rights, poverty reduction, population migration, climate change, etc.). To address all these issues, it was necessary to implement innovative educational strategies (to put it bluntly, the aim is educational reform), which could bring about profound changes in citizens' behaviour.

- **Values:** To bring about this change in mentalities and to move into the 21st century, states have to rely on the values that have forged their identity. The challenge of Education for Sustainable Development does not mean making a "clean slate" of history and culture and opposing traditional society to techno-society, but understanding its own values, those of the society in which we live, and those of other societies. This is an essential aspect of education for sustainable development, "*each nation, cultural group and individual must learn the skills of recognizing their own values and assessing these values in the context of sustainability*" (UNESCO, 2005, p. 7). It is difficult to draw up an exhaustive list of values, some of them refer to ideas of justice (human rights, equity, equality), respect (for others, for nature), emotions (sympathy, empathy, apathy), principles (participation, solidarity, precaution, responsibility). In addition, there could be a lengthy discussion on the values that should be introduced into educational programmes. Education for sustainable development emphasizes, above all, the question of the transmission of values, the inter-generational heritage must enable us to identify locally relevant and culturally appropriate values, and is the fourth pillar of sustainable development, culture.

Linking the Decade to other international educational priorities: ESD must be placed among UNESCO's other initiatives. These include the Millennium Development Goals (MDGs), Education for All (EFA) and the United Nations Literacy Decade (UNLD). All these initiatives treat basic education as important, wishing both to extend it to all continents (especially Africa) and to improve its quality.

Table 2: ESD and other international Priorities

Programmes	MDG	EFA	UNLD	ESD
Objectives	8 objectives 1. Eradicate extreme poverty and hunger 2. Achieve universal primary education 3. Promote gender equality and empower women 4. Reduce child mortality 5. Improve maternal health 6. Combat HIV/AIDS, malaria and other diseases 7. Ensure environmental sustainability 8. Establish a sustainable partnership for development	6 objectives 1. Expand and improve all aspects of early childhood care and education. 2. Ensure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality. 3. Ensure that the learning needs of all young people and adults are met through equitable access to appropriate learning and life-skills programmes. 4. Achieve a 50% improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults. 5. Eliminate gender disparities in primary and secondary education by 2005 and achieve gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality. 6. Improve all aspects of the quality of education and ensure excellence of all, so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills.	3 objectives 1. Mobilize a stronger commitment to literacy; 2. Strengthen the effectiveness of the implementation of literacy programmes; 3. Mobilize new resources for literacy.	4 objectives orking, linkages, exchanges and interactions among stakeholders in ESD; Contribute to improving the quality of teaching and learning in education for sustainable development; Assist countries to make progress towards the achievement of the Millennium Development Goals through efforts on education for sustainable development; Provide countries with new opportunities to integrate education for sustainable development into their educational reform efforts.

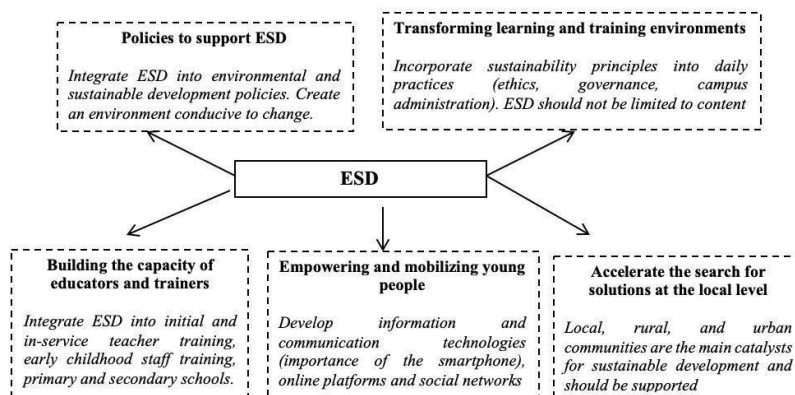
In its 2014 report, UNESCO stated that ESD “*aims at encouraging the transformation of education so that it is able to contribute effectively to the reorientation of societies towards sustainable development... requires participatory teaching and learning methods like critical thinking, imagining future scenarios and making decisions in a collaborative way in order to empower learners to take action for sustainable development*” (2014, p. 20). The report also pointed out that initiatives from south countries had revealed some key points (Khushik, Diemer, 2018) - (i) Education for Sustainable Development has stimulated pedagogical innovation. Education policies (including curriculum reform) have encouraged learning for sustainable development in many countries, from early childhood education to training in the private sector. (ii) Education for Sustainable Development has succeeded in bringing together all levels and fields of education - formal, non-formal, and informal. (iii) Education for Sustainable Development has highlighted the role of stakeholders and partnerships in the implementation of educational programmes.

Issues for ESD

However, these achievements do not exhaust the subject and the challenges to be faced are still numerous: Education for Sustainable Development is not completely integrated into sectoral policies; the place of ESD in early childhood is very heterogeneous across countries (significant gaps in programme accessibility and quality); ECCE (Early Childhood Care and Education) educators do not always have the skills to incorporate ESD into their teaching; much remains to be done to integrate ESD into technical and vocational education and training in both formal and informal contexts; the compartmentalization of disciplines continues to hinder the analysis of complex problems and prevents learners from acquiring the capacity to address complexity; accessibility to ESD in adult learning and education remains difficult, which hinders the dissemination of concepts and practices of sustainable development among adult learners; it is essential to reorient private sector education and training so that education defines the skills needed for critical analysis of the whole system, collaborative problem solving and decision-making. Finally, there is a need to build the capacity of all stakeholders to work in partnership and, in particular, to better understand the social learning process and measures for evaluating and improving outcomes. In 2015, the lessons of the Decade and the challenges ahead guided the Global Action Programme for ESD (resolution 37C/12). Five priority areas for action were identified: (i) policies to support ESD; (ii) a transformation of learning and training

environments; (iii) capacity building for educators and trainers; (iv) youth empowerment and mobilization; (v) accelerating the search for sustainable solutions at the local level.

Figure 3: Priority Action Areas



If these 5 priority areas of action are a call for commitments (over 5 years) from all stakeholders to support the implementation of ESD worldwide, they once again place ESD within a framework of good practice and action in the educational field (UNESCO, 2012). ESD projects focus on a number of criteria such as the needs of populations; the consideration of shared values (cultural and universal); the presence of partnerships from the social and local fabric; the development and dissemination of information and communication through networks, etc. They emphasize a fundamental point of education for sustainable development: the reflective approach. It is an essential component to develop the skills leading to autonomy and responsibility. The reflective approach makes it possible to move forward by regularly looking back, by asking questions such as: does the methodology meet the objectives set? Is it effective? Does it allow the community of actors to be involved? What are the identifiable consequences?

It should be noted that in 2012, UNESCO published a report on good practice in biodiversity education. This underlined an important fact: the educational community increasingly recognized biodiversity education as an essential component of ESD and lifelong learning (2010 was the International Year of Biodiversity in Schools). These good practices in Namibia (Namibia Desert Environmental Education Fund), China (Shangri-la Sustainable Communities Institute), Japan (Regional Centre of Expertise for ESD in the Sendai Metropolitan Area) and Jordan (Royal Society for Nature Conservation) have enabled the involvement of various stakeholders, the creation through networks of a community of learners, the adoption of new norms and behaviors by learners, the transformation of these norms and behaviors into models in the community.

In 2018, UNESCO placed ESD at the heart of the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (United Nations, 2015). The SDGs recognize that all countries should stimulate action in the following key areas - People, Planet, Prosperity, Peace, and Partnership (the Five Ps) - in order to tackle the global challenges that are crucial for the survival of humanity.

ESD is explicitly mentioned in target 4.7: “By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development” (UN, 2015, p. 19). For UNESCO, the five priority action areas are intended to increase the number of countries that have integrated ESD into education and sustainable development policies, and so to catalyse

ESD's capacity to help achieve global commitments (as part of the Paris Agreement on Climate change ESD introduced the Education for Climate Change (ECC)). ESD requires changes in education systems, including strengthening curricula, innovative pedagogies and teacher training, but above all a conceptual and methodological model for transforming education systems.

Conclusion

In an article published in 2013, Patrick Matagne questioned a double rupture (societal and epistemological) between Environmental Education and Education for Sustainable Development. He said that the concept of the environment, initially a disciplinary one, had become "nomadic", enriched by multidisciplinary knowledge, affecting geography and ecology, art and history - Environmental Education had also become polysemous, based on an amalgam of knowledge, practices and values - making it more complex. Education for Sustainable Development is also an education for complexity, but unlike environmental education, it has never been a disciplinary concept. Sustainable development has developed in a context of crisis, around major fields of activity economic, social, political, cultural and scientific - which has increased its complexity. The ESD curriculum often uses both scientific concepts, and many non-scientific references (social consensus, "good practices"), and refers in a recurrent way to the question of values to be transmitted and shared or to the different postures induced by the concepts and representations of the different actors of an educational project oriented towards ESD. Beyond the good practice and guidelines, ESD has to be implemented in education on strong conceptual and methodological foundations. From the conceptual point of view, ESD involves controversial issues, complexity, transdisciplinary, systemic approach, principles, and values. From the methodological point of view, ESD introduces a new framework. The REDOC is an educational model which analyses people's representations, uses pedagogical methodology, proposes didactic tools and suggests new skills. As education seems to be the new vehicle for better sustainability, it is necessary to engage world's citizens in order to change their behavior and accept more responsibility.



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Chapter 4

SDG4 “Quality Education” the cornerstone of the SDGs: Case studies of Pakistan and Senegal

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Arnaud Diemer⁵, Faheem Khushik⁶, Abdourakhmane Ndiaye⁷

Abstract:

In fifteen years, sustainable development has become embedded in national strategies and the reports of major international institutions (OECD, World Bank, UNDP, etc.). It is expressed both in the context of education for sustainable development (UNESCO Decade for education and sustainable development 2005-2014) and in the context of indicators which can measure the progress achieved. The MDGs, and now the SDGs, continue to be the subject of particular attention. States are trying to achieve the targets set by the 17 SDGs by 2030, the UNDP aims to help countries which have difficulty staying on course, and NGOs are working to understand the challenges associated with these new goals. Among the SDGs, SDG 4 Education Quality is of the highest importance. Beyond the fact that education is a key variable in a country's development, SDG4 is positioned as a key factor for change, a change which is more qualitative than quantitative because it assumes that sustainable development (and its education) leads to real changes in individual behaviour.

Keywords: Climate change, Education, MDG, SDG, Poverty

In January 2016, the United Nations officially launched the 2030 Agenda for Sustainable Development. This action program, based on the 17 Sustainable Development Goals (SDGs), presented the main challenges facing the world over the next 15 years. It was to be "a roadmap for individuals and the planet [aimed at] building on the success of the Millennium Development Goals, the famous MDGs and ensuring sustainable economic and social progress throughout the world" (United Nations Report, Foreword by its Secretary-General, Ban Ki-Moon, 2016, p. c2). Unlike the MDGs, which were presented as prescriptions from the North to the South, the SDGs are intended to assess the current global situation, provide an overview through statistical methods and indicators (OECD, 2016), and identify the strengths and weaknesses, constraints and opportunities, specific to each country, and to coordinate efforts by placing them in a global context. The SDGs are neither incentive nor binding (no penalties for countries that did not apply them), they should just be integrated into States' sustainable development policies and national action plans (IDDRI, 2016). However, due to their interdependence, complexity and systemic framework, the SDGs can pose a number of challenges in the implementation of public policies, as highlighted in the latest United Nations report (2017): "This report shows that the pace of progress in many areas is much slower than necessary to achieve the targets by 2030" (United Nations report, Preface by its new Secretary-General, Antonio Guterres, 2017, p. 2).

In this paper, we focus on SDG4 Quality Education, and seek to link it to the other SDGs, in particular SDG1 Poverty, and SDG13 Climate change. The aim is to identify the ambition and "performance" scope of the 17 SDGs, by comparing them to the 8 MDGs and by initiating a discussion on education for sustainable development (with reference to the Decade for education for sustainable development, 2005-2015, launched by UNESCO). This should enable us to

⁵ University Clermont Auvergne, CERDI, CIFEODD Jean Monnet Excellence Center on Sustainability (ERASME)

⁶ University Clermont Auvergne, CERDI, Jean Monnet Excellence Center on Sustainability (ERASME)

⁷ University Clermont Auvergne, CERDI, Jean Monnet Excellence Center on Sustainability (ERASME)

examine the challenges related to SDG4 Education Quality - that is the place of education in primary school, wider and more equitable access to technical and vocational education and training, lifelong learning, and the better living together embodied in the values of sustainable development, but also to identify the main characteristics associated with the SDGs (primary school, low-income countries, developed regions, adult education) as well as the challenges in terms of educational policies (education processes, fundamental knowledge, socio-economic inequalities and gender discrimination).

In this paper, SDG4 will be illustrated via the ESD policies promoted in Senegal and Pakistan, and by placing SDG4 in its systemic and pedagogical dimensions in order to analyse the challenges in terms of educational policies. As such, we will establish links with other SDGs in order to identify the challenges in terms of education for sustainable development, education for climate change and education for citizenship and international solidarity. Our two case studies will use as a common thread, SDG4 and SDG13 with reference to Senegal, and SDG1 and SDG4 with reference to Pakistan.

Finally, this paper aims to question the relevance and operationality of SDGs in order to identify different scenarios in terms of educational policies and education for sustainable development.

1. The long Road to Education for Sustainable Development

In fifteen years, education for sustainable development has succeeded in establishing itself in the educational landscape to the point of generating a profusion of official texts, both national and international, which recommend its implementation (Diemer, Girardin, Marquat, 2015). Resolution 57/254 adopted by the United Nations in December 2002 entrusted UNESCO with the task of leading the United Nations Decade of Education for Sustainable Development (UNDESD). In its international implementation plan for the UNDESD (2005), UNESCO defined education for sustainable development as follows: "*Education for sustainable development is the integration into teaching and learning of key themes of sustainable development, such as climate change, natural hazard prevention, biodiversity, poverty reduction or sustainable consumption. It involves the adoption of participatory pedagogical methods to motivate and empower learners to change their behaviour and become actors in sustainable development*". That is why education for sustainable development promotes the acquisition of skills which enable learners to develop their critical thinking skills, imagine future scenarios, and make common decisions. The authors of the plan did not hesitate to be provocative in concluding that education for sustainable development implied "*a profound change in teaching as it is generally practiced today*". In parallel with this UN initiative, the scientific community mobilized to define, conceptualize and lay the foundations for education for sustainable development (Diemer, Marquat, 2014). We propose here to retrace these two stories to identify the challenges posed by the Sustainable Development Goals (SDGs).

1.1 Education for Sustainable Development, a United Nations Program

In the 2000s, the implementation of "education for sustainable development" in primary, secondary, and higher education programs took place at several levels: international institutions (UN, UNESCO) adopted a series of resolutions; the OECD, through its Commission, designed a general framework of proposals; various states implemented actions to integrate ESD into their national education strategies. Thus, in line with the Brundtland Report (1987) and its definition of sustainable development - "sustainable development is defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs" - ESD was conceived as a political project to promote the vision of sustainable

development and to highlight the role of education in the transition to ESD (Ndiaye, Khushik, Diemer, Pellaud, 2019).

1.1.1 The United Nations Decade of Education for Sustainable Development (UNDESD)

The United Nations Decade of Education for Sustainable Development (2005-2014) - and its corollary, the new Post 2015 Roadmap - has played an important role in popularizing this education in both North (Diemer, Marquat, 2014) and South (Diemer, 2015) countries. The UNDESD completed a series of texts (Chapter 36 of Agenda 21, article 124) adopted at the United Nations Conference on Environment and Development (Rio de Janeiro, June 1992) and the World Summit on Sustainable Development (Johannesburg, September 2002). UNESCO was entrusted with the responsibility of leading this Decade and developing a draft international implementation program. Three areas received particular attention: sustainability issues, the role of values, and the links between different United Nations initiatives.

- Education for sustainable development must prepare "*people from all over the world to forecast, challenge to and find solutions to issues that threaten the sustainability of our planet*" (UNESCO, 2005, p. 7). Most of these issues were addressed at the Earth Summit (Rio de Janeiro, 1992) and then redefined at the World Summit on Sustainable Development (Johannesburg, 2002). These include the problem of access to water (source of conflict), the energy issue (more specifically the slow implementation of renewable energies), biodiversity (definition of property rights in the face of bio-piracy activities by major pharmaceutical groups in the South), and health (many populations exposed to malaria and AIDS).

In point 5, the Johannesburg Declaration recalls that all these issues are the responsibility of States, are on a spatial and temporal scale, and refer to three pillars of sustainable development - environment, society, and economy: "As such, we assume our collective responsibility to advance at the local, national, regional and global levels economic development, social development and environmental protection as independent and complementary pillars of sustainable development". The action plan detailed in point 11 of the same declaration, specifies that "the eradication of poverty, the adaptation of consumption and production patterns, as well as the management of the stock of natural resources necessary for economic and social development are key objectives of sustainable development, and are also its preconditions". The field of sustainability is thus both complex and multifaceted (waste management is mixed with the defence of human rights, poverty reduction, population migration, climate change, etc.). To address all these issues, it would be necessary to implement innovative educational strategies that could bring about profound changes in citizens' behaviour.

- To trigger this change in mentalities and move into the twenty-first century, States had to rely on the values that have forged their identities. The challenge of education for sustainable development does not mean making a "clean sweep" of history and culture, confronting traditional society with techno-society, but understanding a States' own values, those of the society in which we live, and those of other societies. This is an essential aspect of education for sustainable development, "each nation, each cultural group and each individual must acquire the capacity to recognize their own values and to evaluate them in the context of sustainability" (UNESCO, 2005, p. 8). It is difficult to draw up an exhaustive list of values, a certain number of them refer to ideas of justice (human rights, equity, equality), respect (for others, for nature), emotions (sympathy, empathy, apathy), principles (participation, solidarity, precaution, responsibility). In addition, there could be a lengthy discussion on the values that should be introduced into educational programs. Education for sustainable development emphasizes above

all the question of the transmission of values, this intergenerational heritage must enable us to identify locally relevant and culturally appropriate values, which leads to the fourth pillar of sustainable development, culture.

- Education for sustainable development must be placed among UNESCO's other initiatives. These include the Millennium Development Goals (MDGs), Education for All (EFA) and the United Nations Literacy Decade (UNLD). All these initiatives include basic education, wishing both to extend it to all continents (especially Africa) and to improve its quality.

Table 1: Programmes and Goals from UNESCO

Programmes	MDG	EFA	UNLD	ESD
Goals	<p>8 Goals</p> <ol style="list-style-type: none"> 1. Eradicate extreme poverty and hunger 2. Achieve universal primary education 3. Promote gender equality and empower women 4. Reduce child mortality 5. Improve maternal health 6. Combat HIV/AIDS, malaria and other diseases 7. Ensure environmental sustainability 8. Establish a sustainable partnership for development 	<p>6 Goals</p> <ol style="list-style-type: none"> 1. Expand and improve all aspects of early childhood care and education. 2. Ensure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete free and compulsory primary education of good quality. 3. Ensure that the learning needs of all young people and adults are met through equitable access to appropriate learning and life-skills programmes. 4. Achieve a 50% improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults. 5. Eliminate gender disparities in primary and secondary education by 2005 and achieve gender equality in education by 2015, with a focus on ensuring girls' full and equal access to and achievement in basic education of good quality. 6. Improve all aspects of the quality of education and ensuring excellence of all so that recognized and measurable learning outcomes are achieved by all, especially in literacy, numeracy and essential life skills. 	<p>3 Goals</p> <ol style="list-style-type: none"> 1. Mobilize a stronger commitment to literacy; 2. Strengthen the effectiveness of the implementation of literacy programmes; 3. Mobilize new resources for literacy. 	<p>4 Goals</p> <ol style="list-style-type: none"> 1. Facilitate networking, linkages, exchanges and interactions between ESD stakeholders, 2. Contribute to improving the quality of teaching and learning in education for sustainable development, 3. Assist countries to make progress towards the achievement of the Millennium Development Goals through efforts on education for sustainable development, 4. Provide countries with new opportunities to integrate education for sustainable development into their education reform efforts.

ESD is central to UNESCO's initiatives, as it is not limited to the educational field alone. Indeed, it refers to the social, cultural and institutional fabric of each country. It emphasizes the values and principles conveyed by sustainable development. It leads to a profound reform of teaching practices. Finally, it introduces the participation of partners at all levels (local, regional, national, international) and from all spheres (governments, civil society, NGOs, private sector). The concepts of governance and stakeholders thus emerge as the 5th pillar of sustainable development. At the national level, ministries of education provide a policy framework for ESD

(formal education) and mobilize resources (including providing teachers and trainers with the knowledge and information needed to put ESD into practice); NGOs facilitate exchanges on good practices (informal education); the media work to raise public awareness of sustainable development and ESD, etc.

The overall assessment of the actions carried out during the United Nations Decade of Education for Sustainable Development has not yet been made, but initiatives from countries in the South have revealed some key points (UNESCO, 2014).

(i) Education for sustainable development has stimulated teaching innovation. Education policies (including curriculum reform) have encouraged learning for sustainable development in many countries, from early childhood education to training in the private sector. Siraj-Blatchford (2014) referred to the Matarajio project in the Rift Valley (Kenya), which was based on the ecological legacy of Wangari Maathai, an environmental activist and Nobel Peace Prize winner. Children were able to learn and exchange information about environmental issues, while participating in various practical activities on the appreciation, preservation, and management of woodlands. Ackbarally (2013) noted that nearly 250,000 primary and secondary school students in Mauritius were learning about climate change and the environment. Finally, higher education is not to be outdone, the regional network Integration of Environment and Sustainability into the African University Partnership Program (MESA) brings together 77 African universities in 32 African countries.

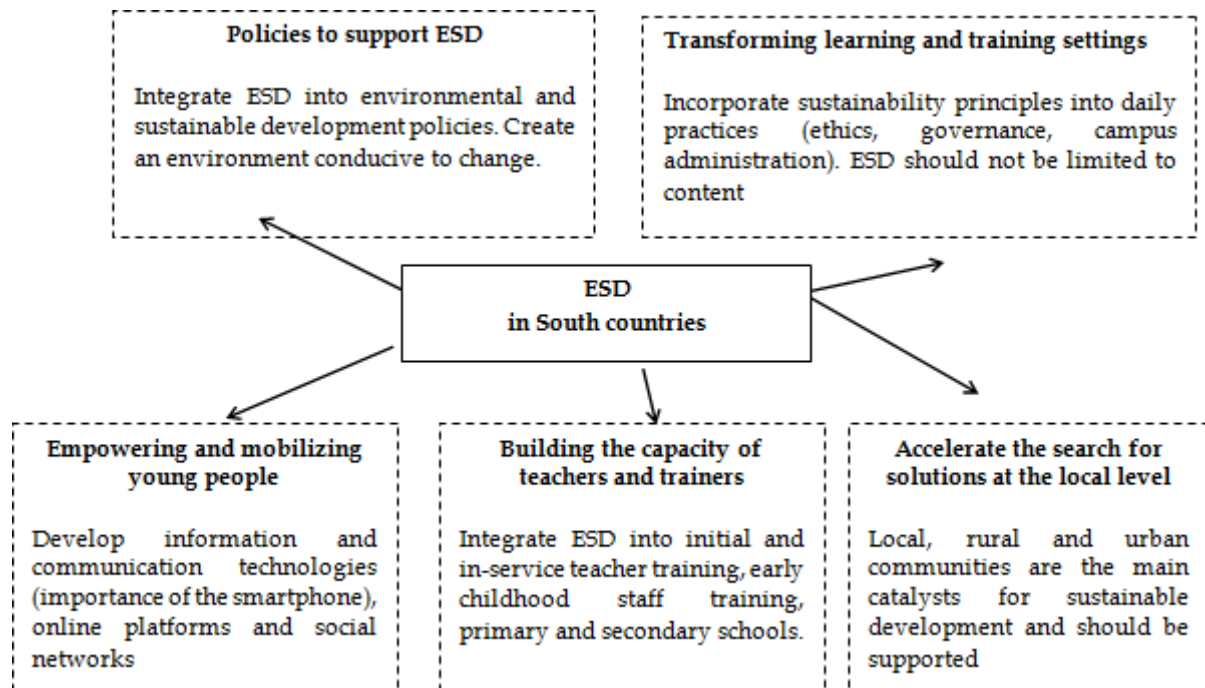
(ii) Sustainable development education succeeds in investing and bringing together all levels and fields of education, particularly between formal, non-formal, and informal education. Tostan (2013) described the Solar Power project, carried out by the NGO Tostan in Africa, which empowers rural women to go to the "Barefoot College" for a training program in solar energy engineering. On their return, these women can train other women from neighbouring communities, so multiplying the effects of the program (58 solar engineers trained) and giving each of them a livelihood. Through this project, women have a renewable energy source and are becoming entrepreneurs in their communities, which helps to strengthen community-led development (452 solar panels installed in 9 villages in Senegal).

(iii) Development education has highlighted the role of stakeholders and partnerships in the implementation of educational programs. In the public sector, the Government of Mongolia and the Swiss Department of Development and Cooperation have signed a cooperation agreement to promote a sustainable future through ESD. This project involves 752 schools, teacher training institutions, and departments of education - 500,000 children and 26,000 teachers are involved in the project (SDC, 2013).

1.1.2 The 2015 Roadmap, a global action program for ESD

The lessons of the Decade and the challenges ahead have guided the Global Action Program for ESD (resolution 37C/12). Five priority areas for action have been identified: (i) policies to support ESD, (ii) transformation of learning and training settings, (iii) capacity building for teachers and trainers, (iv) youth empowerment and mobilization, (v) accelerating the search for sustainable solutions at the local level.

Figure 1: Priority action areas



While these 5 priority action areas constitute a call for commitments (over 5 years) from all stakeholders to support the implementation of ESD worldwide, they place ESD in a framework of good practice (UNESCO, 2012). In other words, ESD is still descriptive and no methodological framework seems to be proposed, although the issue of SD themes, values and skills is at the forefront.

1.2 Education for sustainable development, a theoretical framework?

It is difficult to design a universal framework for education for sustainable development, as each country must define its own objectives, priorities, program of action, and assessment method. Economic, environmental, social, religious, and cultural conditions are such that ESD can take different forms. Nevertheless, it is possible to specify the essential characteristics of education for sustainable development and to define the contours of its theoretical framework. ESD is a complex issue and the way it is implemented is a challenge for all countries. In the following, we would like to set out a methodological framework for ESD (Diemer, Girardin, Marquat, 2015).

1.2.1 ESD and the concept of “education for”

In recent years, *education for* has entered our educational system. This phenomenon has become so widespread, in France and Europe, that the list continues to grow (environmental education, media education, health education, biodiversity education, climate change education, etc.) as a result of incursions into inter- or trans-disciplinarity. How can such a craze be explained?

Is this a fashionable phenomenon or is it a real desire to transform our education system? Lebeaume (2004), Lange and Victor (2006), Simonneaux (2006), Legardez and Alpe (2013), Lange (2015) do not hesitate to oppose *education for* to traditional teaching. Unlike the latter, which refers to compartmentalized disciplinary content (scientific knowledge is stabilized) and place the teacher at the heart of knowledge transmission, *education for* which is based on the

knowledge of the various actors in formal/informal education, proposes to build a model of social and ethical competencies, uses a trans-disciplinary approach (Diemer, 2014), and aims at a critical and committed pedagogy in action (Diemer, Marquat, 2014; Diemer, 2015). Legardez and Alpe (2013) have specified the four important features of this difference from classic education: their thematic, non-disciplinary and "transversal" nature (according to the terminology of the French Ministry of Education); their close relationship with socially lively issues; the important place they give to values; and their objective of changing behavior, to prepare for action. This flourishing of education has challenged our relationship to teaching and education and is a real challenge for institutions in charge of teacher training. Education for sustainable development would imply nothing less than a fundamental change in teaching as it is generally practiced today.

1.2.2 ESD as a conceptual framework

ESD has a conceptual framework (Diemer, 2013; Diemer, Ndiaye, Khushik, Pellaud, 2019) characterized by societal challenges (also referred to as controversial issues); an introduction to Systems Thinking, a Transdisciplinary approach; 5 pillars of sustainable development (environmental, social, cultural, economic, governance); spatial and temporal scales; a system of values and broad principles (responsibility, precaution, participation, solidarity).

(i) ESD includes a growing list of societal issues (biodiversity, climate change, energy, water, production and consumption patterns, food, human rights, human health, governance, urbanization, sustainable mobility, etc.). ESD is integrated into many global frameworks and conventions: Article 6 "Education, training and public awareness" of the United Nations Framework Convention on Climate Change (1992); Article 13 "Public education and awareness" of the Convention on Biological Diversity; point 18 "Education and training" of the Hyogo Framework for Action 2005 - 2015 for Disaster-Resilient Nations and Communities; and the 10-year framework of programs on sustainable consumption and production 2012 - 2021 "Lifestyles and sustainable education".

(ii) ESD introduces Systems Thinking. A complex situation requires a global vision of the context, which means considering all the factors involved in the problem being addressed, while placing the problem within a broader framework (Morin, 2005). Complexity introduces the notions of interactions, interference, and uncertainty. ESD involves the use of Systems Thinking that focuses on interacting elements (feedback loops) and irreversible processes (time delays).

(iii) ESD requires a transdisciplinary approach. Education for sustainable development is fuelled by the explosion of disciplinary research (importance of fundamental knowledge related to sustainable development), advocates openness between disciplines (interdisciplinarity), and advocates research to bring knowledge together between disciplines (transdisciplinarity). Transdisciplinarity is situated both between disciplines, across disciplines, and beyond disciplines (Nicolescu, 1996). It is supposed to construct its own content and methods in order to capture a multidimensional reality, structured at multiple levels (Piaget, 1972).

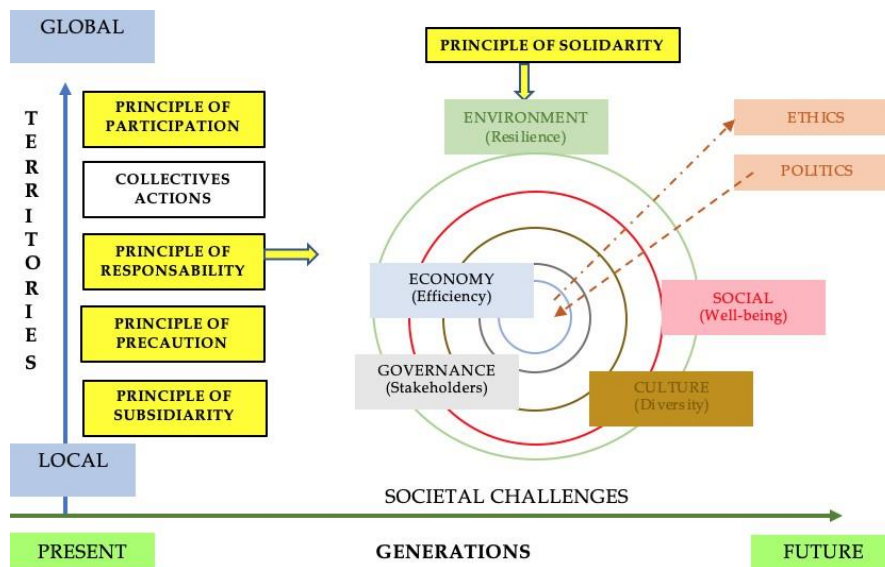
(iv) ESD is based on the 5 pillars of sustainable development. In addition to the three well-known pillars of the Brundtland Report (environmental, social and economic), the cultural and governance pillars are to be added. Culture, and more specifically cultural diversity (UNESCO, 2001, 2005), plays an important role in the understanding, acceptance, and diffusion of sustainable development. This means the need to apply a culturally sensitive education model, so that local populations can both take ownership of ESD and contribute to its enrichment. Governance introduces the notion of stakeholders (Freeman, 1984). It rehabilitates the

intentionality (competence to act) and justifications of actors in a reciprocal determination of doing and saying (Boidin & al, 2014).

(v) ESD is part of spatial and temporal scales. Time introduces the generational effect (this is the definition in the Brundtland report) but also looks at the past (refusal to forget), and the future (forward-looking approach, scenarios). The global must be connected to the local based on the principle of subsidiarity (this point is particularly important when talking about territories and the enhancement of indigenous knowledge).

(vi) Finally, ESD is based on a system of values and broad principles (sustainability). These values (respect for the environment, empathy, respect for others, self-esteem, etc.) should make it possible to empower individuals, to train responsible citizens (education for eco-citizenship) to be capable of projecting themselves into the future, to become involved in a genuine social project, to understand the full complexity of the socio-economic, ecological, cultural, and ethical factors that determine the entire sustainability of development (UNESCO, 2009). Principles such as responsibility, solidarity, precaution, and participation now define the philosophy of sustainable development.

Figure 2: Sustainability Framework



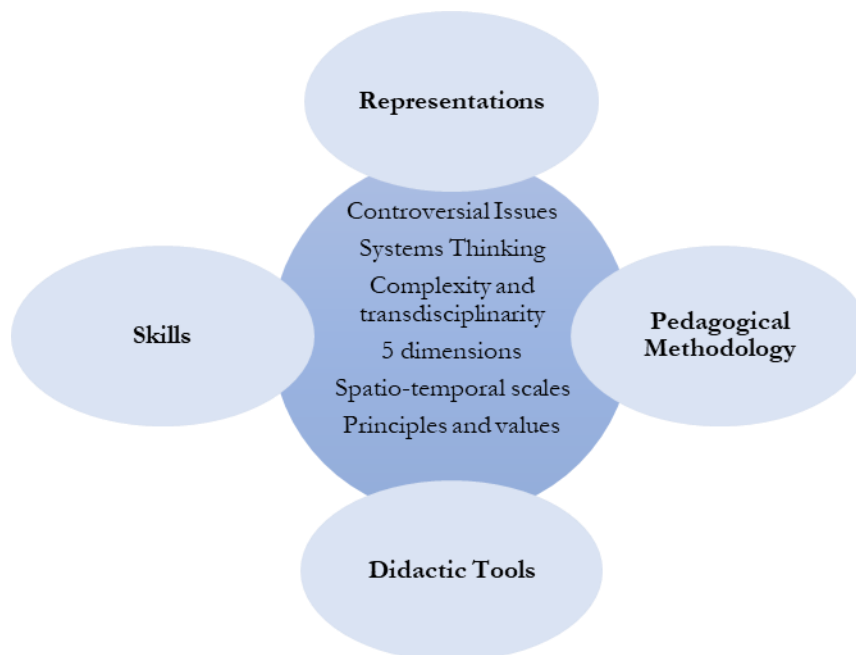
Source: Diemer (2011, 2012, 2013, 2015)

From this conceptual framework, it is possible to propose a methodological framework for integrating ESD into a learning process.

1.2.3 ESD as a methodological framework

In the following, we seek to identify a methodological framework for education for sustainable development. This framework has been associated with a model called REDOC for Representations, Pedagogical Methodology, Didactic Tools and Skills (Diemer, Marquat, Bigohe, 2014; Diemer, Kerneis, Marquat, 2014; Diemer, 2015; Diemer, 2017).

Figure 3: REDOC Model

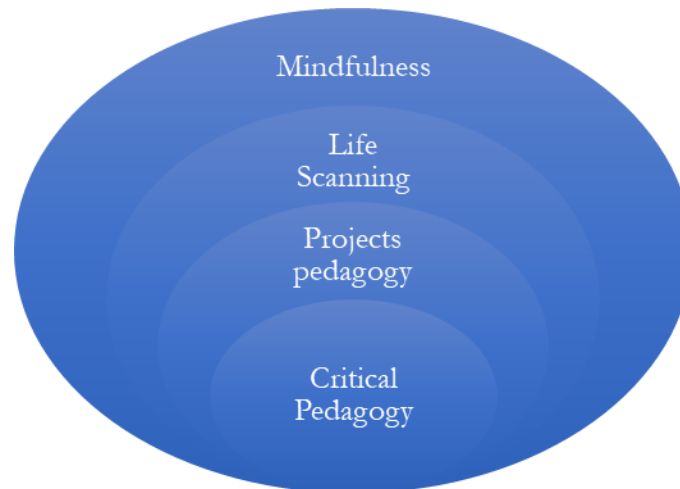


Source: Diemer, Marquat, Bigohe (2014)

“Representation” is the first step in the model. Representation refers to the mental elements that are formed by our actions and that inform our actions. It is characterized by a process of construction and functioning which is distinct from other ways of thinking (Danic, 2006). The notion of (social) representation includes a certain number of features such as symbolism, imagination, cognition, action and interaction, etc. : "Social representation is a process of perceptual and mental elaboration of reality that transforms social objects (persons, contexts, situations) into symbolic categories (values, beliefs, ideologies) and confers on them a cognitive status allowing them to grasp aspects of ordinary life by reframing our own behaviours within social interactions" (Fischer, 1987, p. 118). The aim is to bring out the representation of sustainable development held by teachers, pupils and citizens by using different techniques such as questionnaires, interviews, focus groups, or speech analysis by software such as TROPES.

- Pedagogical methodology is the second step of the model. There is a broad consensus that the pedagogical practices of education for sustainable development are based on the teacher's active construction of his or her own skills (Vygotsky, 1934; Piaget, 1937; Meirieu, 1987, Astolfi, 1997...). Socio-constructivism is a relevant theoretical framework for studying ESD (Doise and Mugny, 1981; Cole, 1991). Each teacher builds his or her own knowledge, skills, attitudes and values in a socialized context (family, village, friends, colleagues, working conditions, social, etc.). ESD invites us to pay particular attention to cultural and educational contexts in cognitive processes. It is this concern for "global thinking, acting locally" that has led us to focus on the following 4 pedagogical modalities (Diemer, Claveau, Marquat, Montéro, 2016) for ESD: Critical pedagogy (Freire, 1974), Project-based pedagogy (Hubert, 1999), Exploration of the living environment (Life scanning (Sauve, 1997), and Mindfulness (Hant Thich Nhat, 2011).

Figure 4: Interactive and complementary methodologies in Education for Sustainable Development



Source: Claveau, Diemer, Montero, Pellaud (2016)

The use and design of teaching tools is the third step of the model. ESD uses innovative tools which enable teachers to interact with their students e.g. photography, storytelling, comic strips, theatre, discussions, and mind mapping of controversial issues are interactive tools which make it possible (i) to collect learners' representations (to “free up” speech and facilitate exchanges during focus group sessions), (ii) to identify tools which resonate with local practices, (iii) to analyse the possibilities for integrating the tools into a phase of accompanying learners in Education for Sustainable Development.

- The last step of the REDOC model addresses skills, a fundamental issue in education for sustainable development. Several of the competences targeted by ESD are derived from the key competences of the education framework, namely acting autonomously, interacting with one's environment, interacting effectively with others, etc. UNESCO's work on competences is based on the report *Learning: the Treasure Within* (1996), which contains the following pillars: (i) learning to know, (ii) learning to do, (iii) learning to be, (iv) learning to live together, (v) learning to transform oneself and society. Of course, each country will seek to give priority in its education system to skills that are consistent with its cultural, social, environmental, and economic specificities. However, there are skills which are related to the pedagogical objectives and modalities of ESD: critical analysis (ability to ask questions, seek answers, debate, choose, argue), systemic thinking (ability to analyse and understand complex situations, to accept several points of view and partial solutions), transdisciplinary approach (ability to mobilize several fields of knowledge, the know-how to connect and discuss them), collaborative decision-making (know-how to collectively build an optimal solution for all, get stakeholders to converge, develop a common vision of a project), a sense of responsibility (act responsibly, ability to assume responsibilities and take charge of missions). It should be noted that in all these skills, there is an interaction between mobilized knowledge, attitudes, and values.

1.2.4 ESD, a matter of good practices and field actions

Beyond the purely theoretical question, it should be recalled that education for sustainable development refers both to good practices (UNESCO program) and to actions in the field. ESD

projects focus on a number of criteria such as the needs of populations, a consideration for shared values (cultural and universal), the presence of partnerships from the local society, the development and dissemination of information and communication through networks. They emphasize a fundamental point of education for sustainable development: the reflective approach. It is an essential component for developing the skills leading to autonomy and responsibility. Reflexivity is "the subject's ability to consider his own activity in order to analyze its genesis, processes or consequences, in other words, the practice of reflexivity constitutes the possibility for any social actor to examine his situation and his action" (Bertucci, 2009). This practice makes it possible to move forward by regularly looking back, by asking questions such as: Does the approach meet the objectives set? Is it effective? Does it allow the community of actors to be involved? What are the consequences?

2. ESD in Pakistan and Senegal

While education for sustainable development - through UNESCO's programs - has spread widely in both the North and the South, national programs have not always made ESD a priority in education policy. Teacher education remains a key variable for the implementation of ESD, and in the absence of a real willingness of teacher education institutions to integrate ESD into teacher training program, little real progress has been made.

This is the case, in particular in Pakistan, which has seen the implementation of scattered initiatives such as the UNESCO Associated Schools Network (ASPnet), courses on ESD as part of master's program (Educational Sciences), the spontaneous participation of a few universities (e.g. University of Punjab in the International Network of Teacher Training Institutions. More than 60 ASPnet schools have developed peace and sustainable development education programs to share contextualized knowledge on respect and cultural diversity with teachers, students, parents, and the community at large. A pedagogical initiative on ESD was proposed by the Institute of Education, Lahore College for Women University (Kalsoom & Khanam, 2017). The objective of this program was to raise awareness among student teachers of the concepts of Sustainable Development (SD) and Education for Sustainable Development (ESD) in order to strengthen their awareness of the notion of sustainability. As part of this initiative, undergraduate student teachers carried out 11 weeks of local work. This work included field surveys on sustainability issues (effect of socio-economic context on education, challenges faced by female students in higher education, environmental awareness of pre-service teachers, culture of teacher training institutions).

Although there are individual or institutional efforts related to the implementation of ESD in teacher education, ESD is only tentatively entering Pakistan's education policy. The analysis of various documents such as education policy (Government of Pakistan, 2009), provincial education sector plans (Government of Balochistan, 2013, Government of Punjab, 2013-2017), the B.Ed. Honors curriculum (Higher Education Commission, 2012) or national professional standards for teachers (Ministry of Education, 2009), do not reveal education for sustainable development as a national priority. This virtual absence of ESD in national systems contrasts with initiatives on other topics. For example, environmental education, economics, human rights and citizenship have been included in the B. Ed. curriculum. Civic responsibility, social cohesion and tolerance are mentioned in national education policy, the education sector plan and national professional standards (Diemer, Khushik, 2020).

According to Kalsoom, Qureshi and Khanam (2018), this low emphasis on ESD has generated two types of problems: (i) the knowledge of student teachers of sustainability issues and their attitudes and behaviours towards sustainability fall short of expectations; (ii) a lack of research on ESD-related issues. Kalsoom, Qureshi and Khanam (2018) analysed a database of ESD-related research-based articles written by Pakistani authors. The databases consulted were Springer, Taylor and Francis, as well as 4 national education journals. They found more than 2,500 articles on ESD, but no empirical studies on ESD have been conducted by Pakistani authors. They analysed 353 articles that were published in national journals from 2004 to 2016 and concluded that no articles had been published on ESD. Pakistani researchers would appear to have little or no exposure to research related to the concepts of sustainable development and education for sustainable development.

The history of ESD in Senegal is different from Pakistan. Senegal's commitment to taking into account the protection of the environment and natural resources is demonstrated, on the one hand, by its adherence to most international environmental treaties and conventions, and on the other hand by the adoption of the first Environment Act in 1983 (Act No. 83-05 of 28 January 1983). As environmental concerns became more complex, Senegal tried to adapt by reviewing the legal environment and by adopting a new environmental law in 2000: Law No. 2001 - 01 of 15 January 2001. In this text, there is a clear national desire to make education a lever, a means of addressing environmental challenges.

Article L 7 of the said code clearly states: "The State guarantees all citizens the right to environmental education. In this context, public and private institutions responsible for teaching, research, or communication must participate in the education, training, and awareness-raising of populations on environmental issues: by integrating into their activities programmes to ensure a better knowledge of the environment; by promoting the capacity building of environmental actors".

Following the Paris Conference and the launch of the Sustainable Development Goals (SDGs), Senegal launched a draft constitutional law in April 2016 to reiterate its commitment and willingness to pursue its economic development with concern for the environment, while making education the pillar of this strategy. On 13/06/2016, following a referendum, Senegal included the concept of sustainable development in its constitution for the first time, as can be seen in the articles below:

Art. 3 - An article 25-1, 25-2 and 25-3 are added after article 25 of the Constitution, as follows

Art. 25-1. - Natural resources belong to the people. They are used to improve their living conditions. The exploitation and management of natural resources must be transparent and in such a way as to generate economic growth, promote the well-being of the population in general and be environmentally sustainable.

Art. 25-2. - Everyone has the right to a healthy environment.

The defence, preservation, and improvement of the environment is the responsibility of the public authorities. Public authorities have an obligation to preserve, restore essential ecological processes, provide for the responsible management of species and ecosystems, preserve the diversity and integrity of genetic heritage, require environmental assessment for plans, projects

or programs, promote environmental education and ensure the protection of populations in the development and implementation of projects and programs with significant social and environmental impacts.

Art. 25-3 Every citizen has the duty to preserve the country's natural resources and environment and to work for sustainable development for the benefit of present and future generations.

The will to use schools to provide solutions to environmental problems, and to move towards sustainable development, is very real. Already in 2000, Senegal hosted the World Education Forum. The Dakar Framework is the collective expression of the international community to act to achieve the goals and objectives of universal education for all in a sustainable manner.

At the sectoral level, the Ministry of the Environment has set up the CEFE: The Environmental Education and Training Unit. It is the logical extension of the Environmental Training Program (ETP), the primary education component of the Sahel Education Program (PES), funded by the European Union by a grant for the decade 1990-2000. In the same year, the Ministry of National Education launched the PDEF, the Education and Training Development Program. In 2005, this was followed by a redesign of the programs through a skills-based approach in which the environment and sustainable development are present. This was also during the United Nations Decade for Sustainable Development, when Senegal was strongly committed to UNESCO, the leader of this program.

The Senegalese educational guide for elementary education has integrated education for sustainable development into the basic education curriculum (Ministry of National Education, 2015). It is a sub-domain (like the discovery of the world) of the field of Education for Science and Social Life, subdivided into two components: living in one's environment, and living together. The guide emphasizes interdisciplinary competence, which aims "to integrate basic concepts, preventive measures, observation techniques and good behavioural habits in situations of human relations and practical solutions to problems related to the environment and living conditions in the immediate environment" (2015, p. 316). The pedagogical approach is centred around 4 interdisciplinary levels (level 1: adapt interdisciplinary competence to disease and hygiene problems) and 4 integration situations of these same levels (level 1 integration situation: one-off learning and integration learning).

The sub-domain "living in one's environment" is broken down into basic skills and criteria (relevance, accuracy, exhaustiveness, conformity, feasibility), and appropriation of the competence (meaning, components). In practice, this means training students to observe their environment, identify problems, and propose appropriate solutions. Competence emerges in situations where students propose appropriate solutions to problems in the immediate environment.

The sub-domain "living together" repeats this same dichotomy, but it is a question of familiarizing students with the fact that they are attentive to the problems which arise from human relationships within their environment (circle of friends, classmates, games) and proposing fair solutions. It is also about promoting good behaviour towards others (parents, adults, elders, friends, classmates). Competence manifests itself in situations where the student adopts or proposes good behaviours.

2. When Sustainable Development interacts with Education for Sustainable Development, the challenges of SDGs, while UNESCO is now associated with education for sustainable development (ESD), it should be recalled that ESD's origins date back to the early 1970s with the Stockholm Conference and the popularization of the concept of eco-development (Diemer, 2015; Berr and Diemer, 2016). However, ESD only gained real recognition at the United Nations Conference on Environment and Development (UNCED), better known as the Earth Summit (Rio de Janeiro) in 1992). At the end of the various negotiations, UNCED published Agenda 21, which proposed a detailed plan of action at the global, national, and local levels for United Nations agencies, governments, major non-governmental and civil society organizations, and networks to reduce the effects of human activity (UNESCO, 2009, p. 7). Following the publication of Agenda 21, a number of international institutions embarked on the path of sustainable development and its education.

Since 2005, the OECD has been offering a range of work in 6 main themes: sustainable consumption and production, climate change and sustainable development, sustainable trade and foreign investment, subsidy reform and sustainable development, education for sustainable development, and environment and health. From an organizational point of view, the OECD has developed a tool, the RAEDD (Annual Meeting of Sustainable Development Experts), which aims to "encourage the integration of sustainable development issues into the activities of OECD committees, share best practices of OECD member countries in sustainable development strategies and engage with non-member countries" (OECD, 2011, p. 4). More specifically, with regard to the theme of education for sustainable development, the OECD has focused on "assessing learners' knowledge of environmental issues, identifying the influence of education on behaviour and determining the conditions necessary for the development of appropriate learning environments" (OECD, 2011, p. 66). The Education Policy Committee (EPC) oversees the overall direction of the work on education for sustainable development.

The EPC focuses on sustainable school facilities, innovative learning environments, the role of higher education in sustainable development, learners' understanding of the impact of environmental concerns, and improving social outcomes through education. Various committees and working groups have contributed to the thinking on ESD.

- The Centre for Effective Learning Environments (CELE) focused on the physical learning environment by exploring how to develop sustainable educational facilities, the cost/benefit ratio of such facilities, and how they support teaching and learning activities.

- The Program on the Management of Higher Education Institutions (IMHE) has carried out a project on higher education and the development of cities/regional areas. These include the contribution of higher education (HEI) research to regional innovation, the role of teaching and learning in the development of human capital and skills, the contribution of HEIs to social, cultural and environmental development, and the role of HEIs in building regional capacity to operate in an increasingly competitive global economy (OECD, 2009). The Higher Education for Sustainable Development report (2010) presented the results of an international study on how higher education institutions are addressing sustainable development.

- The Program for International Student Assessment (PISA) assessed 15-year-olds enrolled in an educational institution internationally. The evaluation carried out in 2006 served as the basis for the report *Green at Fifteen? How 15 years Old perform in environmental science and geoscience*

in Pisa 2009. The latter presents an analysis and information on the factors that raise students' awareness of environmental sciences, their attitude towards the environment, and the correlation between this attitude and environmental science results. In conclusion, the report notes that education systems must improve their performance to ensure that, in all sectors of society, future citizens can exploit their potential to understand environmental issues.

- In 2008, the OECD set up a workshop on education for sustainable development. This horizontal program on sustainable development was organized in cooperation with the Directorate of Education and the Division for Consumer Policy and the Directorate of Science, Technology and Industry. It has made it possible to identify and widely disseminate to organizations and countries good practices concerning national strategies, curricula, and school practices in education for sustainable development (education and awareness-raising on sustainable consumption and production).

- The Centre for Educational Research and Innovation (CERI) has launched a project to study the characteristics and effectiveness of new learning environments and their contribution to sustainable development.

In its Education at a Glance report (2014), the OECD highlighted the essential role that education and skills play in promoting social progress.

In 2015, the United Nations General Assembly (UN) adopted the final document "Transforming our World, the Agenda for Sustainable Development to 2030" devoted to the adoption of the post-2015 development agenda. This sustainable development program was presented as an action plan for humanity, the planet, and prosperity. The eradication of poverty in all its forms and dimensions was seen as the great challenge facing humanity (UN resolution, General Assembly of 25 September 2015). The 17 sustainable development goals (SDGs) and 169 targets today reflect the scope of this new program and its ambition. They also raise the question of the place of education, and in particular education for sustainable development, in anti-poverty programs.

2.1 Philosophy and usability of SDGs

The ambition and scale of the United Nations sustainable development agenda for 2030 leaves no doubt. The SDGs are a follow-up to the Millennium Development Goals (MDGs), both to build on their success and to go beyond them.

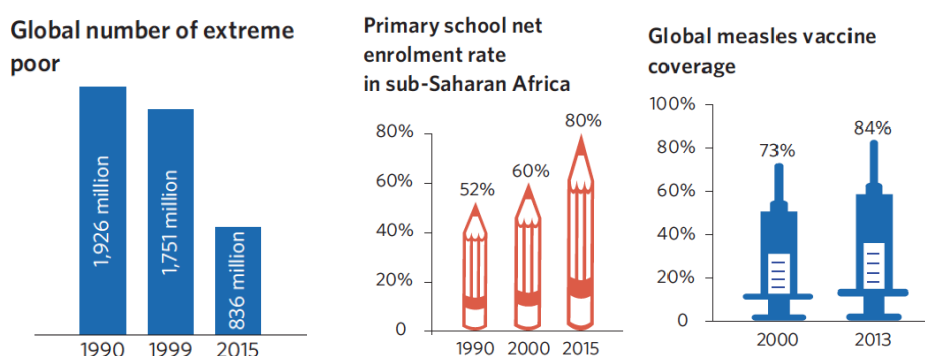
Figure 5: From MDGs to SDGs



Source: United Nations (2015, 2018)

- Build on success - because the MDGs led to progress in several important areas (UN report, 2015). Goal 1 aimed to eradicate extreme poverty and hunger. In 2015, 14% of the population in developing countries lived on less than \$1.25 a day, compared to nearly 47% in 1990. Globally, the number of people living in extreme poverty has more than halved, from 1.9 billion in 1990 to 836 million in 2015. Goal 2 aimed to achieve universal primary education. The number of out-of-school children of primary school age has halved worldwide, from 100 million in 2000 to 57 million in 2015. In developing regions, the net enrolment rate in primary education reached 91% in 2015 compared to 83% in 2000. Goal 3 promoted gender equality and the empowerment of women. In all developing regions, the target of eliminating gender disparity in primary, secondary and tertiary education has been achieved. In South Asia, 74 girls attended primary school for every 100 boys in 1990. In 2015, 103 girls were enrolled for every 100 boys. Goal 4 focused on reducing under-5 mortality. The under-5 mortality rate dropped from 90 to 43 deaths per 1000 live births between 1990 and 2015. Nearly 84% of children worldwide received at least one dose of measles vaccine in 2013, up from 73% in 2000.

Figure 6: Millennium Development Goals



Source: United Nations Report (2015)

Goal 5 aimed to improve maternal health. The maternal mortality ratio decreased from 380 to 210 deaths per 1000 live births between 1990 and 2013. The number of births worldwide attended by skilled health personnel increased from 59% to 71% between 1990 and 2014. Goal 6 aimed to combat HIV/AIDS, malaria and other diseases. New HIV infections fell by 40% between 2000 and 2013 to 2.1 million cases. More than 6,200,000 malaria deaths were prevented between 2000 and 2015, mainly among children under five in sub-Saharan Africa. Goal 7 aimed to ensure environmental sustainability. In 2015, 91% of the world's population used an improved drinking water source compared to 76% in 1990. The proportion of the urban population in developing regions living in slums increased from 39.4% in 2000 to 29.7% in 2014. Goal 8 aimed to establish a global partnership for development.

The amounts that developed countries have spent on official development assistance increased from 81 billion to 135 billion between 2000 and 2014 (an increase of 66%). The number of mobile phone subscriptions increased tenfold, from 738 million in 2000 to 7 billion in 2015.

Go beyond them - because despite these successes, progress has been uneven across regions and countries, resulting in significant gaps. (i) Gender inequalities persist. Despite declining poverty rates in Latin America and the Caribbean, the proportion of women to men in poor households has increased from 108 women per 100 men in 1997 to 117 women per 100 men in 2012. Women face discrimination in access to work, economic assets and participation in decision-making. (ii) Climate change and environmental degradation tend to undermine progress, and it is

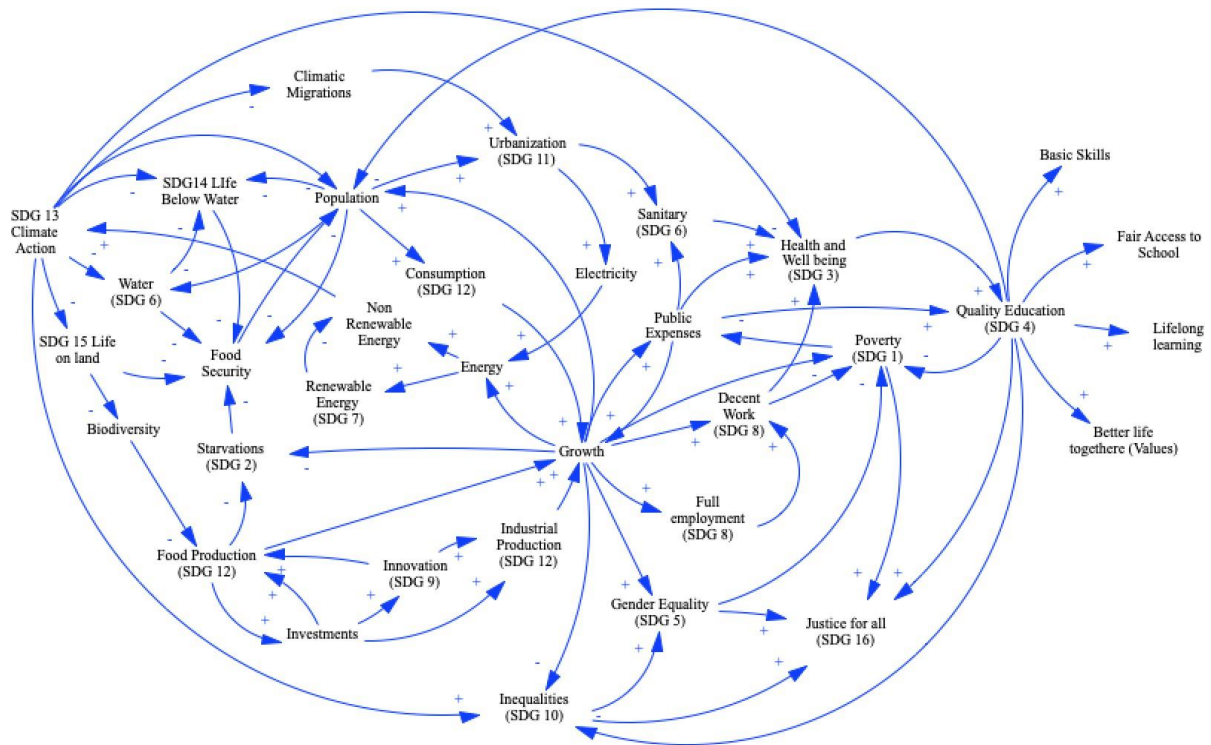
the poorest who suffer. Water scarcity affects 40% of the world's inhabitants. Global carbon dioxide emissions doubled from 1990 to 2015. (iii) Conflict is still the main threat to human development. By the end of 2014, conflicts had forced nearly 60 million people to abandon their homes. (iv) Millions of people still suffer from hunger and lack access to basic services. 800 million people continue to live in extreme poverty. 57 million school-age children are not in school.

In a way, both in substance and in form, the SDGs are different from the MDGs. Unlike the MDGs, which presented themselves as prescriptions from the North to the South (see the report *Taking Stock of the global Partnership for Development*, 2015), the SDGs concern countries in the North and the South. According to the FAO (2015), they offer a vision of a more just and prosperous world. They should make it possible to assess the current global situation, provide an overview through statistical methods and indicators (OECD, 2016), and identify the strengths and weaknesses, constraints and opportunities, specific to each country, to coordinate everyone's efforts by placing them in a global context. The SDGs are neither incentives nor binding (no penalties for countries that do not apply them), they should just be integrated into States' sustainable development policies and national action plans (IDDRI, 2016). However, the word "just" hides a major difficulty, because of their interdependence, complexity and systemic framework, the SDGs pose a number of problems in the implementation of public policies. Thus, and in accordance with the principles of sustainable development, the 17 SDGs are indivisible (tackling the threat of climate change influences the way we manage our natural resources; achieving gender equality or better health helps to eradicate poverty, consolidating peace reduces inequalities and contributes to flourishing economies), and it is as such that they must be analyzed and learned from over the long term.

Systems dynamics (Forrester, 1968) or System Thinking (Meadows, 2008) can be used to understand the links and interdependencies between the different SDGs (SDG 17 Systemic issues seems relevant to integrate SDGs). Positive loops amplify the system (exponential logic), so that if agricultural production increases, it increases growth, which reduces famine, which reduces poverty. Negative loops regulate the system. Less poverty increases the quality of education, which in turn reduces inequalities. This depiction of the SDGs shows that it is difficult to anticipate the effects of a public policy, especially one designed to improve the benefits of education, and it helps to understand the scenarios behind each measure. Thus, the quality of education seems to depend on poverty reduction, which in turn depends on economic growth. In the case of developing countries, this increase in growth may be at the expense of responsible consumption (this is one of the main findings that can currently be made in these countries, which are not yet able to meet the goals of SDG12).

Finally, the SDGs include global environmental issues (Agenda 21 and the 3 international conventions on climate, biodiversity and desertification) which were not part of the MDGs. Thus, the SDGs place climate change at the heart of the sustainable development debate and make UNDP the leader of sustainable development within the United Nations.

Figure 7: System Thinking and SDGs



Source: Diemer, Ndiaye, Khushik (2017)

The United Nations resolution and the launch of the sustainable development program (SDG) for 2030 coincided with another historic agreement, reached in 2015 at the Paris Conference on Climate Change (COP21). The Paris agreement with the Sendai Framework for Disaster Risk Reduction, ratified in Japan in March 2015, define a set of common standards and achievable targets for reducing carbon emissions, managing risks related to climate change and natural disasters, and building resilience capacities (Aubert & al, 2017).

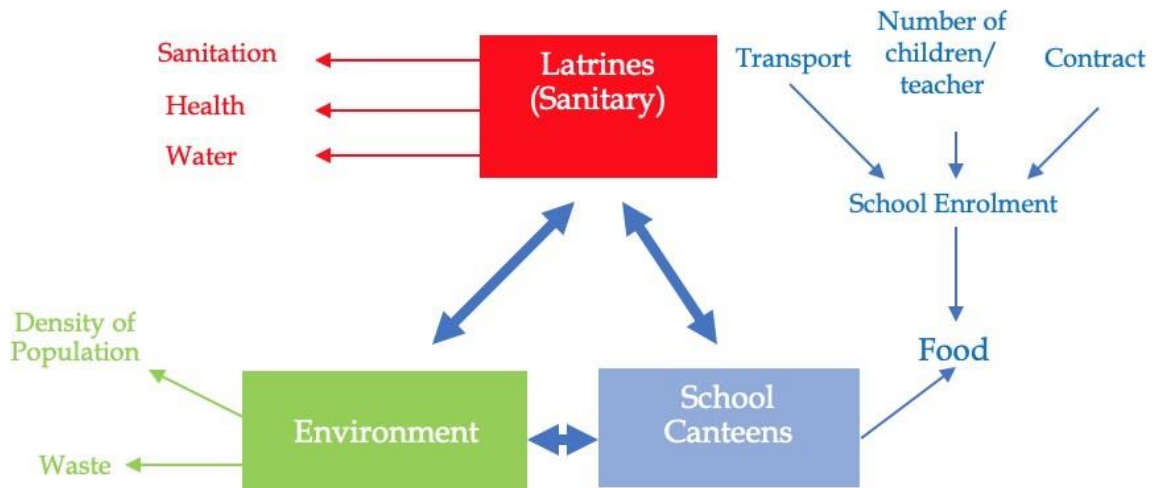
The SDGs, which came into effect in January 2016, guide UNDP policies and funding for the next 15 years. As a result, UNDP is uniquely positioned to contribute to the implementation of the SDGs through its activities in 170 countries and territories. Its strategic plan focuses on key areas, including poverty reduction, democratic governance and peacebuilding, climate change and the risk of natural disasters, and economic inequalities. UNDP supports governments in integrating the SDGs into their national development policies and projects. Through these previous development initiatives, UNDP has gained valuable experience and political expertise to support developing countries in achieving the targets set by the SDGs for 2030.

2.2 SDG and Education, the perspective of SDG 4

Education for sustainable development, and the skills implied, is based on major issues which are relevant for most developing countries: health (associated with sanitation, access to water, and access to health services), the environment (associated with population density in urban areas and waste), and food (provision of school canteens). These societal challenges are then integrated into the basic curriculum of the main national program (e.g. Senegal's pedagogical guide) and the SDGs, thus introducing a final issue, education (itself reflected in SDG 4). However, the education issue cannot be limited to a simple analysis of curricula; in many developing countries, the quality of education is conditioned by a social, political, religious, and economic context. Transportation and access to school can take time for both students (long walking hours) and

teachers (2 to 3 hours a day to get to class). There are inequalities between urban and rural areas. The number of students per class can be as high as 80 in primary school. Despite circulars in developing countries that set the number of students at 35 or 50, reality overwhelms the texts and makes it difficult for any of the pedagogical innovations (e. g. critical pedagogy, mindfulness, project pedagogy) associated with education for sustainable development.

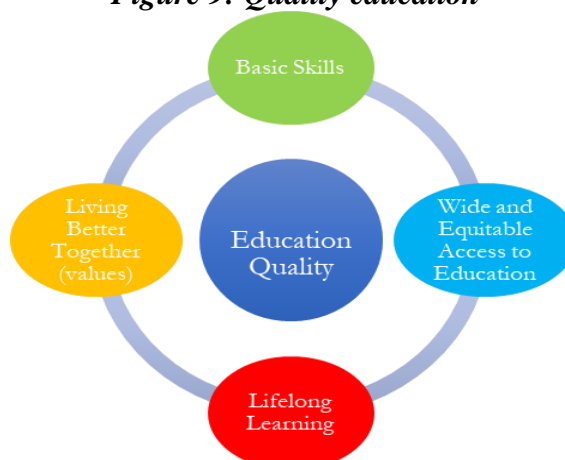
Figure 8: ESD, SDG and Socio-political context



Source: Diemer (2017)

Finally, teacher contracts are not homogeneous and uniform. There are a large number of contracts and therefore a significant range of skills: from the civil servant teacher (who has received teacher training and has been able to benefit from a few hours of training in education for sustainable development) to the contract teacher paid by the village (who has had to forge a culture of education for sustainable development himself). SDG 4 aims to ensure that all people have access to quality education and lifelong learning opportunities. This objective focuses on the acquisition of basic and higher-level skills at all stages of education and development; broader and more equitable access to quality education at all levels, as well as to technical and vocational education and training, plus the knowledge, skills and values required to live in a productive society. This SDG is a reminder that there are numerous situations which prevent children from going to school: children may live in rural areas, may be affected by poverty, or may have parents with little or no education (SDG Report, 2016).

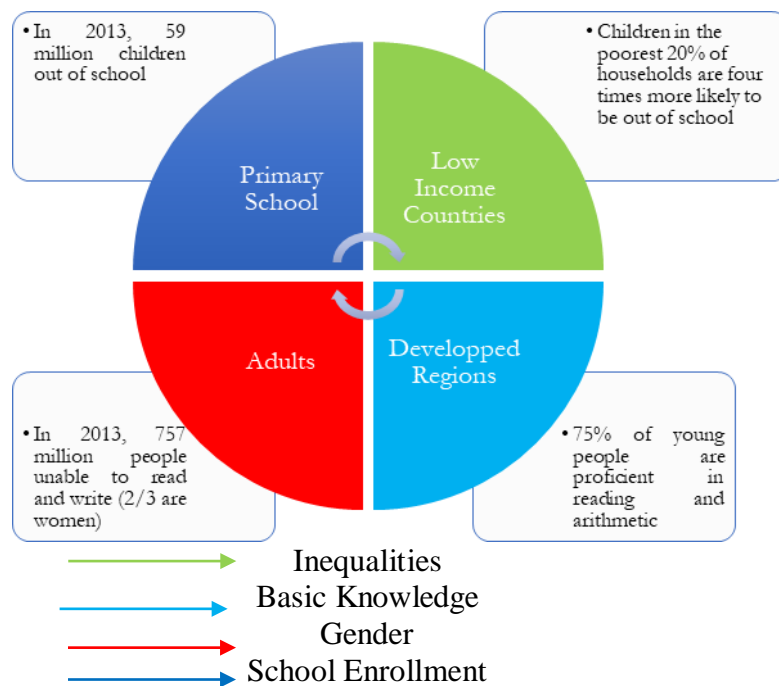
Figure 9: Quality education



Source: Diemer (2017)

However, and this may be where the expectations and outcomes of SDG 4 need to be qualified, the fact that the quality of education may influence several targets (acquisition of basic skills such as literacy and numeracy, good physical, social, emotional and mental health development) somewhat obscures the reality of the facts. Indeed, education quality is influenced by the context. Thus, primary school poses the problem of enrolment and access to the education system, low-income countries point out that an improvement in education requires the eradication of poverty, and argue that developed countries must increase their efforts on basic knowledge, and adult education (e.g. lifelong learning) must not be prevented by gender issues.

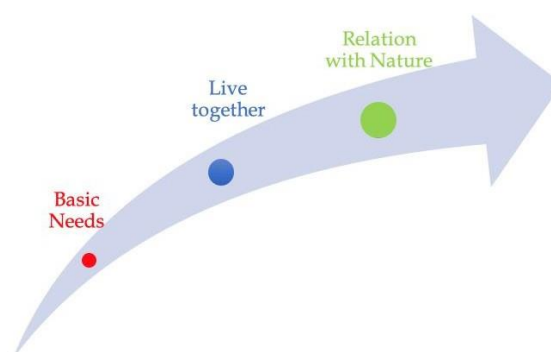
Figure 10: Targets of SDG 4



Source: Diemer (2017)

Inequalities, gender, schooling, and basic knowledge are the target variables of SDG 4, and are expressions of the systemic nature of sustainable development (inequalities corresponding to SDG 10 and gender to SDG 5). This link between SDG 4 and complex and systemic thinking allows us to reaffirm the strong link between education quality and education for sustainable development. In a way, SDG 4 and ESD are positioned at the crossroads of a triptych composed of basic needs, relationship with nature, and living together.

Figure 11: Challenges of SDG 4 and ESD



This is where the challenge lies for both developed and developing countries.

2.3. What position for the countries of the South?

By adopting a universalist position, the United Nations has made poverty a global cause. The SDGs apply to both North and South countries, but sufficient and necessary conditions must be created to ensure that such targets do not melt like snow in the sun. Indeed, beyond the occasional statements, "*We are determined to eradicate poverty and hunger everywhere in the world by 2030; to combat inequalities within and between countries; to build peaceful and just societies, where everyone has a place; to protect human rights and promote gender equality and the empowerment of women and girls; to protect the planet and its natural resources in a sustainable manner*" (United Nations, 2015), sustainable development program should be integrated into the national strategies of individual States.

2.3.1 The implementation of SDG 4 and SDG 13: the case of Senegal

The Global Partnership for Sustainable Development Data (GPSDD) was launched in September 2015, on the margins of the United Nations General Assembly during which the Sustainable Development Goals (SDGs) were adopted. In early 2016, the UN Statistical Commission recommended some 231 indicators for the MDGs, but for many developing countries, data are not available. Senegal was one of the first African countries to join the GPSDD in September 2015. One of the objectives of the GPSDD is to support developing countries in implementing a roadmap, involving different stakeholders, to harness the data revolution for sustainable development. Although the Senegalese authorities acknowledge an alignment between national policies and the SDGs, it must be admitted that there are still many challenges to be addressed. While Senegal has performed well against SDG13, for Senegal SDG4 has only seen marginal improvements.

SDG4 is associated with several targets and indicators. Indicator 1 identifies the "Proportion of children under 5 years of age whose development is on track in health, learning and psychosocial well-being, by gender". It should be noted that the MICS Early Childhood Development Index defines "on track" as the percentage of children aged 36-59 months who are developing in at least three of the following four areas: literacy-calculation, physical, socio-emotional and learning. Other measures use different definitions, with different empirical and conceptual perspectives of how best to define "being on the right track". There is not yet a globally accepted definition of "being on the right path to development". Defining and measuring "being on the right development path" should be an objective for the next phase of development of this indicator. Indicator 1 is a general measure of children's development and school readiness. Data available for global monitoring are generally collected from individual data through direct assessment of children in many regional or national assessments or reported by mothers/primary caregivers or teachers. These data are then used to calculate an indicator that represents a composite measure across a range of agreed-upon characteristics in the areas of health, learning, and psychosocial well-being.

Indicator 2 measures the "rate of participation in organized learning activities (one year before the official primary school entry age), by gender". This is the percentage of children in the given age group who participate in one or more organized learning programs, including programs

which offer a combination of education and care. Indicator 2 includes participation in early childhood education and primary education. The age range varies according to the official age of entry into primary education. An organized learning program consists of a sequence of educational activities designed to achieve pre-determined learning outcomes, or to accomplish a specific set of educational tasks. Early childhood and primary education programs are examples of organized learning programs.

Early childhood and primary education are defined in the 2011 revision of the International Standard Classification of Education (ISCED 2011). Early childhood education is usually designed using a holistic approach to support children's early cognitive, physical, social, and emotional development and to introduce young children to organized education outside the family context. Primary education provides learning and education activities designed to provide learners with basic skills in reading, writing, and mathematics and to establish a solid foundation for learning and understanding in the main areas of knowledge and personal development. It focuses on learning at a basic level of complexity with little or no specialization.

Table 2: SDG 4 Indicators

Year	Indicator		
	Participation rate in organized learning activities (one year before the official primary school age) Male &Female	Participation rate in organized learning activities (one year before the official primary school age) Male	Participation rate in organized learning activities (one year before the official primary school age) Female
SENEGAL			
2010	13.8	13.1	14.5
2011	15	14	15.9
2012	15.7	14.7	16.7
2013	15.5	14.7	16.4
2014	17.6	16.6	18.6
2015	17.3	16.2	18.3
2016	M (?)	M (?)	M (?)

Sources: ECDI, EDI, IDELA, MELQO et ICARO

The official age of admission to primary education is the age at which children are required to start primary education in accordance with national legislation or policies. When more than one age is specified, for example, in different regions of a country, the most common official age of admission (i.e. the age at which most children in the country are expected to start primary school) is used to calculate this indicator at the global level.

In the context of this article, we take a closer look at the link between SDG 4 and SDG13. We believe that this issue is very important because it could make it possible to institute education about climate change - an education that is increasingly advocated by UNESCO. According to the 2016 Senegal national monitoring report on the SDGs (September 2017), significant progress has been made in SDG 2 (eradicating hunger), SDG 11 (sustainable cities) and SDG 13 (urgent action to combat climate change and its impacts). This performance is based on a causality that leaves no doubt about the recommended scenario: the development of the agricultural sector must stimulate strong growth in agricultural yields, coupled with a reduction in inequalities in terms of income (SDG 10, redistribution policy), which should make it possible to improve food

security indicators and thus increase the performance against SDG 2 "Zero hunger". Public expenditure on climate change adaptation (SDG 13) and waste management (SDG 11) would be the main causes of the performance of these two SDGs.

These successes are in contrast to the lack of improvement against SDG 4 (education) and SDG 12 (responsible production and consumption). Indeed, these two SDGs have only made marginal progress, which is not up to expectations. In our opinion, they are symptomatic of choices that, in a systemic way, can affect the future of our societies. For education (SDG 4), the national report points out that if the trend continues, Senegal will only achieve 30% of its target by 2030. The report indicates that demographic inertia may be the main obstacle to the achievement of SDG4, it is therefore recommended to identify the levers that affect education system (i.e. to have a systemic approach) and to act in the expected direction. In the case of SDG 12, the modest results may be partly due to economic growth driven by sectors using a significant amount of high-tech programmed obsolescence products (mobile phones, tablets).

This illustration of Senegal and its approach to the SDGs is not to apportion blame, it simply reflects the state of affairs. It is possible to achieve the same objective by different strategies. The current strategy is focused on productivity and growth gains, with the hope that these benefits will be systematically reflected in other drivers of development, rather than on behavioural change induced by climate change education or responsible consumption. The challenge is therefore significant, as most primary school teachers interviewed between 2015-2016 did not make a link between SDG 13 and SDG 4. Only 20 out of 150 teachers have integrated SDG 13 into a global strategy for education for sustainable development (Diemer, Ndiaye, Khushik, 2018).

2.3.2 The implementation of SDG 1 and SDG 4: the case of Pakistan

Pakistan is mainly characterized by a large population (207.78 million inhabitants) and a high birth rate (2.7%). As well as this situation, typical of many developing countries, it also has a very low literacy rate, 58% (NEMIS-AEPAM, 2016); 30% of the population lives below the poverty line; the gross national income per capita is less than \$1,500 US (current \$); and Pakistan has an HDI of 0.538. Poverty and illiteracy are a combination of evils that drive the majority of young people and children to extremism, violence, or criminal activities. The deteriorating environment, air pollution, recent winter smog, urbanization, contaminated water, terrorism, regional/provincial conflicts, food security, inflation, inequality, access to education, loans, security issues, soil fertility, deforestation, and corruption underpin the long list of challenges facing Pakistan today. These challenges have made Pakistan a very vulnerable country which is dependent on humanitarian aid from major international institutions and/or NGOs.

There is no doubt that education plays an important role in achieving the objectives of well-being and life satisfaction, which are symbols of a society working towards sustainable development. Although there is a controversial debate on the type of education necessary and sufficient to achieve the SDGs, all stakeholders agree that multifaceted education is needed, including education for sustainable development and not conventional education. In a country like Pakistan, which has not been able to achieve the goal of universal primary education over the past decade, the challenge is significant and says a lot about the prospects for achieving SDG 4. According to the 2015 Education for All report, 6.7 million children are still not at school, 62% of whom are girls. Access to schooling is a prerequisite for the implementation of ESD, so it is

essential to ensure that as many children as possible go to school and stay in school up to the middle level.

In what follows, we have chosen to focus on the link between SDG 1 (no poverty) and SDG 4, but this perspective would be insufficient and biased if we did not revisit the MDGs, and in particular MDG 2 "Achieve universal primary education". MDG 2 aimed to achieve 100% primary school enrolment, 100% completion of grades 1-5 and a literacy rate of 88% (Pakistan report, 2013). The Pakistan results were very disappointing. Primary school enrolment and completion rates increased until the mid-2000s, then slowed to 57% and then reduced to 50% in 2011/2012. The literacy rate reached 58%, however, this overall figure conceals wide disparities between men (70%) and women (47%). In 2013, a national action plan was launched to accelerate progress towards MDG 2 so that the target can be reached by 2015. Unfortunately, this action plan could not be implemented despite many initiatives to encourage school enrolment. The TAWANA (Healthy) project provided edible oil, pulses and rice to families to increase the school enrolment rate of children in rural areas. Girls received small allowances to encourage them to enroll and stay in school up to secondary level. From 2008 to 2015, incentives were given to students by providing them with free textbooks from the first to the tenth grade. The National Assembly of Pakistan has established a working group of elected members to review progress towards the MDGs. All these efforts have not been successful, so Pakistan has not achieved the MDGs (32% of children aged 5-9 years were still not at school in 2015).

In the official documents of the Pakistani government (national MDG report 2011 and 2013), there was mention of an inclusive, coherent, and collaborative strategy to achieve ambitious goals. This was part of an action plan, the Millennium Acceleration Framework (MAF), developed by the United Nations Development Programme (UNDP) to accelerate progress on the MDGs, particularly for countries that did not achieve the 2015 targets. While all successive Pakistan governments have sought to achieve the MDGs under international pressure, no single administration has actually defined a list of priorities or taken concrete measures.

Many reasons have been given by Pakistan governments to explain these failures: the military coup of October 1999, which changed the current regime and reduced efforts in the education system; the 2005 earthquake, which caused population displacements and disrupted the deployment of education policy; the post-2005 situation characterized by an increase in terrorist attacks and military operations in the north-western part of the country; the major flood of 2010; and the 2015 earthquake in the western province of Baluchistan. In addition to these natural disasters and human conflicts, internal problems such as corruption, incompetence of ministerial services, lack of monitoring mechanisms, accountability issues, political interference in educational institutions, absences of teachers, and unavailability of basic facilities (water, electricity, toilets) in schools should also be highlighted, and last but not least, the country's extreme poverty.

Poverty is a well-known phenomenon in Pakistan, with 29.5% of its population living below the poverty line (\$1.25 per day is an international indicator of the poverty line). The triangle MDG - ODD - Poverty illustrates Pakistan's past and present situation. The close relationship between SDG 1 and SDG 4 reflects a well-known causality in developing countries, with poverty forcing large numbers of children to work to support and contribute to family income. Pakistan has a clearly visible poverty, despite a very flourishing economy (growth rate of 5.3% in 2016/2017, and a GDP close to 300 billion dollars). Some economists at the Karachi Centre for Social

Policy and Development (SPDC) (Sabir, 2016) see it as a threshold effect, as growth is not yet strong enough to reduce poverty (figures in the order of 6% to 8% are put forward as being high enough to bring about a significant reduction in poverty). In other words, the salvation of education and the optimistic prospects for achieving the targets of SDG 4 are conditioned not by the Pakistani government's desire to improve its education system but by an objective of economic growth. Given the above-mentioned facts and the review of the SDGs, it would seem to be very difficult for Pakistan to prioritize ESD goals or synchronize its 2025 vision with that of the SDGs. The educational agenda is on the priority list (SDG 4), however no mechanism or reference framework has been proposed to implement such a program and achieve the targets within a reasonable timeframe. Most of the targets in SDG 4 are internal challenges. In 2015, the Pakistan government proposed an inclusive strategy, aimed at learning from the past and forging a challenging agenda, calling for (1) the formation of national and provincial working groups on the SDGs to obtain provincial input on national priority setting, (2) the establishment of dedicated SDG offices within the Ministry of Planning and Development to allow stakeholder consultation at the federal and provincial levels, (3) consultations and commitments at national level with all key stakeholders, including the business and media sectors, (4) strengthening national data sources through innovative and creative information technologies at all levels.

For a sustainable development program to be effective and bring about change for society, it must be based on the following four basic elements: (i) an ambitious vision for the future firmly rooted in human rights and universally accepted values and principles, including those set out in the Universal Declaration of Human Rights and the Millennium Declaration, (ii) a set of concise targets to achieve priorities, (iii) a global partnership for development to mobilize means of implementation, (iv) a participatory monitoring framework to integrate all stakeholders in decision-making. In Pakistan, the challenges posed by SDGs 1 and 4 can only be met through a three-pronged approach: coordinating and engaging all stakeholders (including NGOs) in a policy of poverty eradication through education; identifying and prioritizing the essential social development program tailored for each province; and redeploying and allocating appropriate resources through rigorous monitoring and control mechanisms. While poverty is not inevitable, it can very quickly become so if the country's population no longer have reason to hope for change.

Conclusion

If education for sustainable development has spread widely in developed and developing countries, it is mainly due to the United Nations program, set up by UNESCO from 2005 to 2014. During this decade, education for sustainable development became institutionalized so that it has become part of the basic curricula proposed by national guidelines or pedagogical guides. At the same time, development education has merged into the mainstream of education, breaking with the traditional disciplinary approach. It has generated a great deal of activity on the social representations of learners and teachers, on appropriate pedagogical approaches, didactic tools, and the skills mobilized. The REDOC model today claims such a heritage, positioned in both the social and educational sciences, it constitutes a *modus operandi* to initiate changes in behaviour or lead us to understand our differences. If education remains a factor of socialization, it is in diversity and not in homogenization that we must seek the keys to our future. The MDGs, then the SDGs, have boosted our appetite for complex and systemic thinking, for societal issues, for the values that a sustainable society must embody. For some countries, like Pakistan, the SDGs are a long journey fraught with pitfalls and frustrations, for others, like Senegal, they are

benchmarks against which to measure progress and continuously improve expected results. While the SDGs make education a priority target and have chosen to link education for sustainable development to SDG 4 Education Quality, they still struggle to advocate real change in society. Sustainable development risks once again preferring compromises to revolutions, at the risk of pushing back to 2050 the hopes of many citizens of the world.

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Chapter 5

Sustainable Development Goals and Education in Pakistan: the new challenges for 2030

Chapter of Book: Paradigms, Models, Scenarios and Practices for strong sustainability

Arnaud DIEMER, Faheem KHUSHIK
University Clermont Auvergne (UCA), CERDI
Jean Monnet Excellence Centre on Sustainability (ERASME)

Abstract: There is a causal link between Education for sustainable development (ESD) and Sustainable Development Goals (SDGs). This study explores this causality in the context of developing countries with a case study on Pakistan. Education for Sustainable Development and SDGs are inclusively targeting the improvement of people's quality of life through quality education, as defined in SDG4. Implementation of SDGs in Pakistan is very important because of its dynamic nature, which can be a learning exercise for the literature in ESD and SDGs. Pakistan is not ranking high in the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI). Pakistan, Kenya and Bangladesh have the same MPI but inequality in Pakistan is twice that in Kenya and once that in Bangladesh. The Human Development Index and other indexes are reviewed in order to understand the link between SDG-1 and SDG-4 in order to achieve objectives of not only country but global agenda as well. This effort highlights the importance and link between different SDGs, policies, quality education and ESD. It is concluded that living standard of people of Pakistan can be improved by improving the quality education with the objectives of education for sustainable development and prioritizing the SDGs keeping the local context of the country in mind.

Key Words: *Education for Sustainable Development, Health, Quality Education, Pakistan, Poverty, SDGs*

Introduction

While education for sustainable development (ESD) through UNESCO's programs has spread widely in both the North and the South, national programs have not always made ESD a priority in education policy. Teacher education remains a key variable for the implementation of ESD, and in the absence of a real willingness of teacher education institutions to integrate ESD into teacher training program, little real progress has been made.

This is the case in Pakistan, which has seen the implementation of scattered initiatives such as the UNESCO Associated Schools Network (ASPnet), courses on ESD as part of master's program (Educational Sciences), and the spontaneous participation of a few universities such as the University of Punjab in the International Network of Teacher Training Institutions. More than 60 ASPnet schools have developed peace and sustainable development education programs to share contextualized knowledge on respect and cultural diversity with teachers, students, parents, and the community at large. A pedagogical initiative on ESD was proposed by the Institute of Education, Lahore College for Women University (Kalsoom & Khanam, 2017). The objective of this program was to raise awareness among student teachers of the concepts of Sustainable Development (SD) and Education for Sustainable Development in order to strengthen their awareness of the notion of sustainability. As part of this initiative, undergraduate student training to become teachers carried out 11 weeks of local fieldwork. This work included field surveys on

sustainability issues, such as the effect of the socio-economic context on education, the challenges faced by female students in higher education, environmental awareness of pre-service teachers and the culture of teacher training institutions.

Although there are individual or institutional efforts related to the implementation of ESD in teacher education, ESD is only tentatively entering Pakistan's education policy. The analysis of various documents such as education policy (Government of Pakistan, 2009), provincial education sector plans (Government of Balochistan, 2013; Government of Punjab, 2013-2017), the B. Ed. Honors curriculum (Higher Education Commission, 2012) or national professional standards for teachers (Ministry of Education, 2009), do not reveal education for sustainable development as a national priority. This virtual absence of ESD in national systems contrasts with initiatives on other topics. For example, environmental education, economics, human rights and citizenship have been included in the B. Ed. curriculum. Civic responsibility, social cohesion and tolerance are mentioned in national education policy, the education sector plan and national professional standards.

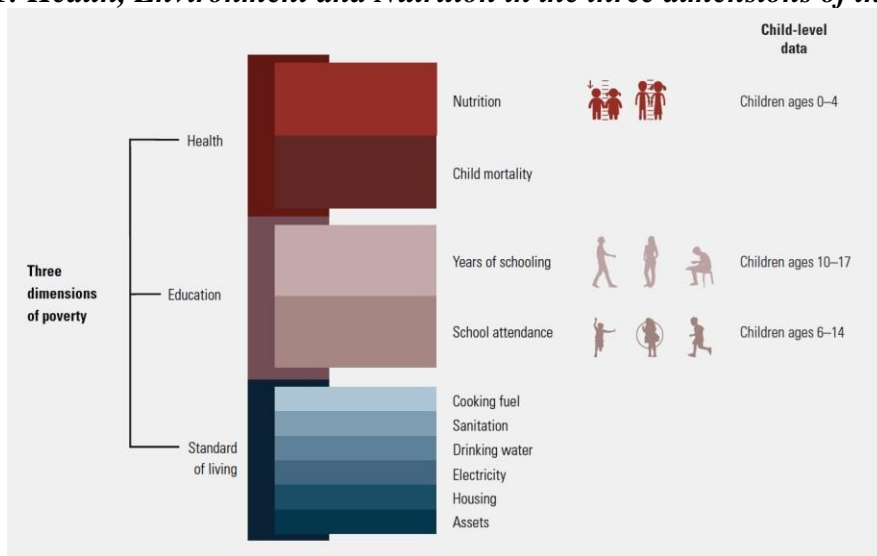
According to Kalsoom, Qureshi and Khanam (2018), this low emphasis on ESD has generated two types of problems: (i) the knowledge of students training to become teachers of sustainability issues and their attitudes and behaviors towards sustainability fall short of expectations; (ii) a lack of research on ESD-related issues. Kalsoom, Qureshi and Khanam (2018) analyzed a database of ESD-related research-based articles written by Pakistani authors. The databases consulted were Springer, Taylor and Francis, as well as 4 national education journals. They found more than 2,500 articles on ESD, but none of them empirical studies. The authors also analyzed 353 articles that were published in national journals from 2004 to 2016 and concluded that no articles had been published on ESD. Pakistani researchers would appear to have little or no exposure to research related to the concepts of sustainable development and education for sustainable development.

This paper addresses education for sustainable development in the case of Pakistan on the basis of two premises. Firstly, it argues that the implementation of education for sustainable development is inextricably linked to issues of health, environment and child nutrition. Thus, the implementation of SDGs may well enable Pakistan to improve the quality of its education. Secondly, it assumes that there is a close link between SDG 4 "Education quality" and SDG 1 "Poverty". The Multidimensional Poverty Index (MPI), based on government social statistics and calculated according to 15 factors, showed that 39% of Pakistanis were poor (UNDP, 2018), the majority in rural areas. This poverty is relatively deep: on average, poor Pakistanis are deprived of basic goods and services in 50.9% of the surveyed areas. A positive loop would seem to show that an improvement in the quality of education can reduce poverty, but also that any reduction in poverty improves the quality of the country's education (Diemer, Faheem, 2020).

Education for sustainable development in developing countries

Education for sustainable development, and the skills implied, is based on three major aspects, which are relevant for most developing countries: health (associated with sanitation, access to water, and access to health services), the environment (associated with population density in urban areas and waste), and food (provision of school canteens). These societal challenges are integrated in the United Nations' recommendations: "*Investments in the health and nutrition of young children will translate into an investment in equality and sustainability throughout life*" (UNDP, 2019), into the basic curriculum of many national programs and the SDGs, thus introducing a final issue, education (itself reflected in SDG 4).

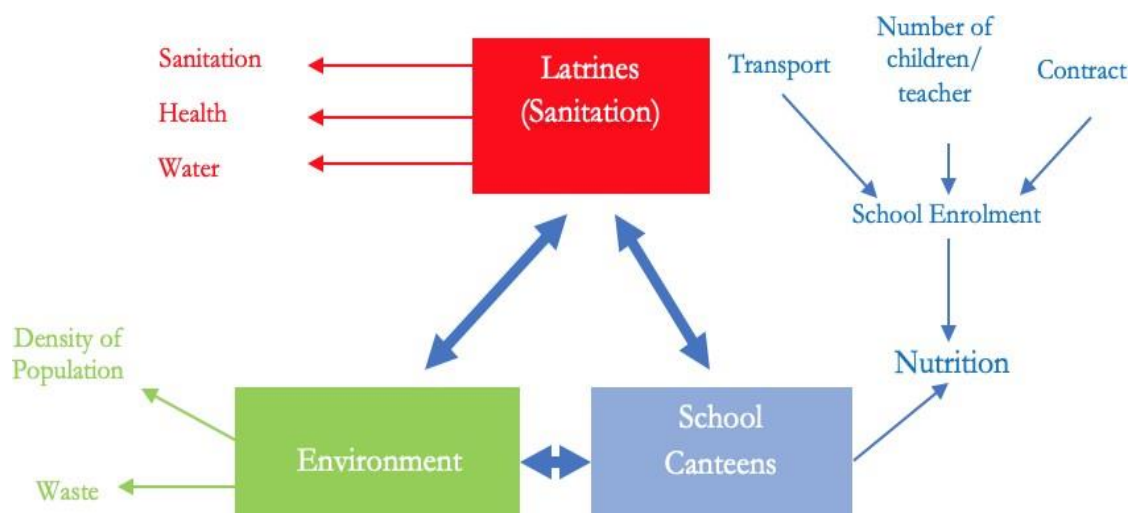
Figure 1: Health, Environment and Nutrition in the three dimensions of the poverty



Source: Oxford Poverty and Human Development Initiative (2018)

However, the education issue cannot be limited to a simple analysis of curricula; in many developing countries, the quality of education is conditioned by the social, political, religious, and economic context. Transportation and access to school can take time for both children and teachers. There are inequalities between urban and rural areas. The number of children per class can be as high as 80 in primary school. Despite official texts in developing countries that set the number of students at 35 or 50, reality overwhelms the texts and makes it difficult to successfully implement any of the pedagogical innovations (e.g: critical pedagogy, mindfulness, project pedagogy) associated with education for sustainable development.

Figure 2: ESD, SDG and Socio-political context



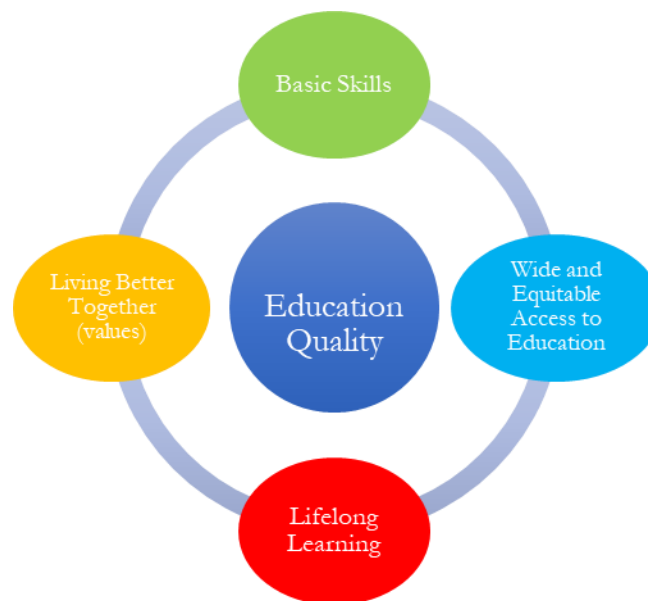
Source: Diemer (2015)

Finally, teacher contracts are not homogeneous and uniform. There is a large number of contracts and therefore a significant range of skills: from the civil servant teachers - who have received

teacher training and have been able to benefit from a few hours of training in education for sustainable development - to the contract teachers paid by the village, who have had to forge a culture of education for sustainable development themselves.

Sustainable Development Goal 4 aims to ensure that all people have access to quality education and lifelong learning opportunities⁸. This objective focuses on the acquisition of basic and higher-level skills at all stages of education and development; broader and more equitable access to quality education at all levels, as well as to technical and vocational education and training, plus the knowledge, skills and values required to live in a productive society. This SDG is a reminder that there are numerous situations which prevent children from going to school: children may live in rural areas, may be affected by poverty, or may have parents with little or no education (SDG Report, 2016).

Figure 3: SDG 4, Quality Education

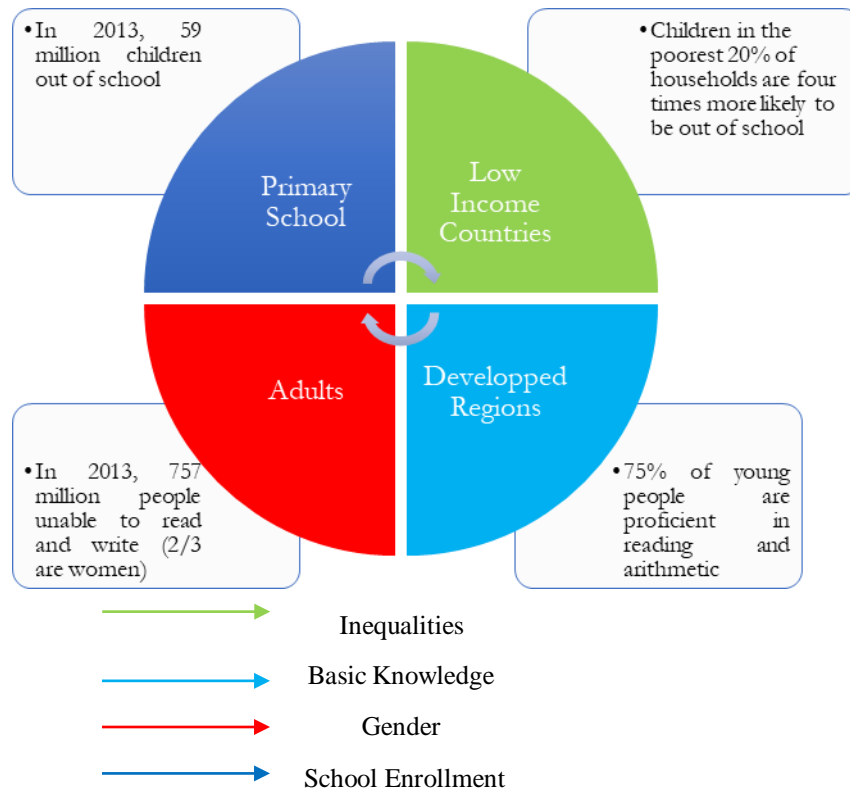


Source: Diemer (2017)

However, and this may be where the expectations and outcomes of SDG 4 need to be qualified, the fact that the quality of education may influence several other SDG targets somewhat obscures the reality of the facts. Indeed, education quality is influenced by the socio-economic context. Thus, the success of primary school depends on enrolment and access to the education system; in low-income countries, an improvement in education first requires the eradication of poverty; in developed countries efforts on basic knowledge must increase; and adult education (e.g. lifelong learning), should not be prevented by gender issues.

⁸ United Nations specified that the reasons for lack of quality education are due to lack of adequately trained teachers, poor conditions of schools and equity issues related to opportunities provided to rural children. For quality education to be provided to the children of impoverished families, investment is needed in educational scholarships, teacher training workshops, school building and improvement of water and electricity access to schools (<https://www.un.org/sustainabledevelopment/education/>).

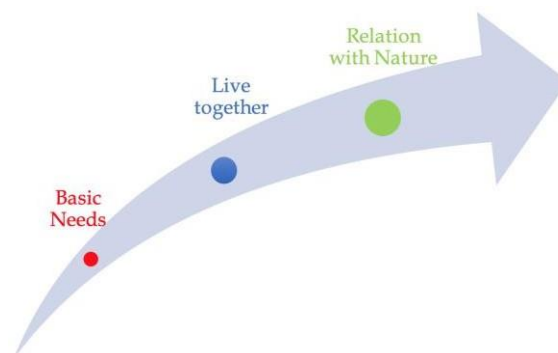
Figure 4: Targets of SDG 4



Source: Diemer (2017)

Inequalities, gender, schooling, and basic knowledge are the target variables of SDG 4, and are expressions of the systemic nature of sustainable development (inequalities corresponding to SDG 10 and gender to SDG 5). This link between SDG 4 and complex and systemic thinking allows us to reaffirm the strong link between education quality and education for sustainable development. In a way, SDG 4 and ESD are positioned at the crossroads of a triptych composed of basic needs, relationship with nature, and living together (see Fig.5).

Figure 5: Challenges of SDG 4 and ESD



The implementation of SDG1 and SDG4 in Pakistan

By adopting a universalist position, the United Nations has made poverty a global issue. The SDGs apply to both North and South countries, but sufficient and necessary conditions must be created to ensure that such targets do not melt like snow in the sun. Indeed, beyond the

occasional statements, "We are determined to eradicate poverty and hunger everywhere in the world by 2030; to combat inequalities within and between countries; to build peaceful and just societies, where everyone has a place; to protect human rights and promote gender equality and the empowerment of women and girls; to protect the planet and its natural resources in a sustainable manner" (United Nations, 2015), sustainable development programs should be integrated into the national strategies of individual states. Pakistan is mainly characterized by a large population (220.9 million inhabitants) and a high birth rate (28.5 per 1000 according United Nations Population Division). It has a very low literacy rate, 58% (NEMIS-AEPAM, 2016); 30% of the population lives below the poverty line; the gross national income per capita is less than \$1,500 US (current \$); and the country's HDI is 0.538. Poverty and illiteracy are a combination of harmful factors that drive the majority of young people and children to extremism, violence, or criminal activities. The deteriorating environment, the decrease in air quality, urbanization, contaminated water, terrorism, regional/provincial conflicts, food security, inflation, social and economic inequalities, access to education, debt, security issues, soil fertility, deforestation, and corruption underpin the long list of challenges facing Pakistan today. These challenges have made Pakistan a very vulnerable country, dependent on humanitarian aid from major international institutions and/or NGOs.

Table 1: Indexes for Pakistan

	HDI	HDI Adjusted to Inequalities		GDI ⁹	GII ¹⁰		Multidimensional Poverty Index		
	Value	Value	Global Lost %	Value	Value	Rank	Value	%	Intensity of deprivation
Pakistan	0.560	0.386	31,1	0.747	0.547	136	0.198	38,3	51,7

Source: UNDP (2019)

There is no doubt that education plays an important role in achieving the objectives of well-being and life satisfaction, which are symbols of a society working towards sustainable development. Although there is a controversial debate on the type of education necessary and sufficient to achieve the SDGs, all stakeholders agree that multifaceted education is needed, including education for sustainable development, and not conventional education. In a country like Pakistan, which has not been able to achieve the goal of universal primary education over the past decade, the challenge is significant and impedes the prospects for achieving SDG 4. According to the 2015 Education for All report, 6.7 million children are still not at school, 62% of whom are girls. Access to schooling is a prerequisite for the implementation of ESD, so it is essential to ensure that as many children as possible go to school and stay in school up to the middle level.

In what follows, we have chosen to focus on the link between SDG 1 (no poverty) and SDG 4, but this perspective would be insufficient and biased if we did not revisit the Millennium Development Goals (MDGs), and in particular MDG 2 "Achieve universal primary education". Millennium Development Goal 2 aimed to achieve 100% primary school enrolment, 100% completion of grades 1-5 and a literacy rate of 88% (Pakistan report, 2013). The Pakistan results were disappointing. Primary school enrolment and completion rates increased until the mid-2000s, then slowed to 57% and then reduced to 50% in 2011/2012. The literacy rate reached 58%, however, this overall figure conceals wide disparities between men (70%) and women (47%). In 2013, a national action plan was launched to accelerate progress towards MDG 2 so

⁹ GDI (Genre Development Index)

¹⁰ GII (Genre Inequalities Index)

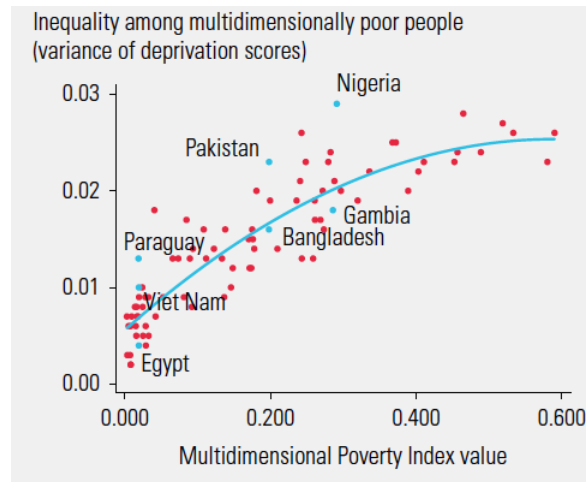
that the target can be reached by 2015. Unfortunately, this action plan could not be implemented despite many initiatives to encourage school enrolment. The TAWANA (Healthy) project provided edible oil, pulses and rice to families to increase the school enrolment rate of children in rural areas. Girls received small allowances to encourage them to enroll and stay in school up to secondary level. From 2008 to 2015, incentives were given to students by providing them with free textbooks from the first to the tenth grade. The National Assembly of Pakistan has established a working group of elected members to review progress towards the MDGs. All these efforts have not been successful, and thus Pakistan has not achieved the MDGs (32% of children aged 5-9 years were still not at school in 2015).

In the official documents of the Pakistani government (national MDG report 2011 and 2013), there was mention of an inclusive, coherent, and collaborative strategy to achieve ambitious goals. This was part of an action plan, the Millennium Acceleration Framework (MAF), developed by the United Nations Development Programme (UNDP) to accelerate progress on the MDGs, particularly for countries that did not achieve the 2015 targets. While all successive Pakistan governments have sought to achieve the MDGs under international pressure, no single administration has actually defined a list of priorities or taken concrete measures. Many reasons have been given by Pakistan governments to explain these failures: the military coup of October 1999, which changed the current regime and reduced efforts in the education system; the 2005 earthquake, which caused population displacements and disrupted the deployment of education policy; the post-2005 situation characterized by an increase in terrorist attacks and military operations in the north-western part of the country; the major floods of 2010; and the 2015 earthquake in the western province of Baluchistan. In addition to these natural disasters and human conflicts, internal problems such as corruption, ineffectiveness of ministerial services, lack of monitoring mechanisms, accountability issues, political interference in educational institutions, deficits in the number of teachers, and unavailability of basic facilities (water, electricity, toilets) in schools should also be highlighted. Last but not least, the country's extreme poverty played a significant role in the failure to implement the MDG on education.

Poverty is a well-known phenomenon in Pakistan. According to the commonly used index, based solely on consumption, 29.5% of Pakistanis are below the poverty line, estimated at 3,030 rupees (25 euros) per adult per month. Since 2016, the Pakistani government has published its multidimensional poverty index – MPI, which takes into account the standard of living but also access to education and health. Of the total population of Pakistanis 39% are poor, the majority in rural areas. This poverty is relatively deep: on average, poor Pakistanis are deprived of basic goods and services in 50.9% of the areas surveyed for the MPI. A correlation seems exist between MPI and Inequality among Multidimensionally Poor People (IMPP), which is the difference in the intensity of poverty experienced by each poor people, measured using the variance¹¹. Clearly, IMPP tends to increase with MPI value. Pakistan has a high MPI value (0.198) and high inequality level (IMPP is about 0.023). In the last United Nations' report, *“the measurement of inequality among multidimensionally poor people summarizes the distribution of their deprivation scores within intensity. Variance adds an additional piece of information: it signals when average intensity is high heterogeneous”* (2019, p. 13). This is the case for Pakistan.

¹¹ Which is calculated by subtracting each multi-dimensionally poor person deprivation score from the average intensity, squaring the difference, summing the squared differences, and dividing the sum by the number of multi-dimensionally poor people. While Variance provides useful insights, it is important to emphasize that the primary objective of SDG 1 is to end poverty – not merely to reduce inequality among poor people.

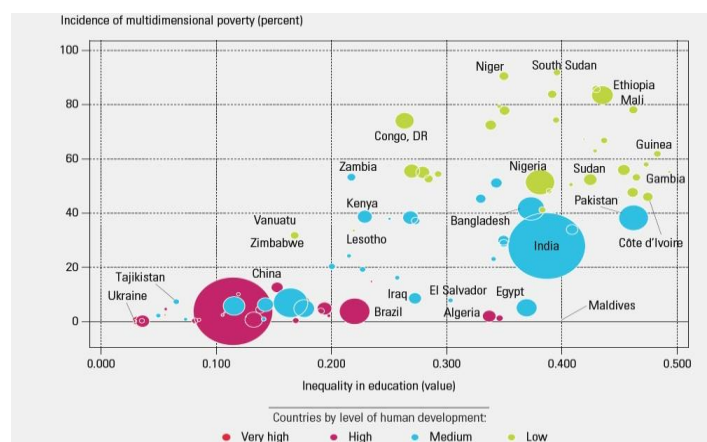
Figure 6: Correlation between MPI and IMPP



Source: Alkire, Santos (2019)

The correlation between inequality in the education dimension of the Human Development Index (HDI) and the Multidimensional Poverty Index (MPI) are not so strong for Pakistan. For example, Pakistan, Kenya and Bangladesh have the same MPI but inequality in Pakistan is twice that in Kenya and once that in Bangladesh (see Fig.7).

Figure 7: Multidimensional Poverty and Inequality in Education



Source: UNDP (2019)

The triangle MDG - SDG - Poverty illustrates Pakistan's past and present situation. The close relationship between SDG 1 and SDG 4 reflects a well-known causality in developing countries, with poverty forcing large numbers of children to work in order to support and contribute to family income. Pakistan has a clearly visible poverty, despite a very flourishing economy: GDP growth rate of 5.3% in 2016/2017, and a GDP close to 300 billion dollars. Some economists at the Karachi Centre for Social Policy and Development (SPDC) (Sabir, 2016) see it as a threshold effect, as growth is not yet strong enough to reduce poverty. Figures in the order of 6% to 8% are

put forward as being high enough to bring about a significant reduction in poverty. In other words, the salvation of education and the optimistic prospects for achieving the targets of SDG 4 are conditioned not by the Pakistani government's desire to improve its education system but by an objective of economic growth.

Table 2: Multidimensional Poverty Index value and its components harmonized for Pakistan

MDI				People who are multidimensionally poor and deprived in each indicator									
Value	%	Population	Intensity Of deprivation	Nutrition	Child mortality	Years of school	School attendance	Cooking Fuel	Sanitation	Drinking Water	Electricity	Housing	Assets
0.198	38,3	76 976 000	51,7	27	5,9	24,8	24,3	31,2	21,7	7,9	7,1	30,6	12,2

Source: UNDP (2019, p. 20)

Given the above-mentioned facts and the review of the SDGs, it would seem to be very difficult for Pakistan to prioritize ESD goals or synchronize its 2025 vision with that of the SDGs. The educational agenda is on the priority list (SDG 4), however no comprehensive mechanism or reference framework has been proposed to implement such a program and achieve the targets within a reasonable timeframe, although some policy documents were developed. Most of the targets in SDG 4 are internal challenges. In 2015, the Pakistan government proposed an inclusive strategy, aimed at learning from the past and forging a challenging agenda, calling for (1) the formation of national and provincial working groups on the SDGs to obtain provincial input on national priority setting, (2) the establishment of dedicated SDG offices within the Ministry of Planning and Development to allow stakeholder consultation at the federal and provincial levels, (3) consultations and commitments at national level with all key stakeholders, including the business and media sectors, (4) strengthening national data sources through innovative and creative information technologies at all levels. For a sustainable development program to be effective and bring about change for society, it must be based on the following four basic elements: (i) an ambitious vision for the future firmly rooted in human rights and universally accepted values and principles, including those set out in the Universal Declaration of Human Rights and the Millennium Declaration, (ii) a set of concise targets to achieve priorities, (iii) a global partnership for development to mobilize means of implementation, (iv) a participatory monitoring framework to integrate all stakeholders in decision-making. In Pakistan, the challenges posed by SDGs 1 and 4 can only be met through a three-pronged approach: coordinating and engaging all stakeholders (including private sector and nongovernmental organizations) in a policy of poverty eradication through education; identifying and prioritizing the essential social development program tailored for each province; and redeploying and allocating appropriate resources through rigorous monitoring and control mechanisms. While poverty is not inevitable, it can very quickly become so if the country's population no longer have reasons to hope for change.

Conclusion

Sustainable Development Goals are an opportunity for developing countries such as Pakistan to improve the living standard of their people through quality education and ESD objectives. This international agenda deliberately engages countries to prioritize issues according to their local country context to achieve local as well as global objectives. Sustainable Development Goal 1 - Poverty is one of the critical challenges for Pakistan, which can be addressed through implementing SDGs especially quality education in order to improve HDI indicators by catering causes linked to poverty. These findings can enhance and contribute in future policy decisions in

order to link SDGs with the country vision for future plans and programmes. 2030 Challenges will be more serious if they are not addressed in present.

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Chapter 6

Education and sustainability, how SDG4 contributes to change the representations of developing issues? The Case Study of Pakistan

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Faheem KHUSHIK, Arnaud DIEMER
University of Clermont Auvergne, CERDI, ERASME

Abstract:

Every nation state is struggling hard to improve the living standard of its people so that Pakistan is looking for its people. It is believed that education can bring long lasting and sustainable transformation or change in any society towards better living standards and improve socio-economic conditions. There is consensus among the majority of nations and academia that quality education with inclusiveness and equity is the only tool which can bring a desired change. Education has a very close relationship with the contemporary paradigm shift of education for sustainable development to create critical thinking mindset of the nation to create healthy minds. Literature on sustainability and education demonstrates a causal link with socio-economic development. Academia, society, researchers, scientists, industry and all folks of society are convinced that education is the key tool to bring a change from local to global level in order to curtail contemporary challenges human beings and the planet is facing. A system analysis approach is used to understand logical links among loops. The causal relationship is demonstrated in the form of a Causal Loops Diagram (CLD) reinforces the idea that education is not only a key driver for introducing more sustainability into the development process, it is also a set of leverage points that should be gradually removed. Therefore, it is understood that quality education is affected by multiple factors to achieve.

Key words: Causal Loop Diagram, Education, quality education, Equitable education, Sustainable development, Sustainable development goals SDG4

1. Introduction

Pakistan is one of the worst affected countries in a long list of multifaceted global challenges such as poverty, education, illiteracy, climate change, terrorism, peace, pollution, environment, social security, tolerance, health, basic necessities so on. Many of these issues are directly or indirectly related to education, economic development and growth. During the previous review of educational policies of Pakistan (Khushik & Diemer, 2017) it was observed that most of the educational policies focused on two main aspects, economic development and character building of the nation. However, it is a dilemma for the country that it could not achieve any of these targets. Education is the prime need of the contemporary era of the country. It is considered as the only tool for the long-term development of the nation and country as a whole. It is widely accepted truth in the developed countries and evident that education transformed many societies (Mundy., Green, Lingard, & Verger, 2016). Many developed countries' living standard is high in HDI because they invest all types of resources into the nation for the developing human capital. Investing in the generations is a productive business in the contemporary world and ensures safe, healthy and productive individuals as well as communal life. Ultimately education enhances the quality of life by improving socio-economic conditions of the country (Hannum & Buchmann, 2005). Legal framework is important for any nation state to operationalize educational objectives

or vision or goal for provision of basic education up to a level to each and every citizen of the country. Similarly, provision of education to each and every citizen of Pakistan is mandatory for every individual, but it remains challenging since inception of Pakistan. Although its first 1973 constitution guarantees every citizen access to basic education as a basic fundamental right. Before the 1947 education conference, the Government of India 1935 Act was adopted as an interim constitution of Pakistan as well as an education policy. During the year 2010, the Constitution has been amended, according to constitution of Islamic Republic of Pakistan's article 38(d) it is state's responsibility *"to provide basic necessities of life such as food, clothing, housing, education and medical relief for all citizens, irrespective of sex, cast, creed or race"*. The Constitution also provides a basic right for literacy to minimize illiteracy in the country. Article 37(b) ensures that the state should *"remove illiteracy and provide free and compulsory secondary education within a minimum possible period"*.

Not only Pakistan but globally it is mandatory for every country to provide access to basic quality education to each and every child of the nation according to different UN declarations. The state shall provide free and compulsory education to all children of the age of Five to Sixteen years" [Article 25-A]; Moreover, the article 26-1 of Universal Declaration of Human Rights (n.d) (UDHR) also mentions the right to education, it states, *"Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available and higher education shall be equally accessible to all on the basis of merit"*. But the statistics about education in Pakistan present a depressing picture; the official literacy rate is still 58% (Pakistan, n.d) and that too is characterized by wide male female and rural-urban disparities.

Education should be the priority of the country's development agenda. Without putting it on the top of the list, it seems challenging for the nations to achieve targeted objectives. However, it seems less of a priority in the budgets of Pakistan. Unfortunately, education remains a less priority for all governments, its evidence is all previous percentage of budget allocations for education in the last seven decades. Even after devolution through 18th constitutional amendments some ministries dissolved at federal level and handed over to provinces/regions according to the new amended constitution of Pakistan as a move to provincial/regional autonomy. However, budget allocation for the education sector throughout the country in all provinces is below from international commitment. Federal government usually reserved about 2.5% as an average of GDP for education sector in every yearly budget, according to World Bank data in year 2015 it was 3% (Government, n.d) and so on as the provincial government except North West province of Khyber Pakhtunkhwa.

Pakistan's educational administration or management is divided into several horizontal and vertical tiers to manage it effectively. Although it proved to be a complex and inefficient administration to implement a national policy of literacy to educate each and every child in the country. Before the year 2010 since independence 1947, Education was managed or administered by the federal level government and it was national level responsibility therefore the national ministry of education was responsible to devise policies, programs, projects and budgets and to ensure the provision of education in public sector education from primary to higher level. After the 2009 national education policy, the federal government of Pakistan passed an 18th constitution amendment. This constitutional change devolved some national level ministries and division into provinces and one of the major ministries was education. Soon after this amendment provinces authorized to develop their own regional educational policies. Therefore,

conceptually provinces/regions become more independent in ensuring quality issues of education. It is another debate whether all provincial/regional governments are competent enough or have capacity to manage decentralization especially education.

Pakistan's primary level public educational system is classified in five different tiers, starting from Primary school (grade or year 1-5), middle schools (grade or year 6-8), high school (grade or year 9-10), higher secondary (grade or year 11-12) and above is university level. Another parallel education type is religious education which is officially recognized education, which is called *Deeni* – a local word means religious education, commonly called the Madrasah system. There are two types of institutions which are key stakeholders and education service provider public (state owned) schools, colleges and universities and private institutions from primary to university level. Within the public and private education system, there is another distinction between them is the medium of instruction and education syllabus. Military also has their own schools, colleges and universities which also have different syllabus. Children of officers and other non-commissioned military go to schools which have the Cambridge (O and A) examination system as well as the matriculation system. Therefore, in Pakistan the educational system is not uniform which creates a difference among nations on understanding the social and other issues of the society and it creates an inequality between individuals. Pakistan's educational system is highly fragmented and segmented. As mentioned above a variety of educational syllabus, medium of instruction, examination pattern, curriculum, religious, private and public institutions... are the reasons of Pakistan's failed education system to produce a harmonized, peaceful, pluralistic, tolerant and sustainable society.

Federal government used economic objectives as a key driver for education. Although, it is another debate about why it could not fulfil its objective to achieve even economic growth. National curriculum was used by different political regimes for their own political purposes. Especially military dictators especially modified national curriculum of schools. Although provinces/regions have adopted other than the federal level curriculum. Some private schools follow the Cambridge school system where they are teaching entirely a different curriculum. It may be because of all these reasons the country failed to create a pluralistic society.

Another key driver of education in Pakistan is the zealous attitude of the nation towards war with neighbouring countries, especially with India. Previous syllabus prepares military mind militia to prepare people for war with India. It also diverts the country's educational system from developing people by providing quality education to live a quality life. This type of approach diverts nations overall interests of development into unproductive goals.

Pakistan obliged the global community and signed the global agenda 2030 for the betterment of the people of Pakistan and the planet as a whole. Soon after acceptance of the challenge during the summit, the government of Pakistan unanimously adopted SDGs through its national parliament and started working on it. It establishes a separate sustainable development goals unit at federal/country level in order to create a focal point for coordination, data collection, information, research, policy formation, progress monitoring and mainstreaming the SDG agenda in order to recommend a framework of action to align next planning from local, national and global level. Pakistan as a state since inception took several initiatives for educational progress under different policy reforms, training programs, local and international conventions etc. Pakistan is a signatory of Millennium Development goals 2000, education for all initiative 1990, Dakar framework of Action 2015.

First challenge for Pakistan's educational system is accessibility of education. According to UNICEF an estimated 22.8 (Education, n.d-c) million children aged between 5 to 16 years are out of school. Few reasons for not attending school are overall quality of education, facilities (water, sanitation, furniture, electricity, classrooms) accessibility to the children is also a hurdle, irrelevant curriculum, teachers rude or no friendly behaviour, poverty because children support their parents in earning by doing labour work, unavailability of text books and note books etc.

Keeping this context and educational scenario of Pakistan where basic educational access is still very challenging for the country to achieve then it would be very difficult to achieve its targets for SDG till year 2030. This study addresses the SDG4 to understand the pattern of progress against SDGs in Pakistan. Therefore, in order to assess the status of SDG 4 and its progress against set targets this paper reviews the progress of the country and builds a future scenario to recommend a sustainable framework in order to achieve not only SDG targets but transform its society to a sustainable society. In this paper, we explore the relation between Education and Sustainability through the objectives/targets of SDG4. This proposed a SDG4 scenario in order to assess, monitor and plan educational policy and programmes to achieve agenda 2030 targets.

2. EDUCATION, THE LONG QUEST TO SUSTAINABILITY

Education has often been presented as an important variable -human capital (Lucas, 1990; Romer, 1990) - of endogenous growth in most economists' work (Ozturk, 2001) (Psacharopoulos, 1985). It is only since the Brundtland Report that it has been associated with the concept of sustainable development. The term Education for sustainable development (ESD) was first introduced in the year 1992 in the United Nations (UN) World Summit on Environment and Development in Rio de Janeiro. Since its inception, it remains on the global development agenda to address global sustainable development challenges. Later on, United Nations launched in the early 2000s an initiative to integrate the principles, values and practices of sustainable development (United Nations, 2004) into all the aspects of education and learning. The Decade of Education for Sustainable Development (DESD, 2005 to 2014) sought "*to mobilize the educational resources of the world to help to create a more sustainable future*". UNESCO is the lead agency for the DESD. Education for Sustainable Development is presented as a holistic and transformational education which addresses learning contents and outcomes, pedagogy and learning environment. It is an important part of the quality education that the United Nations introduced first into Millennium Development Goals (*MDP 2 - Achieve Universal Primary Education*) and then into Sustainable Development Goals (*SDG4 - Quality education*).

The Brundtland Report and Education Issues

The term sustainable development was first introduced in the Brundtland report in 1987. According to the definition, Sustainable Development '*Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*'. This explanation stresses on the needs of future generations and sustainable utilization of resources in the present. In this report, many important areas have been discussed such as the concept of sustainable development, different approaches and strategies, economy, ecosystem, environment, education, food security, population etc. Although it did not focus on the educational perspective of sustainable development, the Brundtland report shared important issues related to sustainable development.

- (1) The report called for a common endeavour and for new norms of behaviour at all levels and in the interest of all. The changes in attitudes, in social values and in aspirations “*will depend on vast campaigns of education, debate and public participation*” (1987, Foreword of Gro Harlem Brundtland).
- (2) There are many feedback effects between Education, Population and Human resources. Rates of population growth compromise many governments’ abilities to provide education. Education improves the human potential to manage resources (education and training produce practical and vocational skills, reduce unemployment). It also gives women the choice to define the size of the family (family planning and contraceptives, social development programmes, female education), this *basic human right for self-determination* raises the status of women.
- (3) Education creates the conditions of fair society, equity and common interest: “*Sustainable development has been described here in general terms. How are individuals in the real world to be persuaded or made to act in the common interest? The answer lies partly in education, institutional development, and law enforcement*” (1987, p. 44).
- (4) Education introduces change in the content of growth, it takes into account the quality dimension: “*Sustainability requires views of human needs and well-being that incorporate such non-economic variables as education and health enjoyed for their own sake, clean air and water, and the protection of natural beauty*” (1987, p. 49). Money spent on education may raise human productivity.
- (5) Lack of education is part of a downward spiral in developing countries (high infant mortality, poverty). At the same, the growth in primary education doesn’t stop illiteracy which is continuing to rise in terms of sheer numbers.
- (6) The understanding of the interactions between environmental processes and economic development requires educational programmes aimed to kids, students and adults. The report considers that: “*Environmental education should be included in and should run throughout the other disciplines of the formal education curriculum at all levels - to foster a sense of responsibility for the state of the environment and to teach students how to monitor, protect, and improve it*” (1987, p. 96).

Finally, the Brundtland report suggests a societal and economic transformation, the main task of education policy should be to make literacy universal, to close the gaps between male and female enrolment rates, to improve education in quality and in relevance to local conditions.

The Agenda 21 and the Crucial Role of Education

The crucial role of education in achieving sustainable development has been duly noted at the United Nations Conference on Environment and Development, held in Rio de Janeiro in 1992, through Chapter 36 of its outcome document.

Agenda 21 is a document which is a non-binding action plan and a product of a meeting in Rio de Janeiro in Brazil in 1992 prepared after a meeting of 178 nation states. The United Nations organized an international meeting in the follow up progress of Brundtland commission. It is also called the earth summit report. It was discussed as an agenda of global, national and local level for each participating country in the meeting to contribute in identified areas to protect people and the planet. Agenda 21 refers to its scope relating to upcoming challenges of the 21st century. Its aim was to achieve sustainable development at a global level by contributing from a local level. Its main feature was introducing global guidelines for every country who can create its

local and national agenda according to its culture and context. Document consists of 40 chapters and four sections, its section first is about social and economic dimensions, section two conservation and management of resources for development, section three, strengthening the role of major groups and the last section is about means of implementation. It was the highest-level global commitment of nation states to fulfil their responsibility to contribute in protecting planned and people. Agenda 21 was considered as a dynamic programme which has a wide scope of changes with the passage of time and evolved as a guiding document on sustainable development. This action plan focuses mostly on the environmental and economical perspectives of sustainable development. This dynamic document proposed the background or context of a specific area of improvement, its concrete objectives, activities and means of implementation so that the governments and civil society should act in a guided manner to achieve specific objectives in a specific time frame.

Education is discussed in chapter 36 of agenda 21. This document is relevant with this effort because it recommends certain means of implementation against each objective in all areas of improvement. This effort also suggests four major areas to implement education for sustainable development principles and objectives. First, promote and improve the quality of education, second, Reorient the curriculum, third, raise public awareness on the concept of sustainable development and the last one, about training the workforce or human capital. These four objectives provided significant grounds for building the next generation to act according to nature and sustain the future of human beings. Quality education which focuses on lifelong learning will ultimately improve quality of life and it's only possible when the teaching material or text focuses on the priority on sustainable development agenda issues. This effort is also focusing on such highly important issues to implement through a sustainable development agenda on specific target groups to contribute on a smaller level. ESD is about education and learning - engaging people in SD issues, developing their capacities to give meaning to SD and to contribute to its development and utilizing the diversity represented by all people - including those who have been or feel marginalized - in generating innovative solutions to SD problems and crises (UNESCO, 2009).

Dakar Framework for Action on Education for All (2000)

The Dakar Framework for Action on Education for All (EFA) was adopted at the World Education Forum in April 2000. It reaffirms the vision of the World Declaration on Education for All (UNESCO, 1990) supported by the Universal Declaration of Human Rights and the Convention on the Rights of the Child: “*all children, young people and adults have the human right to benefit from an education that will meet their basic learning needs in the best and fullest sense of the term, an education that includes learning to know, to do, to live together and to be*” (WEF, 2000). The achievement of EFA involves to reach different goals and targets : (i) expand and improve comprehensive early childhood care and education, especially for the most vulnerable and disadvantaged children; (ii) make sure that by 2015 all children, particularly girls, children in difficult circumstances and those belonging to ethnic minorities, have access to and complete, free and compulsory primary education of good quality; (iii) ensure that learning needs of all young people and adults are met through equitable access to appropriate learning and life-skills programmes.; (iv) achieve a 50 per cent improvement in levels of adult literacy by 2015, especially for women, and equitable access to basic and continuing education for all adults; (v) eliminate gender disparities in primary and secondary education by 2005, and achieve gender equality in education by 2015, with a focus on ensuring girls full and equal access to and

achievement in basic education of good quality; (vi) improve all aspects of the quality of education.

If the Dakar Framework sets these six goals and proposed strategies to reach them, it insists also on the following three principles : (1) Education is a right and an inclusive concept, it imposes an obligation upon states to ensure that all citizens have opportunities to meet their basic learning needs : the education of girls remains a major challenge, especially in South Asia and Sub-Saharan Africa; (2) Primary education should be free, compulsory and of good quality : quantitative achievements tell nothing on the nature and quality of teaching and learning ; (3) the indispensable role of the state in education must be supplemented and supported by bold and comprehensive educational partnerships at all levels of society. ; the spread of democratic principles requires the growing contribution of civil society.

Johannesburg Plan of Implementation (2002)

In 2002 the representatives of 191 governments gathered in Johannesburg, South Africa for the World Summit on Sustainable Development (WSSD), with the aim of examining the progress made on the outcomes of the 1992 Earth Summit in Rio and also to reinvigorate the world's peoples toward true sustainable development. The participants in the Johannesburg Summit all reaffirmed their commitment to the Rio principles, the full implementation of Agenda 21 and the Programme for the Further Implementation of Agenda 21. They also committed themselves to achieve development goals contained in the United Nations Millennium Declaration.

The eradication of poverty was highlighted as the greatest global challenge facing the world and an indispensable requirement for sustainable development, particularly in developing countries. The different countries have been invited to develop programmes for sustainable development to increase access to productive resources, public services and institutions, in particular land, water, employment opportunities, credit, education and health ; to promote women's equal access to and full participation in, *“on the basis of equality with men, decision-making at all levels, mainstreaming gender perspectives in all policies and strategies, eliminating all forms of violence and discrimination against women and improving the status, health and economic welfare of women and girls through full and equal access to economic opportunity, land, credit, education and health-care services”* (United Nations, 2002). The challenge is significant: children are the agents of behavioural change, so national governments have to ensure that boys and girls will be able to complete a full course of primary schooling and will have equal access to all levels of education.

Education as training, capacity-building and skills enhancement are aimed also to promote the development of small and medium-sized enterprises, to develop awareness-raising programmes on the importance of sustainable production and consumption patterns, to provide information for the population about available energy sources and technology or to protect/manage the natural resources base of economic and social development. Finally, the JPOI called on the various governments to *“create and strengthen networks for science and education for sustainable development”* (United Nations, 2002) and to follow the recommendations proposed by the Dakar Framework for Action on Education for All.

United Nations Decade of Education for Sustainable Development (2005 - 2014)

Following the Johannesburg plan where education was taken as an indispensable element for sustainability, the United Nations designated its agency UNESCO to lead this initiative at global level. United Nations Decade of Education for Sustainable Development (2005 – 2014) (DESD) aimed at integrating the principles and practices of sustainable development into all aspects of education and learning, to encourage changes in knowledge, values and attitudes with the vision of enabling a more sustainable and a just society for all (UN, n.d). UN DESD marked an essential milestone to achieve progress against a sustainable global society. Its goal was to integrate knowledge to protect people and the planet and live a healthy sustainable life as a being of planet earth. This document provides a foundation in the field of ESD. For the advancement and progress evaluation UN endorsed a Global Action Program to work. The initiative of decade of education for sustainable development is evidence in the domain of ESD which proves significant advancement at global level. By its vision, aim or purpose, objectives, approach and nature many nations states reported changes in legal structures, policies, priorities and pedagogies. Participatory learning, critical thinking and problem-based learning approaches are taking importance in the field of education. DESD initiative was a successful evidence in implementation of the ESD agenda at global level by acting

through local level. Key focus of the DESD approach was content and purpose of education at all levels. Its initial strategy was to create networking to expand the agenda to larger scale through networks. Along with the principal DESD initiative some other parallel platforms were introduced such as RCE (Regional centres of expertise) and GUPES (Global Universities partnership on environment and sustainability). It was designed in a broad scope and far-reaching effects on the countries especially developing countries in order to transform their whole educational system in accordance with ESD guidelines.

ESD empowers learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society for present and future generations, while respecting cultural diversity. It is about lifelong learning and is an integral part of quality education. ESD is holistic and transformational education which addresses learning content and outcomes, pedagogy and the learning environment. It achieves its purpose by transforming society. DESD was considered as the most effective agenda for promoting the ESD objectives to achieve sustainability at a higher level.

The focus of the 2009 progress report prepared by the M&E Expert group was to track the progress and evaluate its achievement at the midpoint of the programme. The 2009 report was a mid-term review after five year of efforts on advocating the agenda of global challenges. Overall, after this report it was observed that with the passage of time and starting from the initiative more and more people are in the surge of a sustainable world. It motivates the objectives of such initiatives to continue until a significant change in the world. It is because this programme will continue for the next five years.

Chapter three of the report of the DESD emphasis more on meaning of ESD to create a common understanding about the concept. Consensus on the definition of the concept is rather difficult but following the principles and purpose of ESD a common meaning can be derived. *ESD is a process of learning based on the principles of learning and practice about sustainability.* Five types of learning have been discussed in the report (Education, n.d-b) such as learning to know, to be, to live together, learning to do and learning to transform oneself. Overall, the concept of

ESD in the chapter is defining it as a dynamic concept by keeping its huge scope and flexibility to fit in every context, culture and country in the world.

On one hand, another important point is discussed in the report about the relationship between ESD and other adjectival projects or programmes such as global education, environmental education, AIDS education, Education for all, UN Literacy day as well as MDGs (Millennium Development Goals). Although, the objectives of these initiatives resemble the objectives of ESD. On the other hand, it creates confusion among practitioners about the clear scope of ESD because at one stage all of these domains interlinked and mixed with each other. It can be considered as the strength of ESD because its scope covers the majority of academic domains to rapidly influence at a greater level. It is also a reality that all issues are interlinked poverty and quality of life cannot be separated from quality education. This nature of challenges makes ESD a dynamic and wide scope approach to deal with all types of issues and challenges for people and planet in the present and future. It seems this approach is becoming a foundation in transformation of current policies to new policies to achieve sustainability.

On the onset of DESD, implementation of the agenda was a complicated and difficult task. UNESCO took advantage of its already in place networks, mechanisms and partnership to start implementation. Later on, with the passage of time the UN established special mechanisms and frameworks in order to operationalize the concept of ESD within a decade.

Here it's interesting to discuss ESD integration in formal and informal educational policies around the world. Some countries implement it by integrating into curriculum, some by adopting certain activities in extra curricula activities. ESD in this report focused on primary and secondary formal education as an institution and target for integration of DESD agenda into every section and level of education schools. It also considers formal primary schools the way to cope with challenges human beings face at all times at global level. At the same time, it is also argued that sustainable development is adding more burden on the students through an already overcrowded curriculum. That was the key question reviewed during the review of DESD that how the education system integrates ESD agenda in a way that it can be a part of already in place curriculum, training and practice. Learning outcomes are important in ESD and what we are expecting from education to teach. Some learning outcomes were used to evaluate the progress of ESD in that particular decade. It is observed in this report that some poor regions stressed on some social issues such as peace, poverty, equality etc. Informal and non-formal education is also an important component of the ESD. Illiteracy is still a bigger challenge when about 10 million children remain out of school.

A very important and relevant discussion has been covered in the DESD review report in which is emphasis on continuing research on ESD to bring evident evidence to convince the countries which are lagging behind achieving targets in time to contribute to the cause. For the success of the ESD agenda UNESCO recognized research and key strategy along with other seven strategies. Therefore, this research is also focusing on a few of the focused areas of ESD such as policy review and learning. Review report highlighted some obstacles identified during the exercise by the key stakeholders that partners lack clarity about the concept of ESD and environmental education. Methods, content, curriculum, scope, funding and clear roles and responsibilities were also discussed in the report in order to expand the agenda at higher levels. It seems that similar challenges still exist in some countries where there is a need to define the concept and its scope of ESD to avoid confusion among people. It is recognized that non-

governmental organizations and other platforms associated with and without UNESCO played a vital role in promoting ESD agenda besides the constraints of funding and other resources. Overall, this report contributed to the clarity for the meaning, methods, research, development, approaches etc. for widespread understanding in the domain of sustainable development.

The previous report was a review exercise where we observe certain initiatives and challenges in order to pace up the agenda. In this stage, the decade of education for sustainable development was officially closed but its mission is still continuing until the achievement of the maximum percentage of the set target.

Higher Education Sustainability Initiative (HESI, 2015)

At the Rio+20 Conference, the Higher Education Sustainability Initiative (HESI) has been created as a partnership of several sponsor UN entities (UNESCO, UN-DESA, UNEP, Global Compact, and UNU). Over 300 universities from around the world joined the network and signed the TOR (Terms Of Reference) intended to clarify the role and the responsibilities of the various actors involved in HESI. All the members of the network have been committed to work and promote implementation of the SDGs by supporting higher education in their pursuit of integrating sustainable development into teaching, research, curricula, outreach and sustainability practices by (HESI, 2018):

1° Teach sustainable developments across all disciplines of study, including through online based platforms;

2° Engage with students on campus and seek to represent and support their interests through the group;

3° Encourage research and dissemination of sustainable development knowledge;

4° Green campuses and support local sustainability efforts;

5° Engage and share information with international networks;

6° Outline an advocacy agenda that would see partners make contributions towards either systemic, sectoral or thematic issues relating to the SDGs with governments and other stakeholders;

7° Explore innovative practices from other sectors / Partners that seek to deliver transformative change around this agenda.

The Global Action Programme (GAP) of UNESCO (2014)

As a follow-up to the United Nations Decade of ESD (2005-2014), UNESCO launched the Global Action Programme (GAP) on ESD. The overall goal of the GAP is to generate and scale up actions in all levels and areas of education and learning to accelerate progress towards sustainable development. GAP has identified five priority areas to advance to ESD agenda: policy support, whole-institution approaches, educators, youth, and local communities. UNESCO has established five Partner Networks, each corresponding to the five priority areas, as one of its main implementation mechanisms of GAP. The Partner Networks will create synergies for the activities of their members and catalyse actions by other stakeholders.

Keeping the disasters situation of the planet earth where climate change, social inequalities, economic crisis, shrinking of natural resources and a long list of challenges convinced the global community to take decisive actions and convinced that education is the only tool which can contribute in the cause for long term sustainable development. The final report of DESD demonstrates some major steps in contributing and advancing the implementation of the agenda. It reorients learning, teaching, knowledge, information, communication, values, skills, decision

making, mobilizing masses, creating awareness in all three dimensions of ESD social economic and environment. It is believed and observed during the decade long interaction of different stakeholders that the top leadership of every country seems convinced and committed to the cause which advanced in progress of achieving their agenda. This initiative also contributes in advancing the quality of education with reference to sustainable development. A solid foundation has been laid for ESD at the end of the DESD, achieved by raising awareness, influencing policies and generating significant numbers of good practice projects in all areas of education and learning (UN., n.d)

Access to education is the major thrusts of DESD agenda and same is prioritized in this effort. It is prioritized because without the access of education in formal setup how could one realize the benefits of ESD. This article is focusing on the formal educational setup or institutions.

It is important to highlight and discuss how DESD transformed education which is evidence for the next step of planning and implementation.

The 2014 final DESD report highlights major trends and findings learned from the past one decade at different levels. It finds ESD as an enabler for sustainable development by shaping the vision for future generations. Education and sustainable development agenda are reinforcing each other in all three dimensions of ESD social, economic and environmental. Many countries transformed policies, strategies, tools, education curricula etc. to achieve SD agenda. Partnership and political institutions observed instrumental in advancing educational agenda during the decade. Partnership was an observed key effective mechanism to implement the agenda on a large scale to achieve maximum objectives within the limited time frame. Formal education at primary and secondary level achieved significant progress towards agenda within ten years of duration. If this pace progresses, which is although a little slow in achieving objectives, it will bring significant contributions in the human present and future. Change reported by member states specially in transforming curricula and pedagogy. UNESCO observed encouraging evidence through the QME report to demonstrate progress in educational approaches all across member states and other countries of the world.

Overall UNESCO witnessed many challenges and obstacles in implementation of the ESD agenda at high scale. Some countries found it very responsive and interested in implementing ESD objectives, others seemed more reluctant to change curriculum and educational approaches. During the Decade, a variety of implementation strategies were reported from member states. Many initiatives and projects were introduced and implemented. One example is the Australian whole school approach which focused on four basic pillars for integrating ESD, governance policy and capacity building, community partnership and relationship, school facilities and teachers teaching and training and curriculum.

The Muscat Agreement (2014)

The growing international recognition of Education for Sustainable Development (ESD) as an integral element of quality education has been recognized by the MUSCAT Agreement (Global Education For All Meeting: Oman, 12 - 14 may) and the proposal for Sustainable Developments Goals (SGDs) developed by the Open Working Group of the UN General Assembly on SDGs (OWG).

The Muscat Agreement reaffirmed that “*Education is a fundamental human right for every person. It is an essential condition for human fulfilment, peace, sustainable development,*

economic growth, decent work, gender equality and responsible global citizenship” (Unesco, 2014). The post-2015 Education Agenda has to empower learners to take informed decisions and responsible actions for environmental integrity, economic viability and a just society (see table 1). Education must be a stand-alone goal in the broader post-2015 development agenda and be integrated into other development goals. The Muscat Agreement supported "*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*" and translated this goal into global targets.

Table-1. Overarching goal and global targets from Muscat Agreement.

Target 1: By 2030, at least x% of girls and boys are ready for primary school through participation in quality early childhood care and education, including at least one year of free and compulsory pre-primary education, with particular attention to gender equality and the most marginalized.
Target 2: By 2030, all girls and boys complete free and compulsory quality basic education of at least 9 years and achieve relevant learning outcomes, with particular attention to gender equality and the most marginalized.
Target 3: By 2030, all youth and at least x% of adults reach a proficiency level in literacy and numeracy sufficient to fully participate in society, with particular attention to girls and women and the most marginalized.
Target 4: By 2030, at least x% of youth and y% of adults have the knowledge and skills for decent work and life through technical and vocational, upper secondary and tertiary education and training, with particular attention to gender equality and the most marginalized.
Target 5: By 2030, all learners acquire knowledge, skills, values and attitudes to establish sustainable and peaceful societies, including through global citizenship education and education for sustainable development.
Target 6: By 2030, all governments ensure that all learners are taught by qualified, professionally-trained, motivated and well-supported teachers.
Target 7: By 2030, all countries allocate at least 4-6% of their Gross Domestic Product (GDP) or at least 15-20% of their public expenditure to education, prioritizing groups most in need; and strengthen financial cooperation for education, prioritizing countries most in need.

Source: Muscat Agreement (2014).

The Sustainable Development Goals (2015 - 2030)

United Nations general assembly resolution 70/1 approved Sustainable Development Goals (2015-2030) as follow up agenda of Millennium Development Goals (2000-2015) and a global development agenda with larger scope and scale than the previous agenda to achieve global progress towards a sustainable future of people and the planet. This global challenge is a paradigm shift from the policy and planning to implementation of this agenda by aligning it with the national goals of countries' strategic plans. Its scope broadens its scale and engages almost all countries to incorporate objectives into planning policy to achieve goals on large scale.

These SDGs are an urgent call for action in a global partnership strategy. They address a simple message to developing and developed countries: the end of poverty and inequalities requires a holistic and systemic approach aimed at integrating issues related to water, energy, urbanization, transport, climate, technology, food, air quality, health, education.

3. SDGS ISSUES FOR PAKISTAN: TRANSFORMING THE SDGS INTO NATIONAL GOALS AND TARGETS

Pakistan obliged the global community commitment and signed the global agenda 2030 for the betterment of the people of Pakistan and the planet as a whole (Diemer, Khushik, 2020). Soon after acceptance of the challenge during the Paris summit 2015, the government of Pakistan unanimously adopted SDGs through its national parliament resolution and started working on it in February 2016 to become the first country to initiate the process of policy and planning at high level national forums.

Planning, Policy and implementation of SDGs in Pakistan

After experiencing challenges in the previous development agenda's (MDGs, EFA, Polio) or global issues fails to achieve the targets, therefore, this time Pakistan developed a national level SDGs framework to implement SDGs (see figure 1). It is discussed and approved at a high-level government policy and decision-making forum. This framework provides a basic foundation for the baseline and indicators against each and every target to track, monitor and evaluate the progress. It is called the national SDGs framework which includes five critical pathways (CPW5) that would converge to reduce regional inequality by fostering inclusive and sustainable development. In this critical pathway, strategy a comparative criteria model was adopted to prioritize SDG targets. Width, depth, multiplier, level of urgency, low structural change is required, low resources required and relevance for the provinces. Major regular data collection instruments have been modified and aligned with the new tracking target and reporting against targets. Apart from the above discussed framework, there are a number of other initiatives that have been taken since 2015 to address the global agenda.

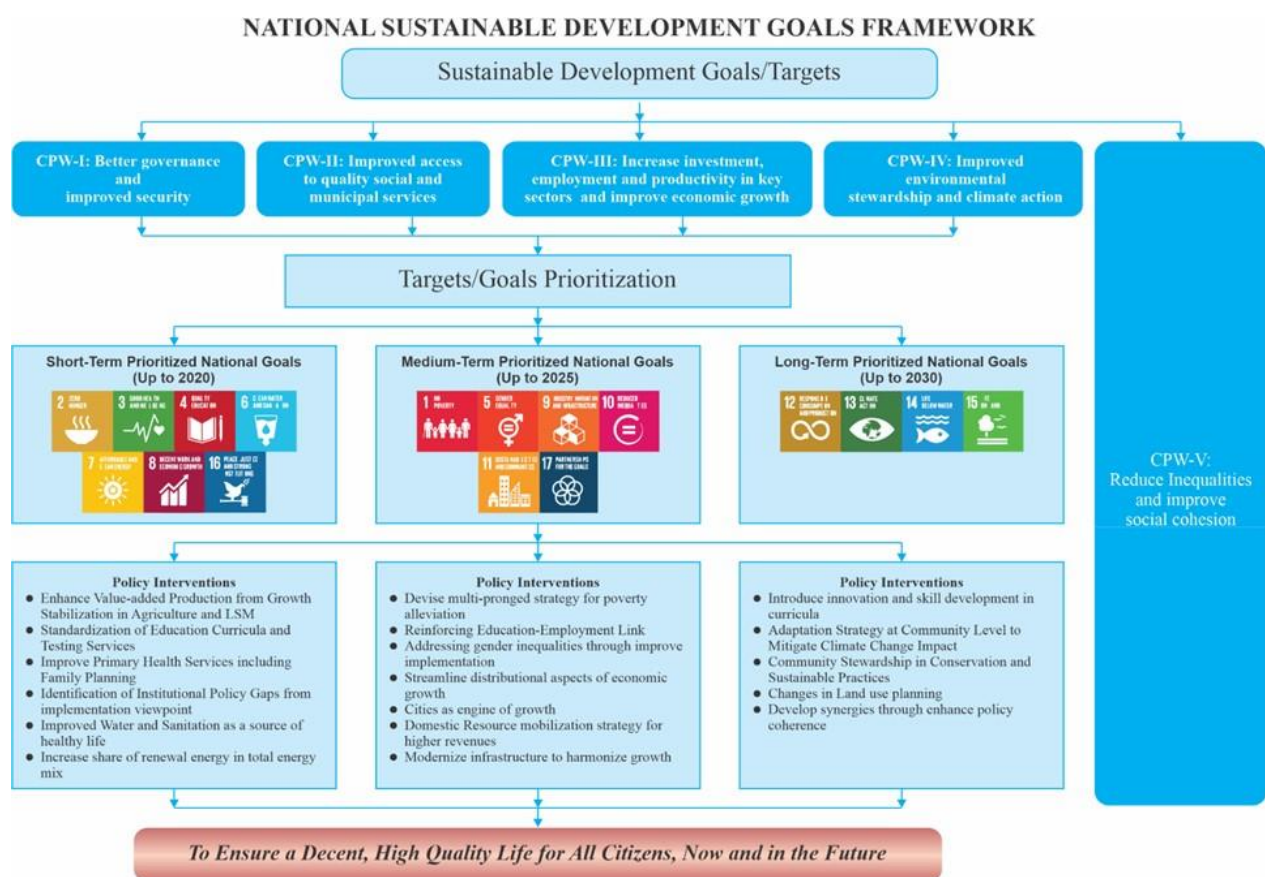


Figure-1. Sustainable development goals and targets.
Source: National SDGs framework for Pakistan 2018.

SDGs are as important as the future of Pakistan because all SDGs are targeting contemporary challenges which are similar to Pakistan and human beings are facing all around the world. Change of policy and enabling environment was considered as the first step in achieving the agenda 2030. Below section is discussion about the first step of policy guidelines regarding SDGs.

Pakistan addressed all 17 SDGs in resolution passed in its national assembly on 16 February 2016 by giving it a legislative initiative but keeping its internal context and limited resources in mind, it prioritized the SDGs to achieve targets. Gradually Pakistan started working on all SDGs targets on a regular basis to map the implementation challenges. Below is the brief discussion on

the progress of Pakistan on mainstreaming SDGs into its planning, policy and implementation. According to an official report of voluntary national review (Pakistan's implementation of the 2030 agenda for sustainable development) (Pakistan's, n.d) introduced four means of implementation:

1. Institutional mechanism for the SDGs.
2. Localizing the goals.
3. Monitoring and reporting mechanism
4. Critical challenges

For addressing the first mean of implementation establish institutes to deal with the SDGs, Pakistan's government established separate desk/unit/institute for sustainable development goals as a unit at federal level in the capital of the country Islamabad in order to create a focal office for, planning, communication, coordination, cooperation, data collection, information sharing, research, policy formation and mainstreaming the SDG agenda in order to recommend framework of action to align next planning from national to local level. This was established as a separate desk/unit/institute for all above tasks because of non-achievements and learning from the challenges and failures in achieving MDGs targets. This desk has a diverse group of experts on various fields to provide policy advice to the government in order to align planning with SDGs targets.

Another report (SDGs, n.d) mentioned three priority areas according to the UNDP recommended approach to mainstream the SDGs in national level agenda. These are Mainstreaming, accelerating and policy support. In this approach giving more understanding on mainstreaming by establishing institutional mechanisms. With the help of the UNDP ministry of planning, development and reform and planning and development departments in the provinces/regions launched a joint five years' project "national initiative for sustainable development goals" to institutionalise 2030 agenda for coordination and implementation.

The Ministry of federal education and professional training (MoFEPT) is an umbrella organization which is responsible for planning, implementation, reporting, communication, coordination, development and dissemination among other regions/provinces educational departments and ministries. The SDG unit works under this ministry jurisdiction and domain.

Since late 2015, Pakistan has been struggling to develop a framework of action to mainstream SDGs agenda into its next planning for the future for the whole country. Pakistan has already a vision 2020 to 2025 plan for the development of the country. However, this plan is reviewed by the ministry of planning, development and reform in order to align its objectives with the SDG agenda. The state of Pakistan owns this global agenda and considers it as its national development agenda but there are some priority areas in the context of Pakistan which are more important for Pakistan. Taking all stakeholders on board, creating new ventures of public private partnerships, policy reviews etc.

In December 2017, the federal SDG unit prepared a first data reporting gap report in order to create a baseline benchmark. This baseline will be followed for next planning. Initially, it was a complex and multi-layered exercise in a country like Pakistan where there are several horizontal and vertical tiers involved in the process of development. SDGs were selected on the basis of urgent importance. On the next step review of policies, plans, theoretical and empirical exercise was done and found that the key issue is availability of data. This data gap demonstrates a huge

unavailability of information on several SDGs. Some of the targets of education have data but unreliable and other targets such as 4.7 have no data. After this report SDG unit decided to develop a list of recommendations to the government departments to make modifications in some regular state level surveys to collect information on the progress against SDGs on a regular basis. Since then all relevant government official departments such as Bureau of Statistics, state bank of Pakistan, finance ministry, ministry of educational planning and development and federal SDG support unit gathering data on a regular basis to monitor and track progress against all targets. Therefore, the Government of Pakistan aligned the 12th five-year plan in accordance with the SDG agenda to reflect its commitment with the purpose. *Pakistan has designed a comprehensive National SDG Framework which was approved by the National Economic Council (NEC), the country's highest economic policy-making forum, in March 2018. This Framework sets baselines and targets for SDG indicators and will feed into the SDGs' Monitoring and Evaluation Framework. The framework is now guiding the provinces and federally administered areas to determine their development priorities, based on local needs* (Pakistan's., n.d). Further, to institutionalize the agenda, thematic clusters and technical committee formulated at district level to channelize the priorities according to SDGs. Overall Pakistan established a mechanism starting from legal framework, planning, implementation, monitoring evaluation and reporting.

Apart from legislation, planning, designing frameworks, projects, plans, reporting etc. raising awareness is also taken as another front to mobilize masses in order to create ownership of agenda. In 2017 the local government representatives' summit was one of the forums. Civil society, academia and all other stakeholders and segments of society taken on board to spread scope and sharing roles and responsibilities in order to rapid results. Following section focuses on only one SDG about education SDG4.

SDG4 implementation challenge

The following SDG4 statement demonstrates an aim for the global community to achieve educational targets for every individual on the planet. Goal 4 is comprehensive, holistic, ambitious, aspirational and universal, and inspired by a vision of education that transforms the lives of individuals, communities and societies, leaving no one behind (Education., n.d). SDG4 is a common cause to address unfinished agenda of previous global targets for education such as MDG2 and EFA. Its approach is rights based focusing education as a basic human right. Objectives is to include every person without any discrimination of race, religion, sex, age, colour ethnicity, language, political affiliation, origin, birth and culture etc. Another feature of this target is that it is a universally owned aim. It is also important that it is widely seen within the context of development. Therefore, this target is relevant and important for the context of a country like Pakistan, because it is a diverse country in all above characteristics therefore it is owned and tried to be implemented locally. Another characteristic of this aim is to include all tiers of education, formal, non-formal and informal, but this effort only focuses on formal education because of its wider scope and scale. In implementing the new agenda, the focus should be on efficiency, effectiveness and equity of education systems.

“Ensure inclusive and equitable quality education for all and promote lifelong learning opportunities for all”.

To further make the aim achievable the agenda 2030 document contains its seven sub-targets in order to make it more feasible, measurable and achievable.

1.1. By 2030 Ensure that All Girls and Boys Complete Free, Equitable and Quality Primary and Secondary Education Leading to Relevant and Effective Learning Outcomes.

Keeping the focus and clarity here, this effort specifically addresses only the first target because without entry in the educational institute in other words access, achieving SDG 4 targets are impossible. Equity and inclusion are two basic components of SDG4.

All provinces/regions and areas of Pakistan legally incorporated and achieved targets at legal level to mainstream SDG4.1 in the legal educational framework. “SDG 4.1 Policies and legislation that guarantee at least 12 years of free, publicly funded, inclusive and equitable quality primary and secondary education (SDG-4, n.d)”. According to Pakistan’s SDG4 gap analysis report 2017, all regions, provinces started legislation after national assembly resolution. Already in places education sector plans, policies, projects, programmes aligned with the SDG4 objectives except, northern areas and Azad Jammu and Kashmir. Although all responsible institutes were regularly guided from federal and provincial SDG units in order to align all official planning, implementation and data collection documents with agenda 2030 targets.



Figure-2. Institutional process to challenge SDG 4.
Source: Authors.

On the educational front Pakistan faced and still faces lots of internal, external, local, national, global challenges and issues in implementation of SDG4 agenda throughout the country (see figure 2). Many of these challenges and background history are already discussed above for example, its dynamic nature, multicultural context, poor socio-economic status, all types of disparities, inequalities, corruption and so on. Another long list of issues is discussed in detail above in the introduction section. Similarly, SDG4 has identical challenges to achieve targets in a given time frame in a proper manner.

An approach recommended in the Incheon framework of action 2015 that Building on the lessons of EFA and the MDGs, states should invest in and scale up innovative, evidence based and cost-effective approaches that enable all individuals to gain access to, participate in, learn through and complete a quality education, with a special focus on those who are the hardest to reach in all contexts (Education.. n.d).

Strengthening policies, plans, legislation and systems, emphasizing equity, inclusion and gender equality, focusing on quality and learning, promoting lifelong learning, addressing education in emergency situations

Table-2. Main streaming SDG 4.1 target in regions/provinces.

SDG 4.1	Balochistan	KP	Punjab	Sindh
Policies and legislation that guarantee at least 12 years of free, publicly funded, inclusive and equitable quality primary and secondary education.	Provincial legislation enacted guaranteeing 10 years of free, publicly funded education.			
Define standards and review curricula to ensure quality and relevance.	National standards and curriculum developed.			
	Curriculum Implementation Framework and capacity assessment; quality textbooks.	Omitted from current ESP.	Includes development of standards for curriculum review.	Emphasis on research-based and contextualized curriculum, with curriculum authority, Curriculum Implementation Framework.
More robust, comprehensive assessment systems to assess learning outcomes.	Shift towards critical skills assessment and developing capacity to conduct diagnostic assessment.	Omitted from current ESP.	Review assessments for curriculum-based assessments; assessment for system diagnosis.	Focus on formative assessment and improved examinations. Curriculum-based assessment.
Strengthen institutions, school leadership, and governance.	Develop supportive political leadership, decentralized governance and managerial efficiency.	Improved data and developing district level management skills.	Strengthening management especially in rural areas.	Capacity building of head teachers and district planners, improved monitoring. Induction training for head teachers.
Alternative modes of learning and education for out of school children and adolescents.	Develop policy framework, expand programmes and build capacity.	Not included.	Develop formal linkages between NFE and education departments.	See SDG 4.6.
Foster bi and multilingual education.	Develop school language policy and capacity to teach in mother tongue.	None, but there is debate in the province on English vs mother tongue education.	Language policy balancing Urdu and English.	Sindhi and Urdu language education already exists.

Source: SDG4 gap analysis report (2017).

SDG 4 is as important as the other SDGs of the 2030 agenda however Pakistan's approach for targeting these SDGs especially through education is believed to be committed with the promise made in Paris conference 2015. As it is discussed above in the section of education and

sustainability where we have observed a long history of debate and discourse on education for sustainable development. Research proved that there is consensus among all folks of life that education, especially quality education which focuses on values and principles of ESD is the long-term sustainable solution of the contemporary challenges human beings are facing. It is considered as the only solution for the challenges human beings are facing at the moment and in the near future. Therefore, Pakistan's approach to education and SDG4 is also prioritized in the national SDG goals framework for short-term national goals to achieve results as per set time frame.

Apparently, literature and educational policies and plans demonstrate similar thinking in decision makers of Pakistan. New National Education Policy and National Curriculum Framework laid the foundations for the achievement of this SDG target (SDG-4, n.d). Although a cycle of problems and challenges and its interconnected nature among each other emphasis more on education because it is the only tool which suggests long term sustainable solutions for many problems of Pakistan is facing today. This school of thought believes that focusing and prioritizing education can bring a sustainable transformation in the society as a whole. Therefore, keeping this thought in observation, the UN widened the scope of SDGs and included many other topics to address the global challenges. Although it is a challenge for the state to operationalize the SDG4 objective from policy/agenda to practice. Following table of framework from the national SDGs framework technical guidelines suggested one of the pathways to achieve agenda 2030 along with education on top of the priority in the short-term national goal.

With regards to achieving targets of SDG4, Pakistan is facing severe challenges, 22 million children aged 5 to 10 years are out of school, access to education is still a major challenge, along with it, there are many internal and external challenges and issues such as corruption, infrastructure (basic facilities - building, furniture, stationary, electricity, water and toilet), inequalities, disparities, quality curriculum, qualified teachers, teachings methods, conducive environment, budget and so on etc. Apart from these internal educational challenges, some external challenges are poverty, illiteracy, cultural barriers, unawareness about education, political interference etc. Along with these issues, the education sector in Pakistan is one of the heavily focused areas along with some other SDGs. The greatest number of legislative frameworks relate to SDG 16 ('Peace, Justice and Strong Institutions'), SDG 8 ('Decent Work and Economic Growth') and SDG 4 ('Quality Education') (Pakistan.. n.d). Keeping the above discussion and Pakistan's context as a case study in mind, this study focus only on the first ESD thrust of improving access to quality basic education (Agenda, n.d) and attainment, which is a one of the greatest challenges for Pakistan's primary level education and simultaneously the primary target of SDG4 in agenda 2030. To achieve 2030 targets of education, here we only discuss access to education because it is the primary reason for education in Pakistan also, without attending an educational institute, it will be impossible to achieve the ultimate objective of education for sustainable development and overall SDG4. Therefore, ESD put access to quality basic education on top of the priority list. If millions of children are out of school, then talking about ESD significance is useless.

Figure 3 presents the dynamics of bad quality of education in Pakistan. We use here System thinking and Causal Loops Diagram to enlighten the loops (R1, R2, R3, R4) which reinforce the bad quality of the education system and the loops (B1, B2, B3, B4, B5, B6) which balance the system. These last loops identify the relevant driving forces to change the system and induce a higher quality of education. This is the systemic challenge of SDG4 for Pakistan.

Loop R1 describes a well-known causal chain in developing countries. Growth in economic activity (GDP) is challenged by growth in population. GDP/capita declines, which increases poverty and inequality. The quality of education deteriorates, this effect is reinforced by three other loops, loop R2 which results in an increase in the number of children per class, loop R3 which integrates the consequences of climate change on teaching conditions (higher temperature in infrastructures), loop R4 which specifies that an increase in poverty leads to a decrease in the quality of education.

It is possible to balance these effects via loops B1, B2, B3, B4 and B5. Loops B1, B4 and B5 relate more specifically to an improvement in the status of women. Loop B1 includes a mechanism for regulating the population through family planning and information on women's rights. Loop B5 relies on micro-credit to develop women's economic activities (entrepreneurial status) and enable them to access bank loans. Loop B4 introduces the idea that the existence of school canteens promotes the emancipation of women and the presence of children in school. Loops B2 and B6 consider that the State must invest in school infrastructure in primary and secondary schools, but also in higher education (an increase in the birth rate will result 18 years later in a massive flow of students to university). This public investment must also take the form of teacher recruitment, which could reduce the number of children per class. It should be noted that the recognition of a real status for women (B3) can only improve girls' access to school.

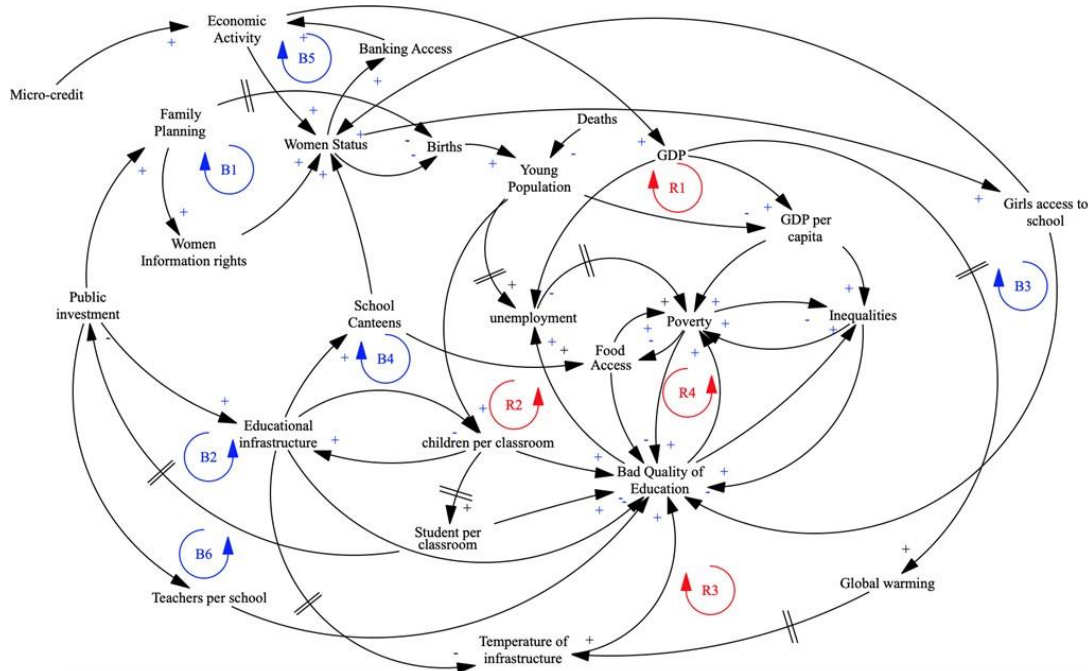


Figure-3. The dynamics of bad quality education.

Source: Authors.

This presentation in the form of a Causal Loops Diagram (CLD) reinforces the idea that education is not only a key driver for introducing more sustainability into the development process, it is also a set of leverage points that should be gradually removed. The identification of these leverage points is the condition for improving the quality of education in Pakistan.

Conclusion

UNESCO's best suited statement about importance of quality education which said that "education is at the heart of the 2030 Agenda for Sustainable Development and essential for the

success of all SDGs (Education, n.d-a)”. In the literature and previous global targets and plans emphasis on education as an indispensable tool to achieve progress in many ways such as global citizenship, responsible and productive citizens, critical decision-making minds, a generation living with peace and harmony with nature etc. In this effort, sustainable development goal 4 is thoroughly reviewed and assessed in the context of a country which is dynamic and unpredictable in many means. Apparently, Pakistan is still struggling to manage progress in the educational front, at least to attract pupils to access education. Some similar factors such as GDP, poverty, basic facilities, and teacher quality etc. are reportedly challenging to achieve the agenda 2030 objectives. Outcome can only be possible when we put relevant and enough input. It is understood by the CLD diagram that education is a key tool to achieve educational targets.

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Chapter 7

Using the iSDG SD model as a policy-making guiding tool to achieve SDG 4 in developing countries: A case study on Pakistan ^[P]_[SEP]

Faheem KHUSHIK, Arnaud DIEMER
University of Clermont-Ferrand, CERDI, ERASME, France

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Abstract: Over the decades, educational systems around the globe evolved in their complexity, with increase in their scope, spread, access and dynamic nature. Developing robust education strategies requires tools that can capture, analyse and quantify the interrelation between education and other sectors, particularly in the perspective of achieving the Sustainable Development Goals (SDGs). This article reviews such a tool, namely system dynamics (SD) modelling, by examining the development of two widely-used development models : the T21 and the iSDG. A case study analysis on Pakistan is then carried out through the use of literature review and Causal Loop Diagrams (CLD), followed by a discussion on the main dynamics that are central to the achievement of SDG 4 for the country. We find that, over the years, SD models have significantly evolved in complexity and accuracy, following a decades long track-record of real-life application with governments around the world. In Pakistan, we find that economic activity, adult literacy rates, effective government spending and average years of schooling for new adults are essential factors in the development of the education sector. The results suggest that implementing the use of SD models in Pakistan can contribute to the creation and subsequent evaluation of holistic education programmes, which would not only contribute to achievement of SDG 4, but have a higher impact on the achievement of the overall SDG agenda in the country.

Keywords: Sustainable Development Goals; Causal Loops Diagram, Education, iSDG, System Thinking, System Analysis

Introduction

The educational context of Pakistan is frequently discussed in reports, projects, programs and research articles (Hunter, 2020; Durrani & Halai, 2018; Hameed-ur-Rehman & Sewani, 2014; Tamim, 2014). The education system in Pakistan is complex and dynamic in nature because of continuous changes, inconsistent policies, multi-scales (urban and rural), gender discrimination, economic inequality or high level of out-of-school rates (Roohi 2007). These are some of the main obstacle's children are facing in society. Preparing children for future challenges is a prerequisite for achieving a sustainable society. Comprehensively addressing these challenges requires a systemic approach to explore dynamics in education and their linkages with challenges associated with promoting peace, sustainability, and global citizenship (Mochizuki 2019). The educational system faces many internal and external challenges. Policy, administration, political interference and political influence need to be addressed in an effective way in order to improve its inputs and outputs/outcomes. The primary purpose of education for Pakistan is to achieve economic objectives (Afzal & al., 2010; Babar & al., 2008) as well as social development (Rasool Memon, 2007). To do so, Pakistan needs a transformation of its education strategies, so that it cannot only achieve the country's priorities but also achieve the global climate objectives that the state has committed to during the Paris summit of 2015 (Sayed, Ahmed, 2015; Mc Grath & Powell, 2016). Following the Paris Agreement, a central sustainable development unit was

established to research, report, collect data and coordinate among government departments and regions in order to synchronize sustainable development efforts at national level. National level meetings, reports and data collection tools were modified, and regional development projects, plans and programs were revised in order to achieve targets within a given time frame (Khushik, Diemer, 2017). One of them - Sustainable Development Goal 4 “*Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all*” - is a global agenda for educational objectives set for the year 2030 (Cho & al., 2017). Its targets and indicators are widely spread all over the globe in order to achieve the global objective of education for maximum children (Unterhalter, 2019).

However, historical results show a trend of inefficiency when it comes to achieving educational targets in Pakistan (Khushik, Diemer, 2018). The country remained far behind in achieving the targets of the Millennium Development Goals (MDGs), education for all and all its internally-set targets in each educational policy (Attaullah, Malik, 2015; Rizvi, Bhatti, Das & Bhutta, 2015). This is still the case with the Sustainable Development Goals (SDGs), where insufficient progress has been made for reaching SDG 4 targets (Ghaus & al., 2015; Seeme, 2017). In its SDG 4 gap analysis report, the United Nations Education, Scientific and Cultural Organisation (UNESCO) mentions that “*Pakistan faces severe challenges with regards to achieving SDG 4, 22.6 million children aged 5-16 years are out of school*” (UNESCO 2020)¹². These challenges concern poverty, accessibility, quality teaching, quality of curriculum, budget constraints, corruption, political interference, inequality, gender discrimination, geographic spread or different cultures, centralization and so on (Roohi, 2007).

One explanation for this situation is that educational challenges or targets are tightly coupled with economic growth (Diemer, Khushik, Ndiaye, 2020). The growth of the Gross Domestic Product (GDP) is a prerequisite to educate more people and set the country on the high-quality education pathway. Econometrics models (Jalil & Idrees, 2013) and Computable General Equilibrium Models (Siddiqui, 2006) used to study this correlation show the lack of efficiency of capturing the structure of the educational system, together with its different feedback effects. The official UNESCO SDG 4 gap report highlights some measures to enhance pace of achieving targets by improving data collection quality with consistency, regular monitoring with concrete indicators and evaluation of progress (Khushik, Diemer, 2020a). At the state level within Pakistan, a clear mapping has been done in order to roll out a policy or program for SDG 4 achievement (Javed, Wajid, 2019). Within the country, different regions/provinces devolve the education department from centre to provinces/regions therefore every region is now independent in policy, planning, implementation and outcome after 18th constitutional amendment in year 2010 (Sohoo & al., 2019). On one hand, decentralization decreases tiers to manage but on the other it poses challenges of capacity (Davood, 2009). Country capacity and resources are also raising questions for not being able to achieve objectives. Primary and secondary education is under provincial domain except higher education in universities, which is managed and administered by the Higher Education Commission (Parveen & al., 2011). Regions/provinces have their own challenges apart from above mentioned issues such as cultural barriers which hinders girls to go to school (Arai, Tabata, 2006). The Planning commission of Pakistan took the lead in conceptualization of the national framework (Kemka, Kumar, 2020). All education sector short, medium- and long-term projects have been modified with special focus on access, quality and governance. Due to a significant portion of private schools

¹² http://unesco.org.pk/education/documents/2018/DRAFT_PK_SDG-4_Gap_Analysis.pdf.

enrollment it is more complicated to mobilize private schools for incorporating national objectives and follow national policy (Sohoo & al., 2019). But “to achieve success on SDGs agenda a strong partnership between public and private sector and civil society is needed¹³”.

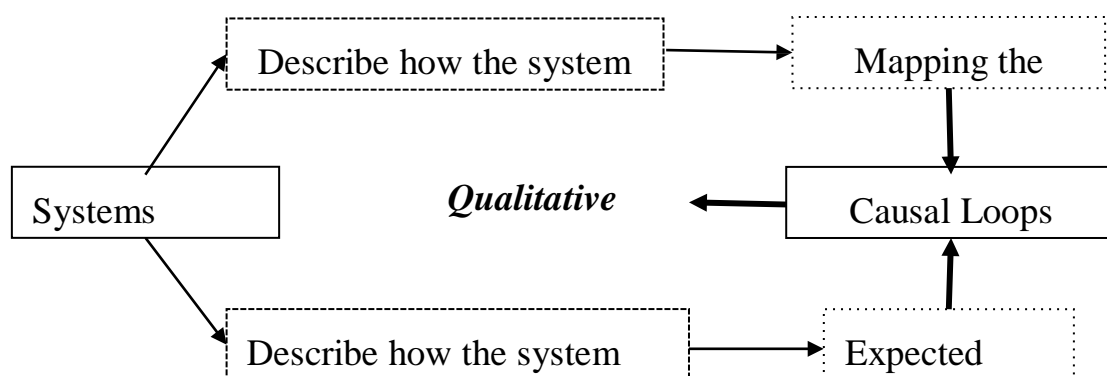
The National SDGs framework proposed some targets regarding SDG 4. Target 4.1 stipulates that 100% (girls+Boys) will finish basic primary education by 2030 as compared to the current 57% literacy rate. Target 4.5 stipulates an increase of the current GPI from 0.87 now to 1 in 2030. With these nationalized targets, Pakistan is hoping to achieve some of SDG 4 targets on time. Nevertheless, it will be extremely challenging for the state to achieve objectives within a given time frame till 2030 (Khushik, Diemer, 2020b). With a fast-growing population, Pakistan is already the sixth most populous country in the world with 221 million people and this number is expected to reach 338 million by 2050 (UN Population Statistics 2020). At present, 63% of Pakistanis are under the age of 30 (UN Population Statistics 2020). Education will thus play a key role in the modernization of the country and the achievement of its SDG agenda through its positive (direct and indirect) impacts on economic and social development, from primary level (Zahid & Iqbal, 1998) and secondary level (Abbas, Foreman-Peck, 2008).

Methodology and Research Design

The overall theoretical framework of this article is **Systems thinking, which** encompasses “a large and fairly amorphous body of methods, tools and principles, all oriented to looking at the interrelatedness of forces, and seeing them as part of a common process” (Senge, 1994). A system is a perceived whole whose elements work together because they continually affect each other over time and operate toward common purpose. In Systems Thinking, the structure of the system plays an important role. The structure is the pattern of interrelationships among key components of the system. That includes the hierarchy of the flows, attitudes and perceptions, the ways the decisions are made. For Senge (1992), systems thinking introduces four levels operating simultaneously: events, patterns of behavior (over time), systemic structure and mental models.

Systems Thinking describes how the world works (the quality of a model depends on the quality of reasoning) but also allows us to imagine how the world could be.

Figure 1 : Systems Thinking and Qualitative Design of a Model



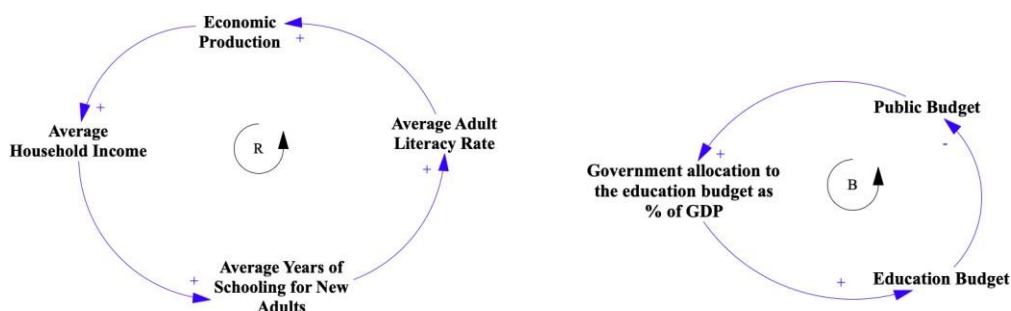
Source : Diemer (2020, 2004)

¹³ SDGs Pakistan." https://www.sdgpakistan.pk/uploads/pub/National_SDGs_Framework_-_NEC_20182.pdf.

One application form of System Thinking has become particularly valuable as a language for describing how to achieve fruitful change in organizations. This application form is called *System Dynamics* (Forrester, 1961, 1969). System dynamics - via causal loop diagrams (CLD) and stock - flows diagrams (SFD) - is the study of dynamic feedback systems using computer simulation (using VENSIM, STELLA or POWERSIM software). It applies to dynamic problems occurring in complex social, management, economic or ecological systems - literally any dynamic system is characterized by interdependence, mutual interaction, information feedback and circular causality.

In order to assess the usefulness of SD modelling for policy design in achieving SDG 4, this paper is based on a case study review on the use of SD modelling in education, with a focus on two major SD models, the T21 and the iSDG, developed by the Millennium Institute (Qu, Barney, Symalla, Martin, 1999). These models were chosen for two main reasons. First, because they have been applied in a number of developing countries around the world and so they constitute an already tested policy-guiding tool. Second, because the iSDG is a revised version of the T21 model, which allows an examination into the main evolutionary changes that have occurred so far, while enabling an analysis of how the model can improve into the future in order to better respond to policy challenges. Causal Loop Diagrams in particular will be used in the discussion part of this paper, where the implications of SD modelling of the Pakistani education sector, particularly through the T21 and iSDG, are examined. These diagrams lead us to see causality as an “ongoing process”, rather than a one-time event. The language of Systems Thinking is “links” and “loops”. From any element in a situation (variable), it’s possible to trace arrows (links) that represent influence on another element. These links may reveal cycles that repeat themselves, time after time. Links never exist in isolation; they always comprise a circle of causality - a feedback loop in which every element is both cause and consequence. There are basically two representations of loops - reinforcing and balancing loops (fig. 6). Reinforcing loops (R) have a positive polarity (+), generating exponential growth and collapse, which continues at an ever-increasing rate. Balancing loops (B) generate resistance’s force (which may limit the growth). Balancing loops have a negative polarity (-) and are found in situations which are self-correcting and self-regulating.

Figure 2: An example of a Reinforcing (R) loop and a balancing (B) loop (B)



Balancing and reinforcing loops often introduce time delays. Delays may have important consequences in a system, frequently accentuating the impact of other forces. Loops and delays are part of the Causal Loops Diagram (CLD). CLDs help visualize the structure and behavior of a system, and to analyse the system in a qualitative way. This point is important because it reminds us that a model is above all qualitative (it must be based on hypotheses that need to be tested, this is the structural model). In addition, CLDs enable us to identify leverage points of intervention in

the system and approximate the effectiveness of a certain policy intervention on the overall system (Meadows 1999, table 2).

*Table 1: Leverage Points of Donella Meadows
Places to Intervene in a System (in increasing order of effectiveness)*

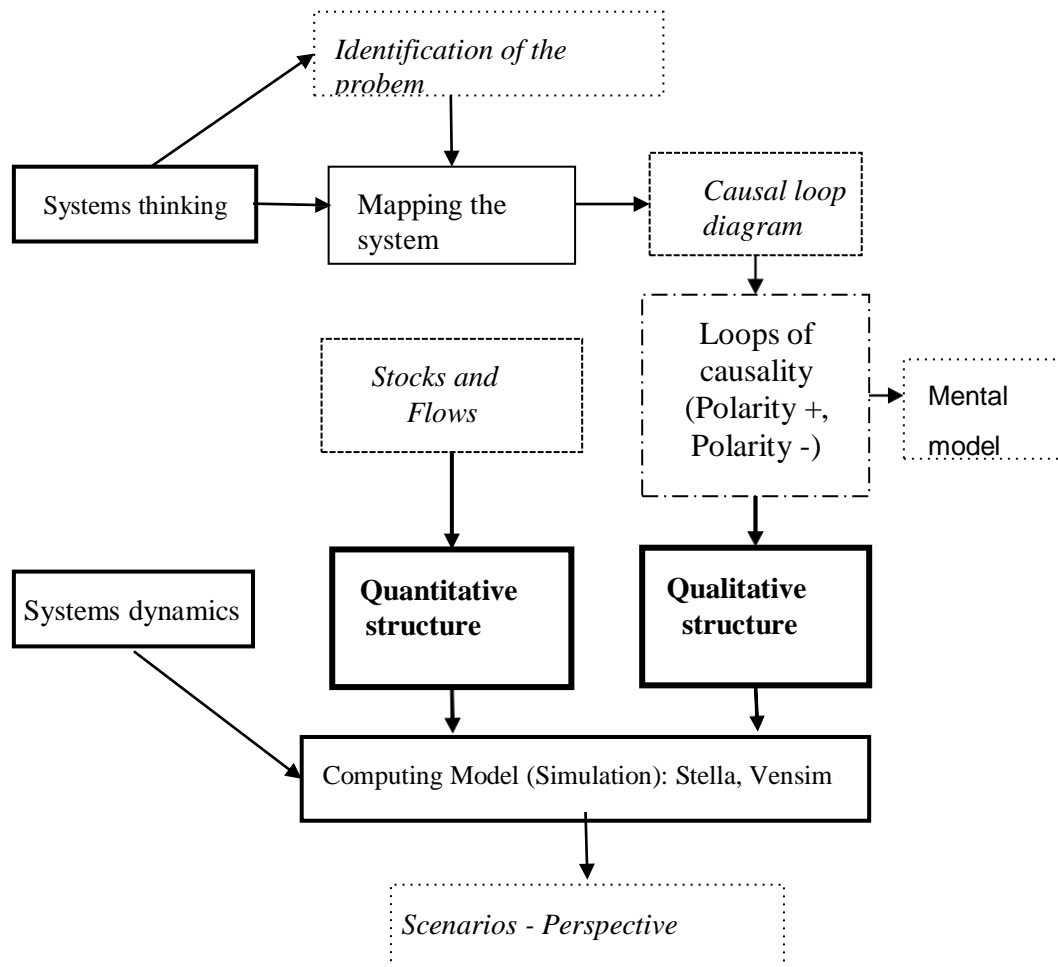
12. Constants, parameters, numbers (such as subsidies, taxes, standards)	6. The structure of information flows (who does and does not have access to what kinds of information)
11. The sizes of buffers and other stabilizing stocks, relative to their flows.	5. The rules of the system (such as incentives, punishments, constraints)
10. The structure of material stocks and flows (such as transport networks, population age structures)	4. The power to add, change, evolve, or self-organize system structure
9. The lengths of delays, relative to the rate of system change	3. The goals of the system
8. The strength of negative feedback loops, relative to the impacts they are trying to correct against	2. The mindset or paradigm out of which the system—its goals, structure, rules, delays, parameters—arises
7. The gain around driving positive feedback loops	1. The power to transcend paradigms

Source: Meadows (1999)

System Dynamics uses models to explore the link between system structure and time evolutionary behavior. The aim is twofold: (1) explain behavior by providing a causal theory; (2) use that theory as the basis for interventions into the system structure which then change the resulting behaviour mode. The concept of feedback is at the heart of the System Dynamics approach. Information feedback loop diagrams and circular causality diagrams are tools for conceptualizing the structure of a complex system and for communicating information based on models (also taking into account the time delays of feedback loops).

The System Dynamics methodology involves the dominance and non-linearity of loops, the concept of endogenous change, a system structure (system boundaries, feedback loops, levels and rates, objective, observed state, deviation, desired action), stocks (levels) and flows (rates) as essential components of the system structure, and behavior as a consequence of the structure. The transition to system dynamics allows the integration of qualitative and quantitative approaches to the model, which via computer simulation, allows long-term simulations (10 - 25 - 50 - 100 years). This last point is crucial, as the model does not give forecasts but long-term trend evolutions. As such, it is a good decision-making tool (fig 3).

Figure 3: Systems Thinking, Systems Dynamic, Models and Simulation



Source: Diemer (2020, 2004)

iSDG Model

In 2015, the General Assembly of the United Nations adopted the 2030 Agenda for Sustainable Development, consisting of 17 Sustainable Development Goals (SDGs) and related targets (A/RES/70/1). The resolution highlights that “the interlinkages and integrated nature of the SDGs are of crucial importance” and that “the challenges and commitments identified... are interrelated and call for integrated solutions”. In order to address the need for planning tools in this framework, the Millennium Institute developed the iSDG (Integrated Sustainable Development Goals) model for medium- and long-term national planning towards the SDG. The iSDG model is the latest in the line of System Dynamics-based T21 models developed by the Millennium Institute that have been adapted and applied to more than 30 countries around the world (Millennium Institute 2017). System Dynamics deconstructs the relationships among many variables and is particularly relevant for studying complex socioeconomic environments (Sterman 2000).

The model could help with integrated decision-making for policy makers, provide insight into the interlinkages across SDGs and inform on budgeting and planning to improve Pakistan’s educational objectives. In this section, we describe the evolution of how Education has been represented in the iSDG and T21 models prior to this.

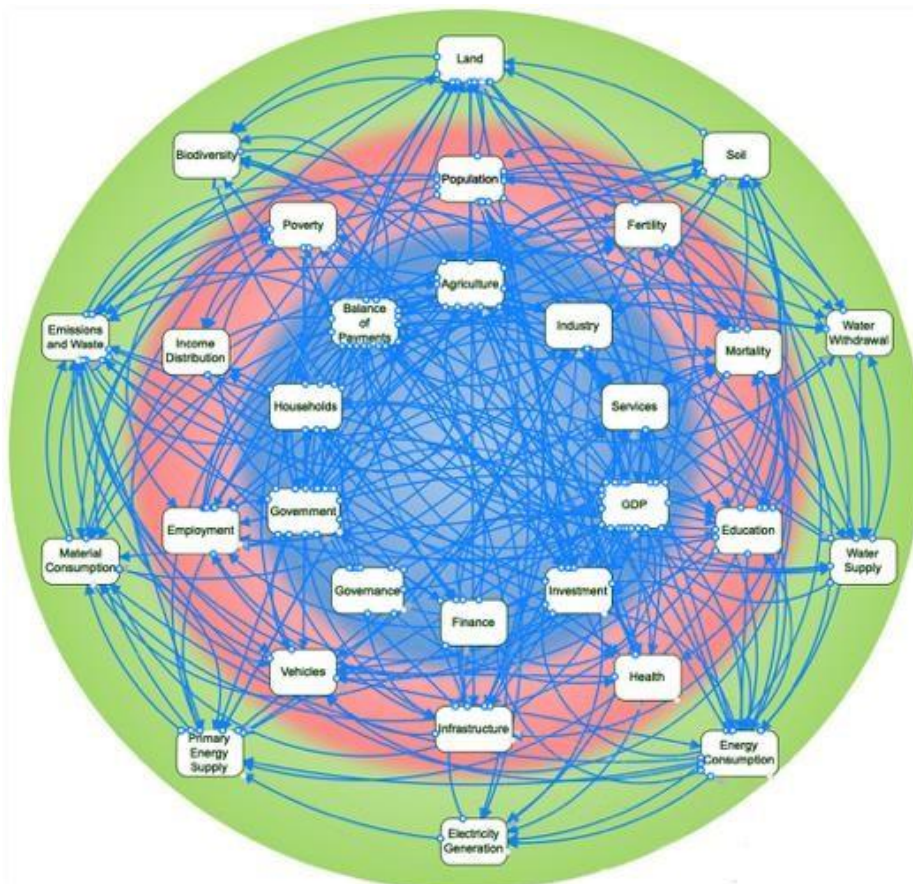
T21 Model Framework

The iSDG model is the latest in a line of models called the T21 developed by the Millennium Institute. The original T21 models were based on a detailed review of the development modeling research, including from such sources as the World Bank, IMF, IPCC, the United States Department of Energy. This culminated in the publication of a book edited by Barney, Kreutzer and Garrentt (1991) that allowed the government and other decision-makers to plan for integrated decision-making. Over time, the T21 has evolved, incorporating additional structures depending on needs and verified by academics and practitioners in the field through group model building and practical applications of the model.

MI's T21 model:

(i) integrates three domains (economy, social and environment). Within each domain are sectors that interact with each other and with sectors in the other domains (fig 10). The Economy domain (blue) contains major production sectors (agriculture, industry, services) which are characterized by Cobb-Douglas production functions with inputs of resources, labor, capital and technology. Demand is based on population and per capita income and distributed among sub-sectors using Engle's Curve. The Social domain (red) contains detailed population dynamics by sex and age cohort, health and education challenges and programs; basic infrastructure; employment; and poverty levels and income distribution. The Environment (green) tracks pollution created in the production processes and its impacts on health. It also estimates the consumption of natural resources (renewable and non-renewable) and can estimate the impact of the depletion of these resources on production and other factors (MI, 2017).

Figure 4: Framework of the T21 model



(ii) represents the important elements of complexity that we find in the Systems Dynamics approach (feedback relationships, non-linearity, time delays).

(iii) is transparent in its structure (assumptions, equations, data requirement), so as to serve as a participatory tool in consensus building and policy discussions.

(iv) is flexible to be customized to specific countries by training users based on country specific conditions (Bangladesh for Health care, nutrition and education in 1994; Tunisia for water and revisited fertility in 1996; Cambodia for effects of war in 1997; China for relative prices, transportation and Chinese interface in 1999; Guyana for structural adjustment of sugar and bauxite industries in 2001; Mozambique for micro-credit, agricultural extension, new roads and Millennium Development Goals in 2003, Mali for Cotton production and gold extraction in 2005; Jamaica for Crime, natural disasters, sugar cane production in 2006).

(v) simulates the short and the long-term consequences of alternative policies

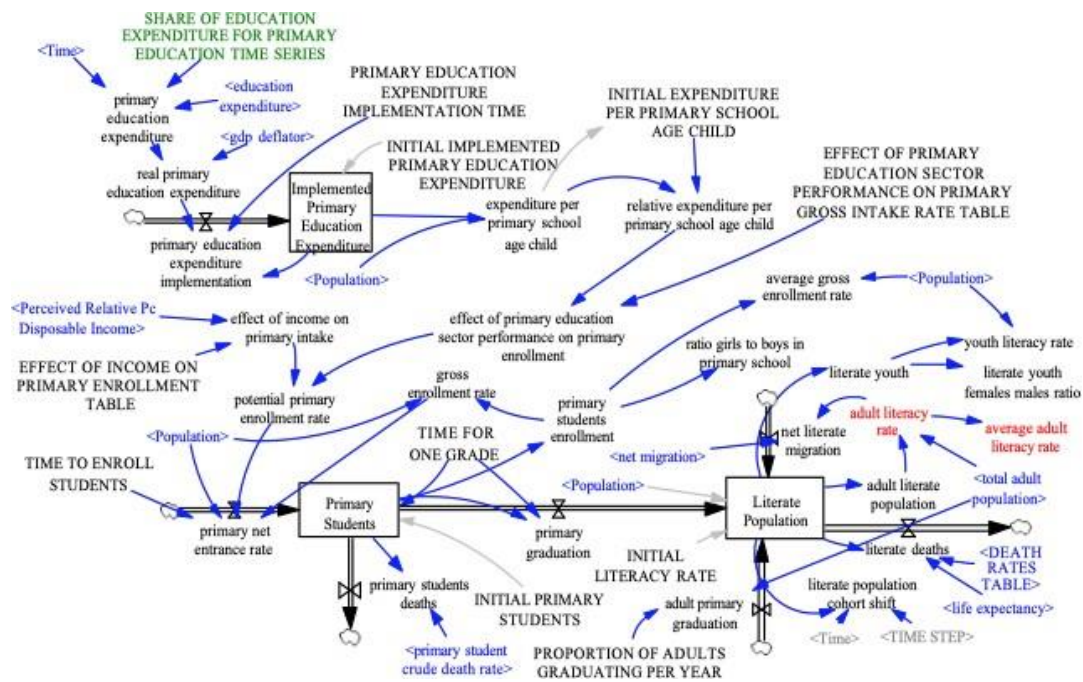
(iv) permits comparison to reference scenarios and supports advanced analytical methods such as sensitivity analysis and optimization.

The Threshold 21 was a generic structure that represented development mechanisms that can be found in most developing and industrialized countries. It covered a broad range of issues that countries all over the world face: poverty, environmental degradation, health, economic growth, demographic expansion or education. The boundaries of the system were defined by the status of the different variables (endogenous, exogenous and excluded variables), the level of aggregation (national level), the geographic limits (the country and the rest of the world) and the time horizon (long term development issues).

T21 was a relatively large size model, composed of more than a thousand equations and included about 60 stocks variables and several thousand feedback loops. The complexity of the model is organized into modules, sectors and spheres.

In the T21, the Education sector belongs to the social sphere and is composed of two modules: primary education and secondary education. *The primary education module* represents the progression of children through primary school to becoming part of the literate population (fig 5). The major output of the module was the adult literacy rate (male and female) which affected many other sectors including population and Production sectors. Major assumptions were: (1) Entrance and dropout rates depend on income and government expenditure per school age child, (2) primary school lasts for 6 years, (3) Graduates from primary school at grade one, (4) the children in school have the same life expectancy as the children who do not go to school, (5) migration of children in school is not considered, (6) the literate population has the same life expectancy and migration behavior as the rest of the population. The primary Education module is presented as a Stock-Flow Diagram (SFD). Stocks are the implemented primary education expenditure, the primary students and the literate population.

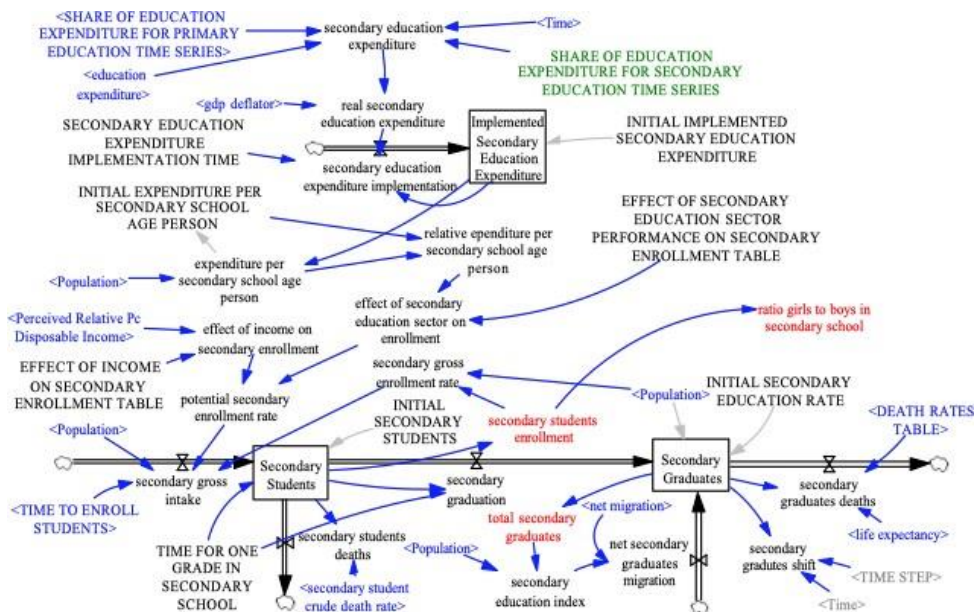
Figure 5: Primary Education Module



Source: Millennium Institute (2007a, p. 29)

The secondary education module is built on the same basic structure of the Primary Education module. it represents the process of students going through secondary school and eventually becoming a part of the population with a secondary degree (fig 6). Students are disaggregated by both year and gender so that gender related education issues could be addressed. The major inputs of the module are total secondary graduates and secondary students enrollment (both sexes) which affect many other sectors, including the labor sector.

Figure 6 : Secondary Education Module



Source: Millennium Institute (2007, p. 33)


The T21 Model has evolved over two decades as applications to individual countries. It has been continuously improved and redesigned to integrate effective strategies to achieve the SDGs. This model is a tool to support policy makers in establishing policy coherence and building an integrated view on development strategies.

General characteristics of iSDG Model and education sector

The iSDG model integrates in a single framework the economic, social, and environmental aspect of development, providing a comprehensive and long-term perspective on a country’s possible futures. The model simulates the fundamental trends for SDGs until 2030 under a business-as-usual (BAU) scenario and supports the analysis of alternative strategic scenarios. Cross-sector impacts of individual policies can be traced and assessed, and synergies emerging from the interaction of multiple policies can be identified, quantified and leveraged. iSDG models undergo a policy process of five stages or steps: 1° Agenda setting / identification of issues; 2° Policy design / formulation / assessment; 3° Policy adoption; 4° Policy implementation; 5° Policy assessment / monitoring / evaluation. However, it's focus is more on stage 2 in supporting policy design of a complex sector of multiple stakeholders. It is generally believed as a participatory model in a sense that it integrates all three perspectives of SDGs: economic, social and environmental.

Model uses three customized indicators in a sense to analyse policy on measuring a specific target of a goal for example in education goal 4 below targets have been used as indicators.

Table 2: SDG4 Indicators

Goal	Indicators
	<ul style="list-style-type: none"> 4.1.1 Proportion of children and young people achieving at least a minimum proficiency in reading and mathematics, by sex 4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex 4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict affected as data become available) 4.6.1 Percentage of population in a given age group achieving at least a fixed level of proficiency in functional (a) literacy and (b) numeracy skills, by sex

The core area of education iSDG is simulating the policy for the public education sector of Pakistan. Broad scope and nature of the model covers a range of issues and problems. Another characteristic of the iSDG model is very much relevant is its data aggregation level. “iSDG is conceived as a national model and, from a geographic perspective, data are aggregated at the national level”¹⁴. Using the approach of iSDG model is also because it is centred on the internal long-term issues of a country therefore it is very much suitable in the context of Pakistan’s progress on sustainable issues. It also determines how an output of a problem relates to the world for example CO2 emission. The time horizon is 1990 to 2030 in order to capture both historical perspectives and attainment towards the 2030 agenda.

¹⁴ "iSDG - Millennium Institute." <https://www.millennium-institute.org/isdg>. Accessed 13 Aug. 2020.

In its structure, the iSDG model is complex and large in size. It consists of thousands of sticks, several feedback loops and sectors. In order to simplify the model, it is divided into smaller logical units labelled as sectors. Each sector has its internal mechanism that can be understood in isolation from the rest of the model. The 30 sectors composing iSDG include: 10 social sectors (Education, health, population etc), 10 economic sectors (Agriculture, industry services etc), and 10 environmental sectors (Land, soil, water etc). The sectors interact with one another dynamically through a complex network of feedback loops. The selection of the sectors is based on the desired ability of the model to properly track the SDGs and simulate relevant policies.

Endogenous, exogenous and excluded variables

“iSDG’s fundamental approach is to endogenously represent variables that are considered an essential part of the development mechanisms under analysis. For example, the Gross Domestic Product (GDP) and its main determinants, population and its main determinants, and the demand and supply of natural resources and their main determinants are endogenously calculated¹⁵”. Variables are determined by context and nature of endogeneity and exogeneity and then considered as strong or weak variables and factors impact on each other. In this context if some variables are out of scope of analysis, that have no quantifiable impact on issues analysed that are not explicitly represented. It does not mean that their effect is not considered but their effect is included in the parameters of the model.

Education Module in iSDG

The education module in the iSDG tracks the average enrolment rate by sex (female or male) and by education level (preprimary, primary, secondary and tertiary). The enrolment rates are constrained by public school capacity and increases if more students are in the private education system. School capacity is determined by education expenditure (UNESCO 1984), which is ultimately affected by overall government expenditure. Other factors that impact the enrolment rate include access to electricity (Leipzig et al 2013), governance (World Bank 2012; Samer 2013; Swaroop, Vinaya & Rajkumar 2002), road infrastructure (Calderon & Serven 2004), health (Behrman 1996), and income (Pritchett et al 1998). Additionally, cultural and economic factors may introduce a gender bias in certain contexts (Shahidul & Zehadul Karim 2015). As a result, the enrolment rate may be skewed towards one sex or another and dropout rates may increase. The model calculates the likelihood to drop out given these factors and capacity restrictions. If a child has not completed primary schooling, they cannot proceed to secondary schooling.

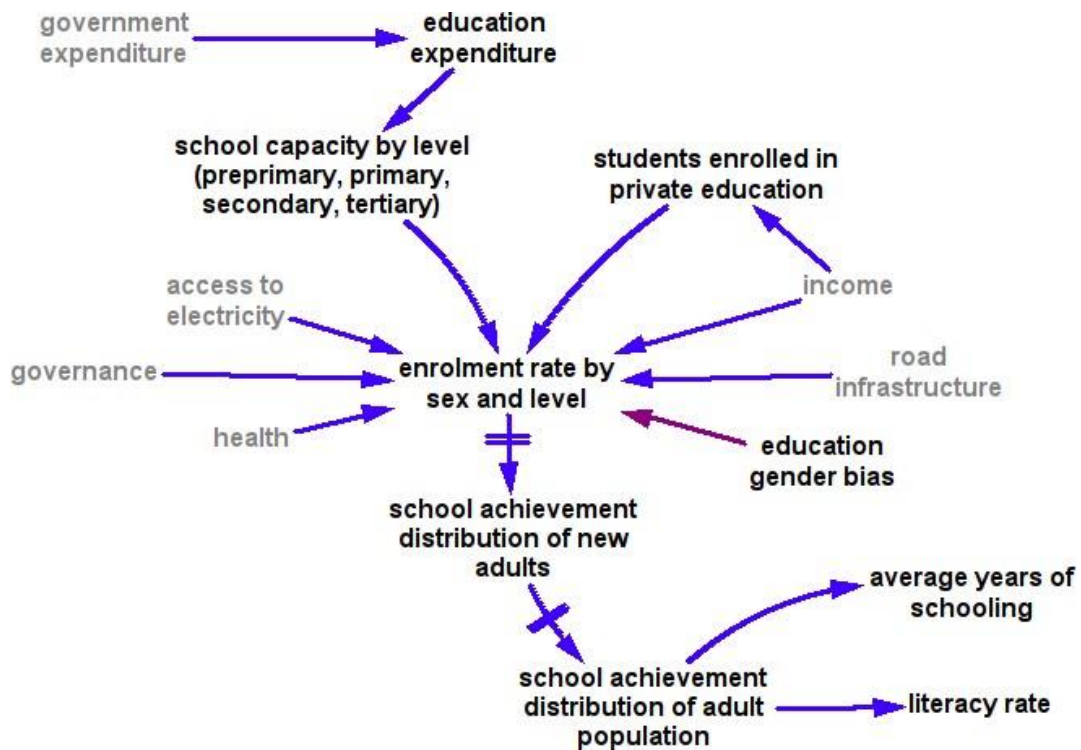
The model takes into account the current enrolment levels to determine the school achievement of young adults. The model is calibrated to education data from Barro & Lee (2013), which includes seven levels of education, namely: no education (E0), some primary education (E1), primary education completed (E2), some secondary education (E3), secondary education completed (E4), some tertiary (E5), and tertiary education completed (E6). The distribution of education will feed into a population aging chain that captures the education levels of the entire population, from which the overall population average years of schooling and literacy rates are calculated.

In addition to mapping the key factors that determine the level of education, this structure takes into account the significant time that it takes to increase the level of education in the population.

¹⁵ "iSDG - Integrated Sustainable Development Goals Model....." <https://www.millennium-institute.org/isdg>.

Not only does it take a significant amount of time to achieve literacy in school-aged children, adults already in the workforce take significant time to age out of the workforce.

Figure 7: Drivers of School Achievement Distribution of Adult Population

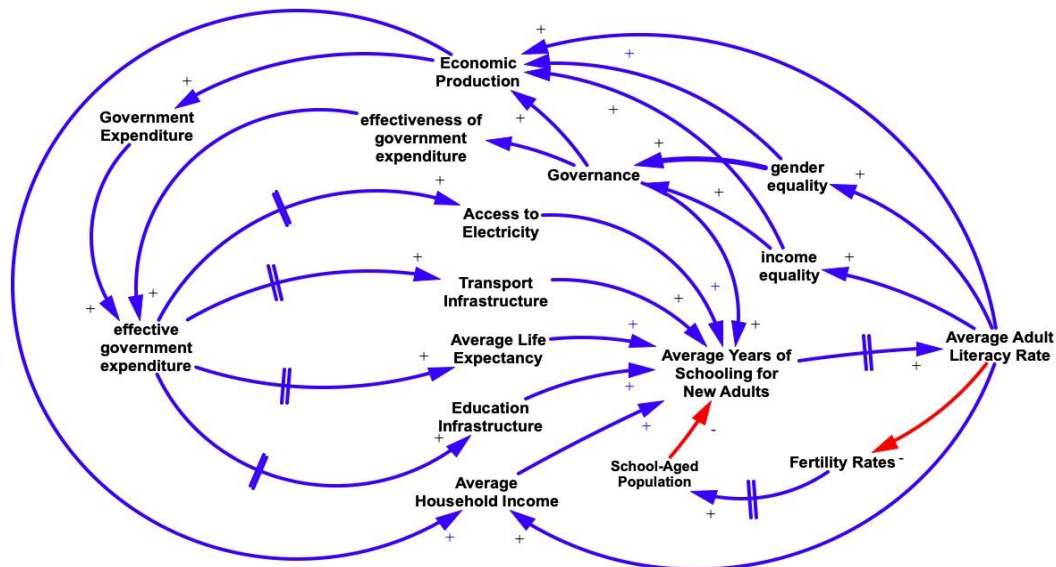


Simplified causal structure of the Education module with links to other modules (variables in grey), positively correlated relationships (blue), and significant delays marked (two dashes through the arrow).

Discussion

The following causal loop diagram demonstrates interrelationship between different socio-economic sectors that one sector positively affects another loop except the two highlighted in red. The detailed discussion about the diagram below is given however in general it indirectly demonstrates educational challenges. This model depicts the country context regarding education. There are some internal and external loops. Here internal means within the education sector such as availability of electricity and external for example government expenditure. Therefore, both types of factors are analysed and necessary to study.

Figure 8: Drivers of Average Adult Literacy Rate



These causal loops diagram shows the main socioeconomic drivers of education (access to electricity, transport infrastructure, average life expectancy, education infrastructure and average household income). If the school-aged population were lower, all else equal, education success would be higher, as per-capita expenditure is greater. In this diagram, blue arrows represent a positive relationship between the two variables (i.e. if the first variable increases, the second increases as well, or if the first decreases, the second will also decrease). Red arrows represent a negative relationship between the two variables (i.e. if the first variable increases, the second will decrease, or if the first decreases, the second increases). Arrows that contain slashes show potential significant sources of delay. For example, although recent graduates may be better educated, it may take years or decades before the overall literacy rate of the population experiences significant changes, as the improved literacy is typically only in the younger population and must replace the population over time.

This being said, the diagram shows multiple opportunities for reinforcing improvements in education. As better education is a driver of economic productivity (human capital), this can in turn increase tax revenues and government spending. This government spending can then be used towards improving electricity, transport, health and education infrastructure, which will all in turn increase the predicted average years of schooling for new adults. Additionally, improved literacy rates across the population will improve gender and income equality as larger proportions of the population are educated and can access better economic opportunity. Along with improved economic production, governance tends to improve gender and income equality. With improved governance comes better economic production (stemming from improved processes for businesses, lower corruption), and higher effectiveness of government expenditure, as society has higher trust in government and it is more effective. This further reinforces the improvements in economic production.

Additionally, higher literacy rates typically lead to lower fertility rates. With lower demand for schooling, the strain on school infrastructures will lessen, further improving schooling outcomes.

Table 3: Indicators of the drivers

Drivers	2019
Government Expenditures (PKR in million)	6 419 111
Education Affairs and Services (PKR in million)	97 155
Government Expenditure on Education (% GDP)	2.8
Expected years in schooling	8.5
Expected years in schooling (male)	9.3
Expected years in Schooling (female)	7.8
Literacy rate, adult (% ages 15 and older)	57%
Fertility rate (births/woman)	3.488
Income inequality (Gini Coefficient)	33.5
School Aged Population (5 - 16) (in million)	51.8
Out-of School children (in million)	22.8
Gender Inequality Index	0.547
Average household Income (PKR)	498 540 000
Life expectancy at birth (years)	67,1
Existing Public School buildings fallen into disrepair (%)	55
Total Road Paved (kms)	156 000 (60%)
Road Density (km/km ²)	0.32
Access to Electricity - All population - Urban - Rural (%)	71 - 100 - 54

Source : http://www.finance.gov.pk/budget/Budget_in_Brief_2019_20.pdf

<http://hdr.undp.org/en/countries/profiles/PAK>

<https://www.unicef.org/pakistan/education>

<https://www.adb.org/sites/default/files/institutional-document/518461/pakistan-school-education-sector-assessment.pdf>

Gender inequality Index (GII): A composite measure reflecting inequality in achievement between women and men in three dimensions: reproductive health, empowerment and the labour market.

Road density is 0.32 km/km² which is low and compares unfavourably with other South Asian countries (Bangladesh-1.7 km/km²; Sri Lanka-1.5 km/km² and India, 1.0 km/km²).

Conclusion

System dynamics models have become reliable tools in developing and assessing robust education policies, particularly through their capacity to capture and quantify complexity and cross-sectoral dynamics. In Pakistan, addressing the multi-faceted education sector has been a challenging task for policy-makers and the country has been underperforming in its progress to achieve SDG 4. By using SD models with a track-record of real-life application, such as the T21 and iSDG models reviewed in this paper, the country has the opportunity to advance a

comprehensive development agenda and simultaneously evaluate and improve the efficiency of its implementation. Future research on the use of SD models for education in Pakistan that would address data inconsistencies, locally tailored methods for participatory approaches in the modelling process and conceptual frameworks on improved model structures (e.g. to the already existing education sectors in the iSDG) can contribute to the development of a valuable policy-guiding tool. Such efforts would not only enable Pakistan to move towards achieving its SDG 4 targets, but it would also allow policy synergies to help the country in implementing its overall SDG agenda.

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Conclusion

This thesis conducted extensive work of different chapters into one consolidated conclusion. Every chapter is concluded with an explanation at the end. In this section, a general conclusion is discussed from the lesson learning, analysis, findings, challenges and recommendations of the study.

The overall literature review about education for sustainable development enhances the scope of the concept to contribute to future interest in the subject matter. Continuous contribution from the scientific community and international organization's research will serve to increase overall understanding about the concept, as does this effort. The approach of education for sustainable development is continuously increasing its importance and application around the world, as was explored in this study. International organizations such as the UN, OCED etc are adopting and advocating its values, principles and skills of education for sustainable development to enhance a large-scale desired change in people on our planet. The UN DESD provides an example as a platform for the feasibility and operationalization of the education for sustainable development from small to large scale. Philosophy of ESD is rapidly contributing in changing understanding among politicians, academia, international organizations and in society as whole. ESD has explored certain changes which were discussed in the subject matter of this study, in education systems, including strengthening curricula, innovative pedagogies and teacher training, but above all as a model for transforming education systems. Importantly, ESD enhances the notion of the locally relevant and culturally appropriate, based on local needs, attitudes and conditions. These characteristics motivated and mobilized Pakistan's educational domain to initiate some initiatives to introduce education for sustainable development as a new option for desired change. It would appear, from vision 2025 (2014) document that establishing an institutional mechanism, for example Federal SDG unit indicating ownership, can be a step forward to operationalize the objectives of not only SDG4 but other SDG targets as well. In vision 2025 (2014) document, it was stressed that Pakistan taking SDG2030 agenda as its own national agenda therefore, a roadmap through UN organizations such as UNDP has been explored. It is observed through this study that overall, if efforts continued then some advancement is possible in right direction.

Research questions play a vital role in investigating the answers for a specific research domain, in this case education for sustainable development. It is evident that this study explores significant answers to respond to these questions throughout its length.

Is education for sustainable development still relevant in the discourse of education in general and particular in the context of Pakistan? The comprehensive discourse discussion and analysis strengthen education for sustainable development's relevance to the domain of education. This thesis presented a literature review in each chapter, where philosophies, discourses discussed by various authors and approaches anthropocentric, environmental etc significantly contributed to future generations. In Pakistan's educational context, it is also significantly proposed that it is relevant, because objectives are aligned with national priorities. ESD is relevant because it proves to correspond to the needs and objectives with the country's priority areas. According to this document "The vision of a *knowledge economy*" cannot come about without promoting quality education in Pakistan (P. c.o. Pakistan, 2015). This document also indirectly addresses the key features of education for sustainable development. It is mentioned that education needs reforms and a different approach.

Pakistan in its Vision 2025 (2014), pillar one, People First, addresses the pressing need of human development and an increase investment in social capital. To achieve this objective, this document prioritizes Primary education enrolment at the top of the list. It aims to increase the rate up to 100% (P. c. o. Pakistan, 2015) by 2025 (2014). It aims to increase the literacy rate to 90% (P. c.o. Pakistan, 2015), and increase the rate of secondary and tertiary education.

The findings highlighted some key areas such as pedagogy, technology, assessment and governance need to be reformed in order to improve quality in education. Vision 2025 (2014) states “*These reforms will ensure that the educational system helps individuals in acquiring/sharpening of creative and analytical abilities and problem-solving skills*” (P. c. o. Pakistan, 2015). Critical thinking and responsible citizenship will enhance sustainability of not only of a nation but also a sustainable planet. Some ingredients of education for sustainable development have been envisioned in the national level official document of Pakistan Vision 2025 but there is no official document which addresses education for sustainable development as a strategy or a priority for transforming the society in order to increase quality of life of the people and planet.

In the first foundational chapter of policy review, significant challenges were highlighted which also proved to be relevant in the country context in order to improve its very basic structure of policy and scale up the rapid changes in the country and the world. All previous educational policies have failed to meet the local needs for knowledge economy, economic growth, national character building etc. All previous policies have failed to achieve the desired and intended planned objectives. Therefore, this observation highlighted the significant relevance of education for sustainable development in the contemporary context.

The ESD curriculum often uses both scientific concepts, and many non-scientific references (social consensus, "good practices"), and refers in a recurrent way to the question of values to be transmitted and shared or to the different postures induced by the concepts and representations of the different actors of an educational project oriented towards ESD. Education for sustainable development became institutionalized so that it has become part of the basic curricula proposed by national guidelines or pedagogical guides. ESD is based on a system of values and broad principles (sustainability). These values (respect for the environment, empathy, respect for others, self-esteem, etc.) should make it possible to empower individuals, to train responsible citizens (education for eco-citizenship) to be capable of projecting themselves into the future, to become involved in a genuine social project, to understand the full complexity of the socio-economic, ecological, cultural, and ethical factors that determine the entire sustainability of development (UNESCO, 2009). Principles such as responsibility, solidarity, precaution, and participation now define the philosophy of sustainable development.

What methodology advocates education for sustainable development? There are some methods advocating and providing some paths to understand education for sustainable development and apply it on large scale. For example, REDOC framework (*Représentations, Démarches, Outils, compétences*) advocates appropriately to address education within the contemporary needs of society. Its four basic components representations, pedagogy, didactic tools and skills highlights its importance and utilization as a methodology. The REDOC model today claims that, by being positioned in both the social and educational sciences, it constitutes a *modus operandi* for initiating changes in behaviour or leading us to understand our differences. In addition to REDOC there are other methods such as system dynamics, Isdg modeling, causal loop diagramming appropriately advocating for sustainable development with its tools, methods and basic characteristics to achieve sustainable development targets.

Does System Thinking allow for the improvement of skills for better quality education? System

thinking and system analysis approach proved to be a useful approach in improving skills in pupils. Beyond the good practices and guidelines, the success of ESD requires a strong conceptual and methodological foundation. From the conceptual point of view, ESD involves controversial issues, complexity, transdisciplinary approach, system thinking method, principles and values. From the methodological point of view, ESD introduces a new framework (you should develop all these points). Causal loop diagram enforces the loops and factors which are closely interlinked with quality education for example poverty, political influence or will, governance, inputs (budget, quality teachers, curricula etc). Robust findings of CLD approach proved to be useful for the future decision-making process.

Along with CLD, system dynamics tools and methods, here the final chapter explored a modeling approach through T21 and iSDG. In this chapter this modeling approach demonstrated a robust analysis regarding the educational sector of Pakistan. It can access robust education policies, particularly through their capacity to capture and quantify complexity and cross-sectoral dynamics. In Pakistan, addressing the multi-faceted education sector has been a challenging task for policy-makers and the country has been underperforming in its progress to achieve SDG 4. By using SD models with a track-record of real-life application, such as the T21 and iSDG models reviewed in this chapter, the country has the opportunity to advance a comprehensive development agenda and simultaneously evaluate and improve the efficiency of its implementation. Future research on the use of SD models for education in Pakistan that would address data inconsistencies, locally tailored methods for participatory approaches in the modelling process and conceptual frameworks on improved model structures (e.g. to the already existing education sectors in the iSDG) can contribute to the development of a valuable policy-guiding tool. Such efforts would not only enable Pakistan to move towards achieving its SDG 4 targets, but it would also allow policy synergies to help the country in implementing its overall SDG agenda.

Is education for sustainable development still a robust driver to achieve objectives of high-quality education (SDG4)? The MDGs, then the SDGs, have boosted our appetite for complex and systemic thinking, for societal issues, for the values that a sustainable society must embody. For some countries, like Pakistan, the SDGs are a long journey fraught with pitfalls and frustrations. While the SDGs make education a priority target and have chosen to link education for sustainable development to SDG 4 Education Quality, they still struggle to advocate real change in society. Sustainable development risks once again preferring compromises to revolutions, at the risk of pushing back to 2050 the hopes of many citizens of the world. Sustainable Development Goals are an opportunity for developing countries such as Pakistan to improve the living standard of their people through quality education and ESD objectives. This international agenda deliberately engages countries to prioritize issues according to their local country context to achieve local as well as global objectives. Sustainable Development Goal 1 - Poverty is one of the critical challenges for Pakistan, which can be addressed through implementing SDGs especially quality education in order to improve HDI indicators by catering causes linked to poverty. These findings can enhance and contribute in future policy decisions in order to link SDGs with the country vision for future plans and programmes. 2030 Challenges will be more serious if they are not addressed in present. Can you reconnect all the SDGs to ESD?

The overall scope and the nature of the study is important in that it examines a complicated and diverse country context from the different perspective of ESD in order to build a scenario for the achievement of future objectives of sustainability through the educational domain. This diversity strengthens the scope of the study and motivates further exploration of this area in order to

transform the educational sector. Several horizontal and vertical tiers of the subject matter enhance the scope of education from the sustainable development point of view in Pakistan. The unique approach and methodology of the study enhances the utility and scope of understanding such a complex subject of education for sustainable development in Pakistan in a simple way. It will contribute to future decision-making process, priorities, more ESD literature and set future objectives of education across the country. There will be significant acceptance and advancement in the years to come of ESD in Pakistan. It will create an interested viewpoint for education in an already struggling sector of the country. It contributed to a greater understanding of the concept of education for sustainable development with reference to two developing countries, Pakistan and Senegal. Developing countries can learn a lesson from this specific case study about how ESD and education interlink at national level. It has enhanced the approach of multidisciplinary in order to contribute in understanding complex cultures such as Pakistan. It has equipped research to reorient education in accordance with urgency of issues that human and nature is facing in the contemporary era.

There are always certain limitations and limited scope of every study and so too with this effort. In a limited timeframe and a study framework, studying a country's context which is diverse, dynamic and different in terms of people and cultures was a great challenge. Transparency, validity and availability of literature and data was another challenge for organizing research. Insufficient literature and data about Pakistan posed a significant challenge. Addressing several tiers of educational structure and different geographical areas in a specific time period in a culturally diverse context was also a challenge. Complex educational structure, confused, inconsistent, unrealistic educational policy objectives was a challenge to study in this context. Similarly, this complex context could be an advantage for those countries which have similar characteristics. Therefore, this was an obstacle in this study.

There are some recommendations to be made in the light of the whole discussion. A transformation of education is required in order to achieve set educational objectives. An unconventional education approach is the need of the hour to address the local, national and global urgency of issues. Robust decisions can play a vital role in policy making as well as the implementation of the policy.

It is hoped that this effort will strengthen future studies and promote similar approaches in order to explore more on this topic and context.

Reference

Planning Commission. (2014). Pakistan vision 2025. *Ministry of Planning*.