

**Modern Agricultural Practices Influencing Socio-economic  
Life of the Farmers**



**Tehmina Naz**

**Quaid-i-Azam University  
Department of Anthropology  
Islamabad - Pakistan  
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# **Modern Agricultural Practices Influencing Socio-economic Life of the Farmers**



**Tehmina Naz**

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Department of Anthropology  
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(Department of Anthropology)

**Final Approval of Thesis**

This is to certify that we have read the thesis submitted by Ms. Tehmina Naz. It is our judgment that this thesis is of sufficient standard to warrant its acceptance by the Quaid-i-Azam University, Islamabad for the award of the Degree of M.Sc in Anthropology.

**Committee:**

1. Dr. Anwaar Mohyuddin  
Supervisor



2. Dr. Rabia Ali  
External Examiner



3. Dr. Aneela Sultana  
In-charge  
Department of Anthropology



## **FORMAL DECLARATION**

I hereby declare that this is my own work without anyone else help except those mentioned here.

This work has not been submitted or published for any degree or examination in any other university in identical or similar shape. All the other sources used in this work have been mentioned as complete references.

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**Tehmina Naz**

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## **ABSTRACT**

Agriculture variety is a paramount constituent of the farming system of city *Attock*. This study focuses on exploring the agriculture system of the area. The main objectives of the research is to provide a comprehensive view of various agricultural systems and nature and extent of modernization in the area. This study also analyzes the impact of modern agriculture and how it influenced the social and economic life of farmers.

Forty individual who have been associated with agriculture were selected as research sample. Depending on the nature and criteria of research questions, qualitative methodology is such as participant observation, in-depth interviewing, focus group discussion and case study method were employed.

The examination of the research findings demonstrates that both traditional and modern agriculture is executing in the research area each with different cultivation and harvesting methods accompanied by dissimilar tools and techniques. Farmers have successfully adopted drip irrigation system, modern equipment including wheat threshers and tractors with chemical control methods. Increased productivity due to technological advancement is also witnessed. The modernization in the agriculture sector has positively influenced the socio-economic life of the farmers.

Key words: *Agriculture, Modernization, Socio-economic, Irrigation*

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# CHAPTER 1

## INTRODUCTION

Agriculture is the combination of deep and complex interaction of the various interdependent component such as water, soil, crops and other natural resources in an environmental setting. Agricultural practices represents the wide range of techniques in farming used by the producers for crop production. They can be traditional, complex, or recently developed and both productive and risk causing or mitigating practices. (Ngoc Chii & Yamada, 2002)

The discipline of anthropology has provided a detailed understanding of farming as it properly comprehends the ancestor's source of livelihood. It also gives a detailed account of how people have maintained their subsistence through animal raising. What methods of farming and rearing animals have been used by early people and the evolution of farming in previous years? The anthropological analysis presents a deep comprehension of how agriculture influence the social life and environment of rural people.

From the past hundred years, changes in farming technology has been shaping agriculture. Globally, many tremendous changes in patterns of production have occurred. The methods of production has modified with increased productivity with reduction in risk. Innovation in the arena of agricultural are identified by the impacts on economy, social and personal life as well as environmental protection. (Sunding & Zilberman, 2000)

Pakistan has considered as a prevalent agricultural-based country, where a large number of people are connected to farming for their livelihood. Punjab is considered as a traditional area of agriculture. In our country, specifically in areas of Punjab, there are units for agricultural production own by farmers. Several production programs have been working in history to increase the crop production and development of agriculture sector. In the nineties, a workable production program had started in which several farmers from Punjab have participated to accept change and to adopt the improved methods of farming. (Arshad, Suhail, Gogi, & Yaseen, 2009)



Despite the agricultural change into industrialization, it is still a predominant sector of economy and livelihood of people in Pakistan. It has significant impacts on the social and economic conditions of the people. It does not only largely contributes to the livelihood of the country but also the labor force and gross domestic product and foreign exchange economy. It is a source of food as well as work as a supplier of the raw material for various purposes. (Khan, Shafi, Shah, & Arif, 2011)

Undoubtedly, Pakistan is gifted with variegated climate and soil, watering and agriculture system with hardworking men that generates a competition with international market in terms of productivity. Nevertheless, the agricultural performance of Pakistan including productivity, consumption, farm management, quality of products is not satisfactory up to international mark of developed countries. Agriculture of the country is in disarray due to the type of agricultural practices, farm and crop management techniques, types of equipment and problems. (Khan, Shafi, Shah, & Arif, 2011)

The profound changes in the agriculture sector in Pakistan have occurred incorporated by various factors of agricultural innovation. The trends in farming have been changed for many years due to numerous factors followed by crop production and household economy of workers. It has increased people desire of working on farms. The changes in agricultural practices is accompanied by the desire of increased food production, the fear of food insecurity, health and nutrition concern and indicated the improvement of economic well-being of the people especially in rural areas. (Ovwohio, 2014)

## **1.1 The Problem**

Previously in research area, the farmers were usually dependent on small farms and traditional methods of farming. The agriculture sector chiefly accords to both the economic level of city and household. Farmers used conventional agriculture method as a guide. Currently, the agriculture system of the city *Attock* has been modified with the adoption of modern techniques by various farmers. There are many determinants which play their role in adoption and rejection of modern techniques. The farm as well as household economy of the farmers, their health and daily life all are interlinked with their agricultural occupation. The espousal of new and advanced agriculture techniques have positively

altered the life, well-being and economy of the farmers. Both conventional and modern methods of farming have been used in the setting which has varied impact on the life and economy of the farmer and farming occupation. In previous researches, the economic impact of modern methods have been studied whereas ignoring its impacts on the social life of the farmers with varied experiences of the farmers while adopting modern methods.

## **1.2 Statement of the Problem**

This study will reveal the indigenous farming methods in the setting of *Attock*. The socio-economic impact of modern farming and detailed analysis of nature of innovation in agriculture field is also explored as agricultural practices in Pakistan is undergoing progression in many areas as majority of farmers have adopted new methods of farming. (Kazmi, Chaudary, Ahmed, & Khan, 2014) The major determinants of modernization include low crop yield, disease and labor issues. (Akbar & Jahiruddin, 2010) Agriculture is the base of social and economic structure directly linked with the development of the research area. The wide variety of modern agricultural practices have directly and indirectly contributed to the productivity of farms and making significant impacts on the social and economic life of people working in agriculture sector. The varied experiences of the farmers when adopting modern methods is also analyzed.

## **1.3 Research Objectives**

1. To study the indigenous agricultural practices.
2. To examine the nature and extent of modernization in the research area.
3. To explore the factors causing modernization in agricultural methods.
4. To analyze the impacts of modern agricultural methods on household economy and social life of farmers.

## **1.4 Research Questions**

1. To study the indigenous agricultural practices
  - What are the major types of farming systems practiced in research area?
  - What are the characteristics and process of farming systems used in locale?
  - What types of tools and methods are used in each farming system?

2. To examine the nature and extent of modernization in the research area.
  - What modern methods and techniques are adopted by farmers?
  - How is the experience of farmers adopting modern methods of agriculture?
  - How the modernization occur in research area?
3. To explore the factors causing modernization in agricultural methods.
  - What are the economic factors that cause modernization?
  - Do social factors influence the change in farming system?
  - Do the characteristics of the farmer have any role in modernization?
4. To analyze the impacts of modern agricultural methods on household economy and social life of farmers.
  - Does the household economy of farmers have modified due to modern methods?
  - How the social life of farmers have changed after adopting modern methods?
  - How the farmers are benefitted from modern agricultural methods?

## **1.5 Hypothesis**

There are several factors that will result in modernization of traditional agriculture. The modern agricultural practices will positively altered the social life and economy of farmers. A significant change will occur in overall agriculture due to modernization.

## **1.6 Significance of the Study**

Various researches in the field of agriculture and horticulture have been accomplished that focuses on the problems faced by farmers and intended to search for ways to increase the farms profit. This research will not only be useful in the economic domain but also educate people at the family level. It increases the general knowledge of people farming methods to discover procedures that increases farm production and food quality.

The findings attained from this research falls into the domain of economic Anthropology. It focuses on the use of material practices to produce, exchange and secure the livelihood

of people such as farming. It studies the processes and consumption of objects in a social context. (Carrier, 2018)

This study makes various contributions to knowledge. It provides detail about farming from the understanding of farmers and a framework to predict the future of farming and its impacts on food in general and on the life of farmers particularly. It shows the continuity of technology occurring from many years till now. This research is beneficial as it increases the awareness of people who have a farming background.

It helps to learn the benefits of adopting new technological methods of farming. This research also contributes to the existing literature as it provides information about farming methods in Pakistan because only limited literature is available on agriculture in the context of Pakistan.

## **1.7 Outline of Research**

Succeeding the primary chapter of introduction, the second chapter of the thesis reviews the relevant existed literature with the conceptualization and operationalization of essential key concepts of the present study. The third chapter is categorized i.e. first part of the chapter describes methodological approaches that were used to conduct the research and justification for the use of various research tools and techniques. The remaining portion of the chapter includes a brief introduction of research locale and its essential components including physical, social and economic features of the area which are relevant to research criteria.

Ensuing the structural chapters of the thesis, remaining four chapters are of research findings. Chapter four presents a comprehensive view of the types of agriculture systems practices in the locale. Chapter five gives a detail account of the nature of modernization with the perception and adoption of modern techniques in agriculture. Chapter six illustrates major factors of the modernization process. Chapter seven discusses the impacts of modern agriculture on the social and economic life of farmers. Chapter eight of the thesis summaries key findings of the research and chapter nine being the last chapter concludes it. The appendices consist of an interview guide and socio-economic form employed for data collection.

## **CHAPTER 2**

### **REVIEW OF LITERATURE**

#### **2.1 Agriculture**

It is the most comprehensive term denotes how crop plants and domestic animals sustain the human population globally in many ways by providing food and other products. The word agriculture has absorbed a wide spectrum of activities involved being integral to agriculture but have their own descriptive terms, including cultivation, horticulture, farming, domestication, arboriculture, and vegeculture. The forms of livestock such as management, mixed crop-livestock farming and pastoralism are also confused with agriculture. The particular forms of agriculture is defined as per various attributes such as principal crops, soil type, cultivation frequency or animals. Agriculture usually implies both crop cultivation and animal domestication but it is occasionally restricted to crop cultivation excluding the raising of domestic animals. Per to the Oxford English Dictionary (1971), it is the art of cultivating crops and science of soil including all pursuits of rearing livestock and harvesting crops in the widest sense. (Harris & Fuller, 2014)

In the present study, the term agriculture refers to the farming activities including crop cultivation and harvesting with or without the use of livestock.

#### **2.2 Modernization**

Modernization refers to the adoption of technological processes having less belief on traditional values and customs and a process of considering and selecting rational choices. It is characterized as an innovations, progress and development associated with prosperity. It has negatively viewed as it denounce the use of conventional knowledge and practices. (Boogaard, Bock, Oosting, Wiskerke, & Zijpp, 2011)

In this study, the term modernization is used as a process of adaptation of modern methods and technological innovation in agricultural farming system.

## **2.3 Economy**

Economy is a part of a social domain that accentuates the practices, discourses, and material expressions linked with the production, use, and administration of resources. Economy is stimulated by the production which utilizes capital, labor and natural resources. Economy is connected with a set of processes involved in a culture and related to the education, values, history, technology, social and political organization and other legal systems. The main factors that influence economy is the natural resources, ecology and geography of the area. All these factors set the conditions and context in which the economy works. Economy does not stand alone. Being a social process, it is based on human practices and transactions. (Poskart, 2014)

In present research, the term economy represents the household income of the farmer and money earn through agriculture to sustain their livelihood.

## **2.4 Agricultural Practices**

Based on the general agreement of the advocates of agriculture, the conventional methods of agriculture are inappropriate. There are noteworthy differences related to the conventional farming practices that require to be developed for the sustainability of agriculture. A far degree of consensus is associated with the problems linked with traditional farming and less techniques are available to deal with them. A variety of alternative approaches have been developed regarding issues of pest management, sustainability and less agricultural yield. (Rigby & Caceres, 2001)

Both spatially and sectoral, the agriculture has come to draw the input and output by depending on the use of new technologies and examining its impacts on people and environment. Particularly, it relies on heavy use of pesticides and chemical fertilizers and derive the outcome by its dependence on external costs, subsidies, threats to living species, ecological pollution and health risks to human and their welfare. (Rigby & Caceres, 2001)

The organic or conventional farming aims at providing humane, environmental friendly, integrated and economically sustainable production system. It maximizes the reliance on interaction between the biological and ecological resource management that consequently

provides adequate and acceptable level of crops that substantiate human nutrition, livestock sustenance, disease and pest control management by returning to appropriate human and other resources. (Rigby & Caceres, 2001)

To understand the impediments of technology adoption is essential for the strategic diffusion of farm technologies. Numerous cross country farm studies has been synthesized by Feeder and Umali in 1993 related to the nature and extent of technology adoption and modernization. Factors that affect innovation in farming include the farm size, human capital and labor, training availability and technology cost. Numerous biophysical and socio-economic variables play a pivotal role in modernization and adoption models. Another requisite factor in the adoption of improved agricultural technologies is the market accessibility. The distance from farm to the market also constrain the possibility of adopting modern practices. Small scale farmers often have insufficient savings to invest in modern methods of agriculture. The credit availability and facilities of farmers encourage adoption of modern practices of farming. (Mariano, Villano, & Fleming, 2012)

The conventional farming being old ecologically based farming system is developed by ancient farmers with the interaction of nature, natural resources, fiber and fodder for generations. It refers to an indigenous method of cultivating crops relying only on locally available resources exempting from external inputs. Once prevalent globally, indigenous farming system is vanishing from developed and developing countries and only confined to some small scale farmers occupying small lands having traditional farming values. The conventional farming is characterized by the use of simple plants, mixed cropping, simple tools used for cultivation and harvesting. Being a community based farming system, the local interaction and environment safety is the key feature of traditional agriculture. (Chhetry & Belbahri, 2009)

The modern practices in agriculture is frequently promoted as it provides various benefits especially it contributes to the rural economy. Besides economic benefits, it supplies healthier food and improved farmed environment. As the nutritional side of the modern farming is concerned, some researches are evident that only the conventional farming reduces the use of toxic chemical additives and fertilizers and predominantly produces a safe diet by increasing the nutritional value such as antioxidants, vitamins and beneficial

fatty acids. Several other kinds of research based on scientific evidences has reported that food produced by using modern methods are not safer and nutritious but they are economically beneficial or farmers. (Lobley, Butler, & Reed, 2009)

The modern practices of farming is inevitably related to the social life interest and relations. The concept of agriculture is deeply embedded into the culture that points to the recognition of economic interactions among relations and community. The modern farming has played a crucial role in rural development. Whereas the traditional farming is associated with the tradition and social connections in the locality, the modern methods indicated better economic dimensions in a society. By benefitting the rural economy it strengthen the local and personal ties. It resulted in indigenous development which may build up the local economy. (Courtney & Errington, 2000)

The adaptive capacity and factors of acclimatizing the modern farming practices includes the technological advancement, economic wealth, knowledge background, skills and training and farm infrastructure. It is further extended into major determinants of modernization relevant to the adaptive capacity of the farmer. The range of technology available for farming and resources are the extrinsic factors whereas the inter-personal variables such as the decision making of farmers, education and information as well as the response and behavior of people towards advancement determined the status of innovation in specific area and influence accordingly. (Below, et al., 2012).

The use of modern techniques is eminently related to the productivity of crops. It is due to the reduction of full time labor and man-made equipment. In fewer years, improved agricultural practices dedicated to the agriculture more than traditional methods. It can be explained in terms of better farm management and administration tasks. The farmers who adopted the modern methods have attended training courses much more in comparison with the conventional farmers. The farmers who employed traditional and modern methods of farming differ in terms of economy generation and labor requirement in farms. The modern farmers believe that improved farming practices requires less time and effort and generates greater output. (Lopez & Requena, 2005)



Trends in agricultural farming have been changed for many years due to numerous factors followed by animal health and household economy of workers. It has increased people desire of working in farms. As other sectors requires use of advance technology, likewise agricultural sector needs to adopt modern methods for progressive increase in production of crops. Several driving forces are there to shift people from traditional to modern methods such as increased farm productivity, pest control methods and farm management etc. Shift in farming methods make production and economy tenable. (Pilvere, Proskina, & Nipers , 2016)

The farming practices has experienced changes due to technological advancement in recent years. From the methods of cultivating to the size of a farm, everything has changed. The involvement of intensive and modern technology in farming has received criticism. The factor of risk of crop failure, health predicament and food production is involved in practicing modern methods. (Ngoc Chi & Yamada, 2002)

Numerous qualitative analysis signify that agricultural practices are inversely connected with the economic aspect of life. Both the group of farmers associated with traditional and modern farming practices are moderately concerned about the economy and finances related to the farm productivity over a long period. The modern farmers seemed to have an economic direction towards the farm sustainability and higher production and also willing to take risks in the future in terms of yield. In contrast, the conventional farmers were more likely to equate making a living with success. To keep a farm and cultivate the crops successfully is a kind of achievement for them. Only a few farmers are showing interest in the use of new methods and expanding their farms. The recent adopters of the modern farming showed financial motives rather than non-economic concerns. (Mccann, Sullivan, Erickson, & Young, 2012)

A discrete selection of technology along with the behavioral criteria is identified as the potential factors that lead to the adoption of modern practices of agriculture. The features of innovation itself, environmental factors, age and education of the farmers, economic situations and most importantly the family experiences of the farmers is affecting the modification of agricultural practices. (Koesling, Flaten, & Lien, 2008)

The economic aspect of farmers had positively and significantly correlated with their adoption and use of the improved techniques and technology. A study conducted on the young farmers proved that the dominant intention of the farmers who use modern methods is to increase the profit rate by reducing the risks of crop failure and farming system. (Singha, Baruah, Bordoloi, Dutta, & Bordoloi, 2012)

The use and adoption of the modern agricultural production technologies was found to be strongly connected with the cost of technology and modern equipment. The decision to shift the agricultural methods as accompanied with cost resulted in low probability of adoption. Only, the fear of losing livelihoods is a considerable social cost for the farmers in their adoption decisions. Despite, the farmer whose main source of subsistence is maize crop, will hesitate to replace this crop with improved cultivation process under the fear of crop failure that would adversely affect his livelihood. Khanna in 2001, noted that only the wealthier farmers have used modern methods and technologies and it is limited to large scale farmers with capital intensive mindsets. Majority of modern equipment are not affordable for small scale operators. In areas where more than ninety percent population is dependent on agriculture for their livelihood, the only way to make modern methods successfully applicable and adopted is to coming out with more affordable techniques. (Akudugu, Guo, & Dadzie, 2012)

The agricultural evolution is much linked with the particular habitat and culture in a time that determine where and why it become successful. The use of specific technologies is dependent on the soils, tools and social organization of the area. (Altieri, 2004) Despite the increasing industrialization and diverse agricultural practices, a large number of farmers in rural areas fill landscape with small scale farming. In developing countries, a considerable area is under cultivation by traditional farmers. (Altieri, 2004)

The socio-economic impacts of modern methods are understood as it increases the economy of farm workers and food availability. Their household income, food production and social life have facilitated with the overall increase in economy of areas especially rural areas of a country. (Garcia, Balikowa, Kiconco, Ndambi , & Hemme, 2008)

The economy and social life of people are linked with the agriculture system. It is not only an income generator occupation but also a source of pride and symbol of status in a society. In different societies people keep the lands for their food needs. Altogether, agriculture supports the income of farmers with ensuring the food provision. (Musaba, 2010)

Throughout the world, traditional agriculture is characterized by multiple cropping patterns in the form of intercropping and traditional crop rotations. Cropping patterns have a major contribution in describing the farming methods followed by particular farming cultures. Cropping involves various stages with each stage demanding different decisions and the use of different inputs. (Altieri, 2004)

The knowledge acquired through experiences of people within a culture is indigenous knowledge employed by traditional farmers. It includes the understanding of environment and informed experiment. It does not involved any special education of farming and techniques rather acquired through ancestors who learned farming practices through extensive production of crops. It represents the dignity of local community. (Musaba, 2010)

Modernization in the field of agriculture provides the base of evolution in agricultural technology. The changes in the field of agriculture has caused many changes in socio-economic life of rural people. Modern technology has created a tremendous change in the labor and its dimension. It becomes a shift not only in agricultural practices but also in lifestyle, family life and values. In recent times, the mechanization in the field of agriculture created various effects in rural areas which includes adverse conditions of human labor, decline in work force and unemployment in village. On contrary, due to the lack of modern technological methods has been a tiring and complex process. ( Shobharani, 2019)

Many pieces of research have found that farmers consider that modern methods as complex set of processes and explain it as an effective way and tool of production. The adoption and substantiality and experiences of the farmers is comprehensively reflected in their perception. Other studies conducted in America demonstrated that farmers with low level of adoption of modern methods results in food insecurity and low agricultural yield

especially farmers with small-scale farming lands. (Jha , Kaechele, Lana, Babu, & Sieber, 2020)

Modernization in agricultural assists effective use of seeds, plant protection, water supply system and fertilizers. Besides inputs, it also enables farmers to alleviate poverty and selecting farming as a reasonable profession and attractive enterprise. Per to the farmers, the cost of herbicide and fertilizer are highest, but the farming technology has positive impacts as communicated by farmers and reflected in agricultural practices. Among various correlated factors, the size of the farm and age of the farmers are highly linked with the adoption of modern farming technology. ( Shobharani, 2019)

Innovation in the arena of agricultural are identified by the impacts on economy, social and personal life as well as environmental protection. Majority of the innovations are categorized accordingly. Pesticides used in modern methods reduce the environmental protection and likewise reduce economic risk. The analysis of the impacts of the innovation needs the evaluation of risk reducing factors. Inter-seasonal factors as well as rural life of individuals require investigation too. (Sunding & Zilberman, 2000)

A higher proportion of the economic resources of Africa, Asia and America employ low yield traditional agriculture methods and less productivity as compared to modernized and high income agriculture. The productivity of land, capital and even per men labor is low. A controversy prevails despite the shift in agriculture that productivity is connected with the inadequate allocation and use of resources by farmers. Numerous empirical studies based on input-output correlation suggested that the combination of modern and traditional resources would increase the intensity of input. (Mellor, 2006)

Sustainability of rural livelihood is confined to traditional farming practices whereas the modernization of agriculture tend to undermine economy due to several perturbations. A case study in China illustrates that shift of traditional dry rice to modern cropping methods and items has caused soil infertility and water paucity in farming locality. Farmers who are aware of ecology and sustainability of conventional farming prefer methods that are less tiring and labor intensive and give more profit and high market value. Economic liberalization is more adapted by farmers which leads to high value crops. However due to

the lack of poor information and unavailability of organizational framework, the alternative methods of innovation, competitive strategies for sustainable rural livelihood have been overlooked. (Shiro, Furtad, Shen, & Yan, 2007)

Sharma argued that adoption level of modern technology is low due to the influencing factors such as ecology, sand condition and value system and attitude of the farmers. The farmers who work on the lands of other have marginal socio-economic benefit despite increased farm production. The economic gain and productivity resulted from modern agriculture can lead to the reduction of rural poverty. (Sharma, 1972)

The findings obtained from small scale farmers in Ghana revealed that with the arrival of tractor technology, there has been a major change in the traditional farming system of the area. The local agriculture practices of manual tools used for sowing, weeding with hoes and raising of mounds have been substituted with agricultural modernization. A few of the small scale farmers have started using tractors, fertilizers and weedicides with personally developed spraying machines. Some methods remained unchanged such as bush burning in the face of transition from traditional to modern agriculture. (Kansanga, et al., 2018)

Modernization in agriculture is concerned with reducing the threats to ecology and improving the productivity of crops and lands, reducing food insecurity and better utility of natural resources with efficiency. In rural areas, modernization is linked with the essence of progress as it is a continuing process. A standard reference of creation and implementation of new technologies and tools is used for the comparison of traditional and modern agriculture. While thanking the broadly understood progress, developed countries has changed the agriculture methods. From the organization of farms to the implementation of new technologies, all these has increased the volume of productivity and decrease the burden of labor with better quality and environmental protection policies. (Kusz, 2014)

Modernization of agricultural is often termed as restructuring of agriculture. In recent decades, it is a familiar phenomenon with substantial changes in farming and relationship between farmer and land. The global department of food, environment and rural affairs have conducted many researches about the nature and extent of changes occurred in agriculture. The adaptation and resistance pattern of the farmers reveal their social

composition and belief system. The restructuring of the agriculture is not practiced in isolation as it has personal cost of living standards and lifestyle as well as agriculture crises. (Lobley, Potter, Butler, Milard, & Whitehead, 2005)

The large number of farmers experienced difficulty on adjusting with the shift of agricultural methods due to their traditional background and change in policy reforms and market values. Moreover in rural communities, change in agricultural practices have social implications which needs to be closely investigated. For instance, the personal and social cost of agricultural modernization and its impacts on the lifestyle of farmers. (Lobley, Potter, Butler, Milard, & Whitehead, 2005)

As modernization is moving towards efficiency, it impacts many fields including agriculture, technology, urban planning, industry, manufacturing, fisheries and economy as well. It is a process that plays a pivotal role in making things work better and efficiently. Modernization has changed all the aspect such as economy, social life and ecology. It includes not only the domestic level but increased on large scale commercial business. The use of synthetic material, machines and technological equipment has been used with the gradual utilization of natural resources. This change also bring a shift in behavior of people to manage natural resources and their economy. Many countries maximizes the economic benefits as sustainability of natural resources. The increase in human population has a major contribution in this modernization. (Olaganathan & Quigley, 2017)

Agricultural production has been altered with the improvement of technology and modern irrigation farming method. It can be planned, controlled and have external technical devices used by experts. Improved and modernized irrigation method require the change in traditional irrigation practices by the use of water pumps and machines. The shift in agricultural and various farming activities is based on the notion that modernization brings benefitting change in agricultural production. (Olaganathan & Quigley, 2017)

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

The social research is an academic activity that searches for pertinent particulars of a specific topic. (Kothari, 2004) The research methodology is a methodical way to deal with phenomenon and to study how a research is carried out. It is the work plan of the researchers through which they describe, explain and predict how the knowledge is gained. The various schemes, procedures and tools used to collect relevant data are termed as research methods. Several qualitative research methods will be deployed to draw samples and to conduct this research. The brief description of the use of tools and techniques adopted is in the following.

#### **3.1 Participant Observation**

Participant observation is a combination of various techniques including informal interviews, discussions, direct observation and participation in the life of community or group under study. I have applied this technique as it is an indispensable method in anthropological research. It has taken over an extended period so I could get accurate information. It assisted me to actively focus and participate in research setting during fieldwork and to develop patience.

It is interconnected with rapport building and enable me to access the backstage cultural process by intervening in the life of people as per the research requirements. For the purpose of becoming a good observer, I had tried to participate in possible and easy activities with the farmers while observing them carefully. The process of participant observation have helped me to develop rapport with my research respondents.

Rapport building is the ability to establish a link with people to create a climate of understanding and trust and negotiating relationships. It is a rudimentary step of my research for successful communication. To collect in-depth data in this research involves a great deal of interaction between me and research respondents. It has created mutual responsiveness, otherwise, people can be dubious and suspicious about my identity and

research questions. Consequently, it resulted in better communication that supplied in-depth and relevant data which directly benefits the research findings.

Before the start of fieldwork, I was not much aware of the locale and agriculture therefore, it took a lot of time and effort to maintain a communication and understanding relation with farmers. Primarily, I informed them about my identity and purpose of fieldwork. I have tried to spend maximum time with them on farms to develop rapport and to get insight about agricultural practices. The process of rapport building not only provided me the preliminary information about agriculture but also helped me to comfortably employ other research tools.

### **3.2 Key Informant**

The key informant technique originally used in ethnographic research is being extensively applied in qualitative researches. It was one of the expert sources of information for my research. Key informants are the people who have knowledge about the community and meaningful information about research questions that they willingly communicate with the researcher. The advantageous quality of data was obtained by key informant in a relatively short period. The preliminary and paramount step of my fieldwork was building comfortable communicational connections with people which was made possible through making key informants.

During the initial stage of rapport building, I have selected a key informant that has helped me to develop comfortable communication and assisted me to select research respondents. He was a farmer working associated with agriculture from past six years. He was thirty eight years old. He was among the first members of the research area with whom I communicate. Due to his kind behavior and comfortable communication, I informed him about my research purpose. He has helped me throughout fieldwork and in conducting interviews.

### **3.3 Socio-economic Census**

The sample of this study was the farmers working in farms using various methods of farming. To conduct this research, it is important to have household and farm economic and social information of the farms and farmers. For this purpose, I have used a census



form to get demographic information of farmers. The census form has revealed the social and economic information of the respondents such as name, age, income, and working hours etc. All the information obtain from the census form is directly related to research findings.

### **3.4 Sampling Procedure**

Sampling is the selection of a few individuals from a bigger group or a whole population to estimate the prevalence of information and outcome regarding a bigger group. A sample is a sub-group of the population selected on which the research is conducted to generalize the situation on the whole population. (Kumar, 2011) The sampling procedure is the method of selecting a sample from the target population by the researcher. In the present study, the purposive sampling method was employed to draw a sample for the research.

#### **3.4.1 Purposive Sampling**

Purposive sampling as a non-probability sampling technique is used to choose the individuals relevant to the research criteria and research-based interest of the researcher. It is a widely applied method in qualitative research and also known as judgmental sampling. In purposive sampling, the researcher identifies people who fulfill the standards of research questions and decide the purpose they serve for research. (Bernard, 2006)

I have deployed purposive sampling because the research objectives focus on examining the agricultural practices in the research only centered to farmers while proving the notion of impact of modern methods on farmers' social and economic life.

#### **3.4.2 Sampling Unit and Sampling Size**

The target population of my research is the male population associated with agriculture in different farms of district *Attock*. I have selected 40 individuals as my research respondents who are farmers, owning or working in the farms aged between 30-50 years.

### **3.5 In-depth Interviews**

In-depth interviewing involves both structured and unstructured interviews. Structured interviews have less flexibility and are based on guided conversations. They are led by interview questions. The interview guide was required to conduct formal interviews. I have

asked interview questions from the interview guide. I have conducted eleven structured interviews with the help of interview guide. These interviews have done in a single sitting with farmers. The daily routine and schedule of the farmers were kept in mind before scheduling structured interviews. All the interviews were recorded with the consent of the farmers. Audio recording tool was used to record interviews.

The unstructured interviews were described as a part of participant observation and rapport building process as it contains detail and open conversation. It was based on a conversation held with a purpose to gather research data followed by a normal conversation with the underlying subject of exploring answers which are not openly provided by respondents during structured interviews.

I have used this techniques by generating discussions with the farmers related to research questions. The informal discussion follows the sequence from general to specific questions related to agriculture with no proper schedule. This method has allowed the farmers to speak freely about all the related aspects of agriculture, thus assisted in getting valuable data.

### **3.6 Case Study Method**

Case study, a valid method of research for anthropologists and social scientists is employed to draw subjective results by studying a phenomenon or a particular situation deeply and in the smallest unit. (Singh, 2006) It provides a holistic approach to the researcher for the understanding of the whole case.

I have conducted five case studies that revealed the impact of modern agriculture on the economic and social life farmers. During participant observation, formal and informal discussion, I have revealed detail case studies of the farmers about their experiences of using modern methods of agriculture and its impacts on their social and economic life. This process comprised much irrelevant information that was excluded during transcribing process of interviews.

### **3.7 Focus group discussion**

It is an efficacious way to gather people with similar topics of interest in acquiring local knowledge. Focus group discussion is a technique of participatory research to get similar paradigms guided by a moderator or facilitator. (Nyumba, Wilson, Derrick, & Mukherjee, 2018) It facilitates a natural discussion among various participants that provide insight about their experiences, beliefs and variations in a particular community.

I have employed this method and conducted one focus group discussion and got in-depth information relevant to research questions. It includes ten farmers from both the traditional and modern farms. In this way, the true nature and impacts of both the types of agriculture were revealed. The focus group discussion was conducted outside the farms. It started with asking some general questions about agriculture and recorded with audio recording method. I have tried to speak less and to encourage farmers to speak openly.

### **3.8 Photography**

In academic social research, photography is a creative attempt and a collaborative tool to record visual information. It assists the readers to entirely comprehend the explored data. (Wilton, 2016) I have capture a few photographs of the equipment used in agriculture, farming lands and other particulars related to the farming after taking permission from the respondents.

### **3.9 Interview Guide**

It is essential for a researcher to establish a list of relevant questions before conducting structured interviews. By concentrating on the research questions, I have prepared an interview guide that contains meaningful, pertinent and appropriate questions. All the questions have an open-ended response pattern and they follow general to the specific sequence of questioning.

### **3.10 Audio Recording**

Audio or sound recording methods are valuable tools that aid the researchers to record essential data that assists them during data analysis. This tool provides reliability and validity of the data as recordings can easily listen repeatedly during analysis in case of any

doubt. (Yateem, 2012) After taking permission from research respondents, I have used a sound recording device to record structured interviews and focus group discussions. The recorded information have been contemporaneously transcribed for analysis and thesis writing purposes.

### **3.11 Field Notes**

It is one of the initially used methods to record data and is still employed. It comprised of writing essential information by using paper and pen. It is an important source of reserving ideas and memories from interviews during fieldwork. ( Tessier, 2012) In this research, it is one of the substantial techniques deploy to record research data. I have maintained a daily dairy during my fieldwork to note down pivotal data.

### **3.12 Ethical Considerations**

This research has carried out by the underpinning of various ethical practices. The aim of the research is clearly known to all the respondents. The identity of the researcher has not concealed from the participants of the study. All the discussions and interviews were conducted with the informed consent of the respondents. Photographs have captured by taking permission from respondents. Likewise, interviews were recorded as per the will of research respondents. It was also ensured that during the time spent on farms, no property would be harmed and no farmer was discriminated based on the economic status.

### **3.13 Research Setting**

The brief description of the research area is provided in this sub-section of the topic which includes relevant information about research objectives and questions.

#### **3.13.1 Introduction to Locale**

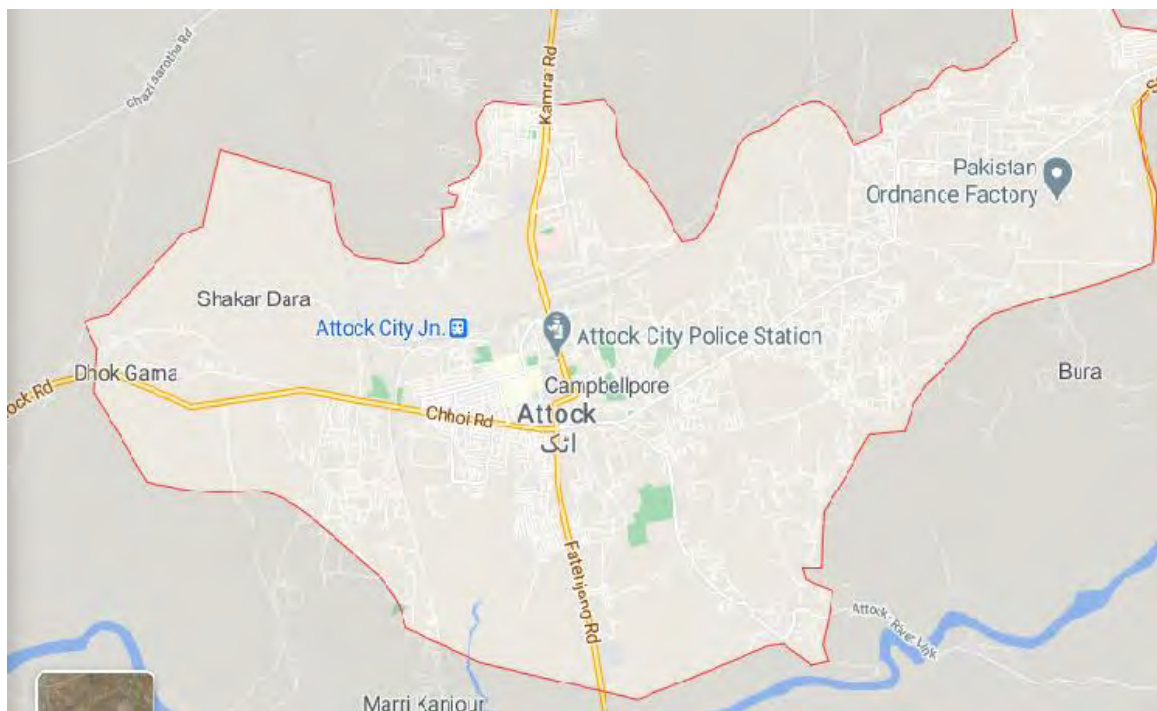
The locale of this research is a village area named “Baryar” located in Attock. It is a district in the Punjab province of Pakistan. It is divided into six tehsils including Attock, Hasan Abdal, Fateh Jhang, Hazro, Pindi Gheb and Jand. It is formerly known as campbellpur. This name was changed into Attock in 1978 which means “foot of the mountain”. The region of Attock is a part of Potohar plateau. It is renowned for the representation of Pakistan military. The residents of the area is associated with various types of farming. The

rationale behind the selection of this setting is that the area has numerous small and large scale farms and people of the area are largely associated with agriculture growing mainly wheat, corn and a variety of fruits and vegetables. The agriculture sector of the area has been experiencing changes from a few past years regarding farming methods and practices.

### 3.13.2 Location

It is situated in the north west of Punjab. On east, it is surrounded by Haripur district and on west by Swabi of KPK. Kohat district lies on the west and Rawalpindi on the east. For about 130 km along of the western boundary, river Indus flows. The area is situated at the longitude of 72°.35' North and latitude 33°.46' east. It is the corridor of Asia as it is carved through the Hindukush Mountains. It has total area of 6,857 sq.km.

**Figure 1: Map of Attock**



(Source: Google)

### **3.13.3 History of Locale**

The district Attock was created in 1904 from several miles southeast of a city established by Mughals. It was named Campbellpur in the honor of Sir Collin Campbell who was a British commander in chief of India. It was established in sixteenth century. Prior to partition, it was one of the northern most area of Punjab province before partition. After partition, Muslim refugees settled in Attock whereas the Sikh and Hindus migrated to India.

### **3.13.4 Climate and Topography**

The climate of the area resembles with other areas of Punjab province. The summers of the Attock district are clear, dry, and sweltering whereas the winters have short duration with clear and cold climate. The summer season lasts for approximately four months having high temperature of 40°C. The winter season lasts for two to three months with low temperature of 8°C. The region shows a variety of rain variation in several months throughout the year which is directly associated with agriculture. Based on a survey of the area, it has gentle to steep topography from north-east with deep water i.e. 15m and too deep in south-west about 120m. Hills and plains mainly constitute the area with fertile land.

### **3.13.5 Population**

Per to the census 1998, the population of the Attock district is 1,274,935. The majority area of the Attock is rural i.e. 78% whereas 20% is urban. Attock is considered as the sixty one populous city of Pakistan. The total population of the area is divided into female population of 50.08% whereas having male population of 49.91%.

### **3.13.6 Language**

Majority of the people of Attock speak Punjabi language. However, a small section of the population speak Pushto as well. The national language Urdu is also spoken by people and understand by whole population. The medium in school is both Urdu and English. English is also spoken and understood by educated class of the area.

### **3.13.7 Education**

The literacy rate of the Attock has been increased and about 50% because many educational institutions have started working in the district. The region is considered as the under developed area of Punjab. It has total 1287 government schools in which almost half of

them are for female population. Primary and intermediate education has imperative place in the educational domain of the area. Several famous colleges include government post graduate college Attock, Shaheen College and Bahria Foundation College etc.

### **3.13.8 Economic Organization**

The population of the area is associated with various occupations. A major part of the area has agriculture and farming as livelihood. The economy of the region is mainly based on agriculture and rain to meet agricultural requirements. They are indulged in both agriculture and horticulture. Many people are working in various government and private sectors and in industries. In Attock, several industrial units including cement, textile, oil and gas and woolen are significant units.

## **CHAPTER 4**

### **INDIGENOUS AGRICULTURAL PRACTICES**

This chapter provides detail knowledge about the types of agricultural methods practiced in research area. It is also a source of giving insight about the tools and equipment used in each type of farming as well as dominant crop selection by indigenous farmers. The detail description of crops, agricultural practices and their characteristics is in the following.

#### **4.1 Major Crops**

Mainly, local farmers grow food crops such as wheat, rice, maize and millets. Their cultivation and harvesting time depends on ecological process such as season and rain. Small scale farmers usually grow wheat for their subsistence. It is grown in winter season and harvested during summers. Whereas, the large scale farmers of the area choose many hybrid types of rice which are sown in spring season and harvested in winter.

##### **4.1.1 Wheat**

The crop of wheat is of paramount importance in research area. Approximately 80% of the farmers grow it as their livelihood depends on it. Wheat is a Rabi crop which is grown in spring and winter season. From October to December, wheat is sowed and harvested during April and May period. Both small and large scale farmers grow wheat by using various tools and techniques.

##### **4.1.2 Rice**

The farmers of the area also produce rice crop. As rice is a cash crop in Pakistan, so the farmers cultivate it both for economic purpose and as staple food. Rice is a Kharif season crop and planted in May-June period and harvest occurs during winter months i.e. October-December.

##### **4.1.3 Maize**

In research area, maize is grown as multipurpose crop. Maize is mainly cultivated by poor farmers who use them maize as fodder for their livestock. It is used as a food for people and feed for livestock. It is grown in two seasons i.e. autumn and spring. In the early days



of February, the spring maize is planted whereas in July-August period, autumn maize is sowed.

#### **4.1.4 Millet**

Similar to maize, millet is sown for the purpose of food and fodder in research area by the farmers. Usually, the small scale farmers cultivate millet. It is grown from May-July months. For the purpose of food, sowing is delayed to these months to avoid flowering due to high temperature.

#### **4.1.5 Vegetables**

The farmers also grow vegetables in their lands. The major vegetables grown in the area are tomato, potato, chilies, cauliflower and peas. These vegetables are used both for livelihood as well as for food. Mainly, the small scale farmers produce vegetables in their land.

### **4.2 Types of Soil**

Soil is a cardinal aspect of the agricultural yield. The type of soil and the nutrients it contains highly effect the crop and its productivity. Different types of soil require different tilling and irrigation during crop cultivation. Following are the types of soil on which the farmers of the area cultivate crops.

#### **4.2.1 Sand Soil**

This type of soil is very common as it consists of small particles of rock. This type of soils has less productivity due to lack of nutrients and water absorption capacity. Farmers usually use much quantity of fertilizers to improve the quality of soil and crop yield. It requires much ploughing.

#### **4.2.2 Silt Soil**

This type of soil is preferably used for growing vegetables. As compared to sandy soil, it has much particles of soil and minerals. It is a fine quality soil and more fertile. Therefore, it is also added into agricultural soil for improving the soil fertility. Ploughing is required in this type of soil when one crop more than a year is grown on the soil.

### **4.2.3 Clay Soil**

It is the type of soil in which the small particles of soil are tightly packed so the soil does not drain easily. It has a good water storage quality. Excessive cultivation can reduce the soil fertility so, the cultivation must be kept minimum. Spring cropping is difficult in this type of the soil.

### **4.2.4 Loamy Soil**

Loamy soil is a combination of clay, sand and silt soil as it contains all the beneficial properties of each of them. It easily retain moisture as well as highest nutritional and PH levels.

## **4.3 Overview of Agriculture in Research Area**

Agriculture is an essential component of livelihood of the research area and works as a contributor of food and economy. It is also a job opportunity and provide labor for many people. The city comprised of many farms and agriculture areas. The agriculture of the area is categorized into small scale farms and large scale farms operated with different techniques.

### **4.3.1 Small-Scale Farms**

Usually, the small scale farms are operated by traditional methods. They depend on the conventional and local knowledge of agriculture. The production of the farms are mainly used for household food demand and income generation for family use. The subsistence farmers of the area are predominantly the small scale farmers. They usually grow vegetables and wheat.

### **4.3.2 Large-Scale Farms**

The large scale farms are the organized system of agriculture based on market and business system. Large scale farmers employ modern techniques of agriculture. The structure of the farms, management and tools used all are based on modernized agriculture. The production of the large farms are way better than small scale farms. They grow rice, wheat, maize and vegetables on large scale.

## **4.4 Traditional Agriculture**

Indigenous agriculture refers to a primitive style of farming based on intensive use of local tools, traditional knowledge, natural fertilizers and resources by cultural beliefs of farming. In research setting, about half of the population is practicing the traditional agricultural methods.

### **4.4.1 Characteristics of Traditional Agriculture**

This type of farming system is both technically and technologically primitive. People use their land for subsistence purposes by farming. A detailed delineation of the characteristics and processes of traditional farming is in the following.

### **4.4.2 The Ancestral occupation**

The people who practice traditional farming have a family background of agricultural. Their predecessors had small lands who were involved in farming with simple tools and techniques applied based on family and cultural knowledge of farming. The traditional farmers considered indigenous methods of farming as prestige in the area. They are carrying it without any professional training of farming.

### **4.4.3 Production methods**

Traditional farmers mainly use resources which are already available naturally in the environment which can help in maintain crop and land productivity. Over a long period of time, small scale farmers have been managing their agricultural practices. Traditional farmers follow ecological methods including tillage and cropping methods by using local resources.

### **4.4.4 Tillage Process**

It is the process of preparing land for growing crops through various tools and applying techniques. The majority of traditional farmers in research setting use indigenous tillage tools including digging through shovels or pick-mattock. The processes involved and tools employed in tillage system are not only low cost but also based on cultural adoption and indigenous knowledge. Mostly, farmers perform tillage through plough. Previously, tillage

activities were used in plant or fruit cropping. This process is requires intensive human labor due to manual farming methods.

#### **4.4.5 Intercropping Method**

The traditional farmers have small lands to cultivate. Therefore, they cultivate two or more crops on the same land with intervals or sometimes simultaneously. Due to the cultivation of two or more crops on the same piece of land, intercropping is required. This process has the potential to minimize crop failure and enhance crop yield. Intercropping process is mainly applied by traditional farmers by pairing legumes with maize. Traditional farmers of the village believed that intercropping process is essential in bringing soil fertility and reduced environmental risks. It is the method of cultivating two or more crops on the same land. Farmers usually practice intercropping as it is inexpensive process due to time management and labor can be invested in cultivating various crops on the same piece of land.

#### **4.4.6 Crop rotation**

It is the process of growing various crops on the same land with intervals for increasing food production. Conventional farmers use crop rotation method to minimize risk of crop failure and weed suppression. Traditionally, crop rotation is considered as a method to control pests, weeds and crop diseases.

#### **4.4.7 Use of Local Seeds**

Seed systems play a pivotal role in agriculture and food production. The traditional farmers usually exchange crop seeds at community level. In many traditional farming systems, the farmers collect seeds from their neighbors or relatives. The exchange system of seeds is embedded in social relation. They reinforce social ties between people. For improved varieties, seeds are purchased from the markets. Farmers maintain and store seeds throughout the year and replace old seeds with fresh ones after harvesting. The local seed system is questionable in terms of changing production demand and population growth.

#### **4.4.8 Reliance on Manual Farming**

Over a long period of time traditional farmers have relied on different farming implements to prepare land and to some degree, some of these implements are still in use today. These implements are locally made by local craftsmen. For many traditional farmers, hoe and animal drawn ploughs are their main farming implements.

#### **4.4.9 Livestock Usage**

The traditional farmers keep animals such as cattle and oxen. Animal drawn procedures include ploughing method by the use of ox instead of tractors. In other case, a group of farmers purchase a tractor collectively and use with intervals. Nevertheless, it requires work skills and capacity.

#### **4.4.10 Dependence on indigenous knowledge**

Mainly, small- scale and conventional farmers rely on indigenous knowledge of farming and traditionally used methods to sustain their farming systems. The indigenous information has been successfully transferred for years by understanding natural environmental processes. It includes information about crop production, soil management and identifying soil for satisfactory yield.

#### **4.4.11 Soils identification and management**

The local knowledge about soil is essential for small farmers. They identify soil on the basis of its color, texture, environmental conditions, weeds and workability. They have categorized soils depending on above mentioned characteristics and locally called them *Loomi, Chikni, Chona and Peet*.

#### **4.4.12 Traditional Plant Protection Practices**

Traditional technologies for crop production have been used for centuries through trial and error method and keen observation. These are still exercising in the research area. The traditional home-made technologies and products are ecologically friendly. These methods helps in increasing crop production and sometimes farmers achieve higher yields than modern agriculture. The crops are protected from pests, weeds, physical damage and diseases. Farmers have traditional ways of protecting their crops against such pests and

birds by devising scarecrows. To protect crops from heat and cold weather, the farmers use seeds with high resistance abilities. To control weeds, farmers prefer hand weeding by using various tools. It is a very time consuming process from morning till evening. New weeds started growing the time when the farmer finishes weeding.

#### **4.4.13 Dependency on Human Labor**

In research setting, majority of farmers rely on family labor to carry out farming procedures. Many activities including land preparation, weeding, planting, and harvesting are carried out by hand. All these processes require a variety of human labor.

#### **4.4.14 Subsistence Pattern**

The agriculture in research area is mainly seasonal which depends on rain and weather schedule. Traditional farmers have small lands and average size is less than two or three hectares. They harvest as per crop season and water availability. The agricultural production is mainly a source of subsistence. The soil management and land productivity seem to be the biggest challenge. The land production is completely dependent on the socio-economic conditions of the farmers and resource availability. Farming activities are carried for household consumption. The remaining product is sold to local markets which contributes to community markets.

### **4.5 Tools used in Traditional Farming**

Farmers who are involved in traditional farming use various hand tools for agriculture purposes. Different tools are used for specific farming procedure including ploughing, intercultural operation and harvesting processes. Most commonly used traditional tools are described below with their utility.

#### **4.5.1 Pick-Mattock or Plough**

The small scale and traditional farmers prefer to use plough rather than tractors. It is used for digging small canals and breaking the top hard soil to sow the seeds. It is used for the preliminary process called “Tillage”. It helps in creating favorable condition for the placement of seeds. Indigenous farmers have been using plough method for the centuries. Previously, it was made with a branch of a tree. It consists of a handle, beam and a body.

**Figure 2: Pick-mattock**



(Source: Photo by researcher)

#### **4.5.2 Hand Trowel**

It is also a hand tool used for loosening the soil by digging the areas around the plants. After digging the soil, small amounts of viscous or particulate materials such as fertilizers are added in the soil. It comes in various sizes. Farmers use trowels of different sizes depending on the size of their land and the type of crop.

**Figure 3: Hand Towel**



(Source: Photo by researcher)

### **4.5.3 Spade**

This tool is used for various purposes including making ridges for seeds, to move soil, making canals for irrigation and removal of crop residue. It is a long tool having two parts. The handle is made of wood whereas the working part is made of iron. It is also used for mixing soil.



**Figure 4: Spade**



(Source: Photo by researcher)

#### **4.5.4 Rake**

It has a wooden block on which small sized bamboo pegs are fitted. It is used for leveling the ground and cleaning the soil surface. It is also used to collect grass and leaves before preparing soil for seeding.

**Figure 5: Rake**



(Source: Photo by researcher)

### **4.5.5 Weeder**

This tool is used for removing weeds from the grounds which increased the field capacity. For vegetables and fruits, a small weeder is used whereas long handle weeder is used for crops. It is made of iron. The farmers first pierce the soil with the help of this tool and then lift the soil.

**Figure 6: Weeder**



(Source: Photo by researcher)

### **4.5.6 Sickle**

Per to the respondents, sickle is one of the most popularly used tool in agriculture by the ancestors. It is primarily used for harvesting purposes. With the help of a sickle, farmers harvest whole of the plant. Like other hand tools, the cutting area of the sickle is made of iron whereas the handle is made of wood. It has a curved shape.

**Figure 7: Sickle**



(Source: Photo by researcher)

## **4.6 Modern Agriculture**

The modern agriculture technology has improved the agricultural practices employed by traditional farmers. It includes the use of hybrid seeds of a single crop with various varieties by adopting modern equipment, modern irrigation system with fertilizers and pesticides. It has been adopted by a segment of population in research area to get high production and economic benefit.

### **4.6.1 Characteristics of Modern Agriculture**

Modern dairy farming is characterized by change in procedures and improvement in the use of various factors and knowledge of agriculture with the help of advanced technology. The detail of the procedures and equipment involved in modern agriculture is in the following.

### **4.6.2 Intensive Tillage**

As tillage is the process of preparing soil for cultivation, the soil is deeply and regularly prepared in modern agriculture to completely cultivate it. Tractors are used to facilitate the process of intensive tillage. Thus, the soil is loosened, seeds can be planted easily, water absorbs effectively and consequently the roots grow faster. It is also used to control weeds and to merge the dead plants into the soil.

### **4.6.3 Monoculture**

In contrast to traditional farming, only a single crop is cultivated in a field. It is called the process of monoculture. The process of monoculture helps to cultivate and harvest easily, seeding process effective and control of weeds efficiently. Monoculture improves the cost and profitability of the crop by expanding the size of farm agriculture. Concurrently, it also assists other processes involved in modern agriculture.

### **4.6.4 Use of Chemical Fertilizers**

The application of chemical fertilizers is an essential process of modern agriculture. Synthetic chemical fertilizers are applied in granular or liquid form. They consist of various nutrients essential for plants and their growth.

### **4.6.5 Irrigation Technologies**

In traditional farming method, supplying water to crops is mainly dependent on rainy seasons. To supply water to crops in hot weather is difficult. In modern agriculture system, irrigation system based on underground wells, building reservoirs and canals have used to supply water to crops which boosted crop yield. Several pumps and drip irrigation systems have used to supply water to crops.

### **4.6.6 Chemical Pest Control**

The monoculture fields have pests and weeds that interfere with crop growth. They cause plant diseases and slowdown the growth. Chemical pest control methods such as pesticides are used to control insect or pests attack on the fields. In the times of pest outbreaks, chemical sprays are used which quickly respond.

### **4.6.7 Crop Breeding**

Traditional farmers choose between various crops to achieve specific characteristics of agriculture and production. Modern agricultural techniques involved various crop breeding processes. For instance, development and use of hybrid seeds in which seeds of two crops are combined to generate a new seed.

## **4.7 Tools used in Modern Farming**

### **4.7.1 Drip irrigation system**

It is the system of supplying water to the fields that allow the water to reach to the roots properly. It is a micro-irrigation method that saves water. Drip irrigation system is preferably used in modern agriculture. It has a network of pipelines and tubes either buried below the surface or above the soil to properly distribute water into the root zone. In traditional agriculture, the water present above the soil has maximum chances of evaporation whereas by using drip irrigation system, water evaporation can be minimized.

**Figure 8: Drip Irrigation System**



### **4.7.2 Solar panels**

The devices which absorb sun rays and then convert them into electricity are mainly used to run micro-irrigation systems. To save cost, modern farmers use solar panels which are arranged in open areas near irrigation plant.

**Figure 9: Solar panels**



(Source: Photo by researcher)

### **4.7.3 Rotavator**

Rotator is a machine used for soil preparation in modern farming. It is a very useful equipment based on motorized machinery. It has rotating blades to turn soil before seeding. It has similar function as tillage.

**Figure 10: Rotavator**



(Source: Photo by researcher)

#### **4.7.4 Hoe Blade**

A hoe is an ancient and traditional agricultural tool used previously in traditional farming and horticulture. It is a hand tool which was primarily used to remove weeds and clear the soil. In modern agriculture, it is used with a variation. The hoe blade is attached with the tractor to level the soil for planting seeds. It is locally called “*Maihra*”.

**Figure 11: Hoe Blade**



(Source: Photo by researcher)

#### **4.7.5 Tractor**

A tractor is a well-known farming equipment to replace the human extensive labor. In modern agriculture, tractor is nowadays used for various agricultural tasks, originally for tillage (soil preparation) purpose. Different equipment are towed behind the tractor for various purposes including tillage, harvesting or levelling the soil.



**Figure 12: Tractor**



(Source: Photo by researcher)

#### **4.7.6 Wheat Thresher**

A threshing machine or a thresher is a piece of farm equipment that threshes grain, that is, it removes the seeds from the stalks and husks. It does so by beating the plant to make the seeds fall out. Mechanization of this process removed a substantial amount of drudgery from farm labor.

**Figure 13: Wheat Thresher**



(Source: Photo by researcher)

## **4.8 Pest Management and Disease Control Methods**

Various ways of pest controlling and disease management methods have used by both the traditional and modern farmers. Each method is effective and significant for the crops having major difference in their usage. The types of the methods used for pest and disease control is described in the following.

### **4.8.1 Cultural Method**

The cultural method of disease control and pest management includes suppression of worms, mites, and insects during the early stage of crop cultivation. It includes the process of land preparation, tillage, choosing plants that are less attractive to pests and comparatively less chances of getting diseases. Crop-rotation is also used as a means of pest management to avoid pest attacks and diseases. Mainly, the farmers who employed traditional agriculture methods use cultural or manual process to rescue their crops.

### **4.8.2 Biological Method**

It is a method to control pests, mites, weeds and plant diseases through other organisms by relying on parasites of pests and mites. These natural organisms are manually introduced to the infected crops to get rid of them. It requires a high understanding and knowledge of organisms to control consequences and side-effects. A few of the farmers who have adopted modern methods of farming practice this method as traditional method of agriculture lacks adequate knowledge of parasites, diseases and pests in reference to bio-control method.

### **4.8.3 Chemical Method**

This method requires the use of chemical substances to control diseases, weeds and pests. Each pesticide has its own purpose as they are mainly categorized as herbicides and fungicides. To get rid of weeds, herbicides are sprayed on the crops whereas fungicides treat various fungi based crop diseases. It is a widespread method used by modern farmers due to its effectiveness and availability.

### **4.8.4 Physical Method**

This method is a mechanical method of removing pests and insects by removing or killing them as well as removing infected parts of the crops. Setting barriers such as by covering the crops to keep the insects out of the plants is used for pest management. Fire is also used as technique of farmers to destroy insects breeding on crops. The farmers who grow vegetables usually use these methods.

**Table 1: Local Crops and their Diseases**

<b>S.No</b>	<b>Crops</b>	<b>Diseases</b>	<b>Local Names</b>
1	Wheat	Wild oat, smut and rust, attack of insects.	Kala tela, Kangali boti.
2	Rice	Stem and root borrows.	Tanay ki sundi.
3	Maize	Stem and root borrows, Army worm.	Tanay ki sundi, Lashkari sundi.
4	Potato	Fungus, Virus, Blight disease and worm.	Khushki paton ki bemari, Lashkari sundi.
5	Vegetables	Bugs, mites, virus, white fly.	Tela, sundi, patta maroor virus.

(Source: Respondents)

## CHAPTER 5

### NATURE AND EXTENT OF MODERNIZATION

This chapter provides detail about the complete process of modernization in the research area. It covers both the positive and negative worldviews of farmers about the modern agriculture and how farmers shift to it accompanied with the detail about the extent of modernization.

#### 5.1 Perception of Farmers Regarding Modern Agriculture

Both the endogenous and exogenous features of the farm are under the control of the farmers. The decision about the selection of the farming system is constituted by the farmers' interaction with these factors. To adopt or to abandon is entirely the decision of the farmer. Therefore, the decision of the farmers is ultimately dependent on the understanding and perception of the farmers regarding modern agriculture.

Perception works as a means of interpreting the things newly observed or experienced. In agriculture, perception is the way of receiving new information and to change it according to cognitive awareness. The personal perspective of the farmer about agricultural methods selects the farming techniques and farm management. Modern methods of agriculture play a pivotal role in the improvement and productivity in several aspects. Therefore, it is essential to know the comprehension and perception of farmers about modern agriculture.

Generally, the farmers have positive discernment about modern processes and technology in agriculture. They consider modern agriculture as a way of ensuring high productivity. Economic factors play a significant role in determining the perception of farmers i.e. the level of farm yield is related to the adoption of modern methods.

A farmer narrated: "*Jery lok mashi tor ty mazboot ny una mary jaded tariqa istemal karna koi masla ni oo istemal kar skny ny. Un is to zayada faida cha sakhny agr una kharcha pora kar sakan*" (Economically stable people are more likely to afford the modern methods and its benefits as they can bear the expenses of modern equipment).

Besides positive perception, a considerable number of farmers have negative opinion about modern farming regarding chemical pest control methods. They criticized on the quality of food and have health concerns.

A respondent responded: *“Jery lok chemical spray istemal karnyn una ic chemical ny khatarnaq nuksan na nahe pata hona, ay lokan ny sehat aan b bara faraq pana.* (People who use chemical sprays do not have safety measures about the poisonous effects of chemicals, thus effecting the health of people).

Apart from the practical usage of the advanced methods, the population of farmers who are not currently using modern methods and technological equipment also admire them. A farmer who is shifting from conventional to modern agriculture recounted: *“Aj kal ny daur ich kashtkari da nizam hun ghar ty khandan da kam nhi rehya bulky ay ty pora karobar ban gya ee. Madaran tareqy ty bohat aqalmandi da sabot hony ny taky kpi changi pedawar mili jaye ty kisana da vi bhala hoyee”* (Currently, agriculture is more inclined towards economic production and income units rather than an ancestral occupation. Modern farming is a judicious choice to achieve better productivity and economic prosperity).

## **5.2 The positive Response of Farmers**

For the efficient production and increasing the quantity of products, modernization in agriculture is viewed as an opportunity with only a cost of modern equipment. It is viewed as a well-organized process of the application of technology in agriculture. Therefore, many farmers has successfully adopted modern methods. It has caused reduction in human labor with many automation processes. The positive response of farmers about modernization of agriculture is based on the worldview that these methods and ways have more progression, yield and efficiency than other methods.

A respondent narrated: *“Zayada tar kisana na tajarba acha rya jis time kuj lokan jaded tariqa shuru kita. Bas kuj sarmaye ni kami ni wja tu kisan thory pichy haty”* (The response of majority of the farmers was positive when few people started adopting modern methods. Only due to the dearth of capital, farmers show resistance in using modern methods).

### **5.3 The Negative Image of Farmers**

In research setting, modernization of agriculture is considered as a threat to the conventional knowledge and values of farming. Several farmers showed resistance and criticized the change in agriculture techniques, disease control methods and cultivating practices. They believed that modern methods results in effecting the quality of crops and food and outbreak of more crop diseases.

### **5.4 Adoption of Modern Agriculture**

With the elevated trend of urbanization, increase population and income, the food demand has also been increased. The farmers of the research area have taken the important steps to meet this demand and their personal needs including improved cropping techniques and disease control methods. The farmers have adopted the modern watering system, cropping methods, chemical pest control methods and a variety of tools and equipment to reduce human labor and to improve production system.

#### **5.4.1 Adoption of Drip Irrigation Method**

In large farms of the village, drip irrigation method is well adopted and advanced technology of watering crops. It is the system of supplying water to the fields that allow the water to reach to the roots properly. It is a micro-irrigation method that saves water. It has a network of pipelines and tubes either buried below the surface or above the soil to properly distribute water into the root zone.

It is adopted because it efficiently replaced the local traditional system of watering crops. Drip irrigation system alone is sufficient for watering procedure as it has minimum evaporation of water as compared to traditional watering system.

A modern farmer narrated: *“Asi drip irrigation tareqa istamal karny aan apni kanak mary kue ky ee asan tariqa ay paani lany na. Dowe tariqy nal pani lany taan pani uty ee rehna zameen ny jis waja toun miti khushak ho weni jis nal bau sara faraq pay jana”* (We use drip irrigation system for our crops as it is easy and dependable way of watering crops. In traditional way of watering crops, the water stay at the top of the soil, which increases the chances of soil dryness affecting the quality of crop).

### **5.4.2 Adoption of Threshers**

The use of threshers is widely used and adopted by the farmers. It helps the farmer to easily remove the grains of wheat from the crops thus reducing the tiring human labor. In traditional method and tools used for harvesting wheat almost takes a week which also depends on the weather. The farmers either use wheat thresher by themselves or hire labor on fixed wages. In previous years it was not common but now extensively used by the farmers.

### **5.4.3 Adoption of Monoculture**

The process of monoculture is adopted by the farmers to cultivate and harvest easily. It is the process of cultivating a single crop on land in a time which makes seeding process effective and control of weeds efficiently. Previously for weeds control process, multi crop techniques has been used by the farmers. Monoculture improves the cost and profitability of the crop by expanding the size of farm agriculture.

### **5.4.4 Adoption of Chemical Pest Control Method and Fertilizers**

The use of fertilizers and chemical pesticides is common in the area. Traditionally manure was used to improve the quality of the crops which also require much human labor. In contrast, the chemical fertilizer are available in much smaller quantity and easy to spread. Chemical methods of pest and weed control method are also adopted by a variety of farmers to get rid of weeds, pest and diseases of crops.

### **5.4.5 Adoption of Modern Tools**

Several types of modern tools and machines have adopted by the farmers for their ease and crop betterment. By replacing the hand tools, the human labor has significantly decreased. Solar panels, hoe blades, rotavator and tractors are used by the farmers. All these methods has successfully modernized the agriculture, farm and the working routine of the farmers.

## **5.5 Modernization process**

The agriculture sector of the village *Baryar* has experienced a considerable change in agricultural processes as rapid modernization and change in economy. As the process of modernization is gradual, the large scale farmers brought modern agricultural methods and



use of technological equipment in the village. People who are economically stable and have large cultivating lands purchased modern machinery.

Later, other farmers adopted the modern ways of agriculture from them. It is essential to understand the perception and worldview of people about modern methods to analyze the process of agricultural modernization in the area. People who are indulged in agriculture for economic and business conception are more likely to accept change in agriculture.

## **5.6 The successful Adoption of Modern Methods**

A growing number of farmers in research setting are supporting modern techniques as they accepted and practices a variety of techniques and tools in their agriculture. As the people of the area are mainly involved in agriculture as their occupation and production demands has been increasing with time, farmers take agriculture as a pathway to economic prosperity and sustainability. Many farmers have employed modern input and received better results. These farmers have comparatively better educational qualification and are mainly middle-aged.

### **5.6.1 Case Study**

It is the case study of a farmer who has adopted modernized ways of agriculture and shifted from traditional agriculture to modern methods of farming. He is thirty eight years old with an educational qualification of F.A. He has been cultivating crops from past twelve years. He discussed about his experience of the adoption of modern methods in detail.

He narrated: *“Jis time mai zaraat shuru kiti uc time ty mai purana tariqa hi shuru kita, aam bej istemal karna ty hathan nal kam kityn zimi chy par uc nal ty koi faida ni milya. Par jis time mai nawa tareqa apnaya menda ty zarrat ny kamy ich kadan e tan barya jis time mai uc naal kafi faida milya”* (When I started agriculture, I was extensively involved in traditional methods of crop cultivation. I used local seeds for crops and hand-made tools for soil preparation which give me low input. After the adoption of modern methods and technological facilities, my overall experience of agriculture has enhanced with increased productivity).

Initially, he observed a few of the large scale farmers adopting modern agriculture and getting benefits. These farmers had recommended him used modern tools. He accepted the suggestions of other farmers and purchased some of the tools including wheat threshers and fertilizers. He does not have a large farm but due to stable economic conditions, he is willing to extend his farm and to adopt other modern methods too.

He further narrated: *“Jis time na mai jaded tariqy nal kashtkari shuri kiti mendy apny halat vi kafi badal gaye. Hun mai downen lokan vi ic tariky nal chalny na mashwra dena kue ky mai a pic to faida uthana pyan”* (After adopting the modernization in farming, my livelihood has been even, I recommend other people to adopt modern methods as I am getting benefits from the adoption of modernization).

The adoption of modern technological methods have increased the farm yield and provided many facilitates to the respondent. Previously, the farmer was involved in traditional farming method. The change in farming style has positive implications on the economy of farm. The farmers has adopted modern methods per to the suggestions of other modern farmers. He started the use of modern methods with a few machines and get benefitted.

### **5.6.2 Case Study**

It is the case study of a young farmer who have adopted modern farming. He is thirty two years old. He is linked with the agriculture occupation as his ancestral business i.e. traditional agriculture. After modernization in the field of agriculture in research area, he started his separate agriculture based on modern farming thus easily contrasting the both types of agricultural methods. He took a step and started working against his family and succeed in modern farming business.

He narrated: *“Jis time mai jaded tareqy nal kashtkari karny da faisla ghida, mai ic nal bilkul na waqif ayaan. Mai ghary alya ty hor vi as pas ny bndya baun mashwra dityan. Shuru ich ty mai aap v bau paredhan ayan ky pata nhi kinj hosi ky bansri, par hun mai kafi faida chaan pyan is to”* (When I decided to start the business of farming based on modern techniques, I was not much aware of the farming trends and business properly. I also received extreme criticism from my family and derided remarks often. At the start, I was confused about the benefits of modern technologies, but later I started getting advantages).

He used drip irrigation method for watering crops and solar panels for the generation of electricity that sufficiently provides energy for electric equipment. For improving the productivity of the crops, he used chemical pesticides that provides safety to the crops against diseases and pest management.

He further narrated: *“Ee gal thek ay ky jaded ty machinery bau mehnagi ay par uc ny nataij bau zayada aya mendy wasty. Faram purany tareqy nal ty chal sakna ay par uc nal koi khas faida nhi hasal hona tay una naal koi khas faida ni hasal hona tay una nal koi khas faida ni hasal hona ty un anal apas ich bay faraq a dowa tariqyan ich. Machinery awly tareqy sahe faram da intazam bnady ny”* (The equipment used in modern agriculture is doubtlessly expensive but the better results are satisfactory for me and the farm. It is possible to run the farm on conventional terms, but there is a substantial difference between the productivity of both types of farming. Mechanized farming also provide organized farming).

The farmers started agriculture by joining his traditional family farming but was not satisfied with the productivity of the farm generated through conventional business. He has faced criticism by his family when he decided to shift from traditional to modern method of farming. His experience of modern technology including machinery for watering crops has demonstrated the positive results of adoption of modern methods of farming.

## **5.7 The ineffective Adoption of Modern Methods**

In recent years, the agriculture in the research setting has undergone profound changes. Numerous farmers have adopted mechanized farming methods. Due to proper education and lack of knowledge about the effects of the modern techniques and proper usage, they have affected their farms and crop production to some extent. Among all the farmers using modern methods, a few of them have been unsuccessful in employing and getting benefits because of the dearth of essential training and mismanagement of the methods and farms. To get the desired output, proper understanding about the utilization of technology is required.

### 5.7.1 Case Study

It is the case study of a farmer who had adopted the modern agriculture practices but remained unsuccessful in getting enough productivity. He is fifty two years old. His educational qualification is matriculation. He have employed the technique of monoculture in his farm for the sake of better crop productivity and less pest attack. Due to his ill-experience of modern methods, he has indifferent views about modern agriculture regardless of adopting modern methods.

He narrated: "*Pehly pehly tay mai rawayti tareqy nal kam karna ayan porany tareqy nal rahi wahi. Downen kisana nal mil ky mai v time ty rahi wahi karna ayan. Par mai lagna ky una mai sahi mashwra ni dita jing un akhyn ky ic tariqy naal zayada pedawar honi. Uc nal mai koi acha asrat ni milyan. Saf gal akhan ty uc nal jeri pedawar ayi o mery andazy nal bilkul mukhalif ayi*" (I was used to grow crops by traditional methods as I was associated with traditional agriculture practices in past. By the suggestion of other farmers, I also tried growing one crop at a time. I think these farmers misguided me that this method gives increased production as I am not happy with the result which this method has produced. In reality, the crop productivity is not much satisfactory).

He has faced a considerable problem of the shortage of proper input along with monoculture. The results has restricted him for further application of modern methods.

He further narrated: "*Mai smajhna ky farm na muqam ty mitti rawayti tareqy nal istamal honi. Asan ny niky farm jaded zaraat mary sahi ni un. Ay v hik bari wja jaded tareqy kolo faida wasool karny chy*" (I think the location and the soil of the farm is used to the traditional methods. Our small scale farms are not suitable for the modern cropping methods. This is the major issues in getting benefit from modern techniques).

Besides successful adoption of the modern methods of farming, few of the farmers have abortive experiences of modern farming due to numerous factors. Over-association with traditional farming, dearth of proper knowledge and use of modern methods, physical features of the farm and mindset of the farmer play their role in unsuccessful adoption of the modern methods. The farmer in above mentioned case study was primarily associated

with traditional methods of farming and shifted to modern methods but due to working on small scale he did not get satisfactory benefit from modern farming methods.

## **CHAPTER 6**

### **MODERNIZATION: CAUSES AND FACTORS**

This chapter comprised causes of the shift of traditional farming into modern agricultural methods. The focus of this section is to uncover the factors that influence the adaptation of modern agricultural methods by the farmers.

#### **6.1 Determinants of Modernization**

The adoption of modern agriculture methods is closely associated with the economic and social characteristics of the farmers as well as the physical features of the land. Following are the determinants of adoption of modern processes.

##### **6.1.1 Characteristics of the farmers**

It includes the basic information about the age, education and household size of the workers which is directly associated with the socio-economic life of workers. Per to the research data, the social and personal traits of the farmers play an important role in the adoption and rejection of modernization. The education and age of the farmers determine the use of modern agriculture. People who are well educated or get the basic education as well as young farmers adopted the shift in agricultural. People who are illiterate have less knowledge about the technological advancement and its benefits, so they believe that they are unable to use modern methods. Old age farmers have deep rooted traditional and family knowledge of farming which abstain them to adopt modern methods of agriculture.

##### **6.1.2 Age of the Farmers**

Usually people of all ages are indulged in the agriculture occupation in research area. Mainly, people who are between 25-55 years are associated with agriculture. The young farmers are more likely to adapt modern techniques and tools of agriculture.

##### **6.1.3 Educational Qualification**

In research setting, majority of the farmers are illiterate and their livelihood is solely dependent on agriculture. Some of the workers have educational qualification of primary, matriculation and intermediate as well especially the young workers.

### **6.1.4 Household Size**

The farmers have both nuclear as well as joint family systems. Majority of them are married and have a large family to support. The average household size varies from six to fourteen.

### **6.1.5 Income Pattern**

The income of the farmer depends on the soil, crop production and water availability. The production of rain-fed soil is twenty thousand rupees. The farmers who work on others' land earn five hundred to eight hundred wages on daily basis. Monthly income of the workers vary from fifteen thousand to twenty thousand rupees. The farmers who work on the land where wheat is cultivated also get wheat grains after harvesting.

## **6.2 Socio-economic Features of farmers**

The ideology of farmers about technological advancement of agriculture is closely associated with the farm and household economy. Farmers who are financially stable and have large cultivation land have positive view about modernization, thus they adopted new and modern methods of agriculture. The farmers with low income and small farms are reluctant in adopting modern techniques and tools. To get enough yield by employing modern methods, large farmers easily take risks. Some of the small farmers also shifted from traditional to modern for facilities.

### **6.2.1 Case Study**

It is the case study of a farmer who owned a small piece of land. He has been associated with agriculture for past fifteen years. He is forty seven years old. Previously, he worked on the land of a farmer who used traditional farming methods. The owner of the land did not live in village rather visit the land occasionally. The income he earned from the land was not sufficient. Due to economic issues, he left the traditional farm and started working on a farm with modern equipment.

He narrated: *“Jera wada zameendar aya maluk us kol bau sara raqba we rahanry maary pr us kol munasab zaraiye machinary e koi itny sary raqby maary ty maan o pori dhiyari na panj sat so rupaya dena aya. Ty ina pesyan nal mendy ghary na marr k bau okha jya*

*guzara hona aya q je dhiyari bau ghat aye. Pr k kran majboori aye hor kam ni aya ty karna pena aya sara kuj pta honry ny bawajood b k ghat dhiyar labhni. Mendy ghary aaly b preshan ayn q j saara ghaar mendy hikaly siry ty chalna pyaa ayaa*” (The traditional owner of the land had a huge area to cultivate but he did not have appropriated machinery and he only gave me five to seven hundred rupees per day. At that time, my family lived from hand to mouth due to less income. I was in a debt and also fed up of working in less income and hectic routine. My family members were also worried because I am the sole earner of the family).

He further narrated: “*Fir ma o dera chor satya ty hik hori jaye aarahyan jithy sara machinery na istemaal ayaa. Hunr ma shukr a bau khush aan apni aamdani ty naly hunr naal apanra b hik loka jya toota zimi na chah gida*” (Then, I left that farm and started working on a farm with modern methods. Now, I am satisfied with the income and also own a small piece of land).

The conversion from traditional to modern methods of farming occur under household economic conditions. The socio-economic circumstances of the small farmers impelled hi, to make decision to work in farm with modernization in farming. Initially, when he worked in a traditional farm he lived from hand to mouth with inappropriate working conditions and limited income. After started working in modern farm, his economic conditions started progressing.

### **6.3 Physical Environment of Farm**

The ecological factors of the area and land influence the modernization of traditional agriculture. The adoption of new agriculture system is linked with the weather, type of crop, location of the farm, water resources and availability, rain factor and soil type and management. The natural attack of insects, pests and other creatures also force the farmers to use hybrid seeds and better crop protection measures as well as the lack of irrigation water results in adoption of modernize irrigation system.

### **6.4 Increased Labor**

In agriculture, technology plays an important role in crop yield, farm management and to deal with farming issues. The preparation of soil, cultivation, harvesting and other



processes are manually handled by the workers in conventional farming. Due to the lack of sufficient technology, workers of the farms use traditional tools for all the processes involved in production. Therefore, lack of technology has caused many difficulties for the farmers. By not using adequate and modern tools, the working hours and the labor both have increased for the farmers.

Excessive labor has also affected the health status of the workers. Consequently by keeping in view the working capacity of farmers, to deal with the social and economic issues and to improve the production of the crops, farmers have adopted modern methods of agriculture. The farmers who have shifted from traditional to modern agriculture are using drip irrigation method for watering crops as well as ploughing through tractor which reduced human labor and increased farm production. Hence, labor issues and working timing has made farmers espoused modern methods of agriculture.

## **6.5 Inaccessibility of Workers**

The research findings illustrate that dearth of workers is a considerable driving force of causing modernization in agriculture in the research setting. Similar to other issues faced by traditional farmers, the numbers of the workers in farms are inadequate. The available number of workers are not properly linked with the amount of workers, thus people have to perform excessive work for preparation of land, cultivation and harvesting as well as watering crops.

The paucity of proper equipment and the increased working hours with excessive labor have caused disturbance in the health as well as social and family life of the farmers. Accordingly, traditional farmers are not willing to work by traditional methods with insufficient labor.

A traditional farmer narrated: *“Aj kal dy daur ich zaminy samny mary banda dhondna bau mushkil kam hogya we. Koi banda razi ee nhi hona ay farm ty kam karan wasty. Agar asan kol munasib mazdoor howan ty asi acha khasa faida cha sakny aan farm an chalany chy”* (To hire workers for traditional farms is the major challenge we are facing currently. People are not willing to work in farm with complete manual working processes. We can run our farms in a better way with proper labor availability).

With the lack of suitable labor, many farmers have shifted to modern methods of agriculture. Many traditional farmers are in the process of adopting modernization.

## **6.6 Untenable Economic Conditions**

The economic conditions of the farmers and farms have a crucial role in the modernization of traditional farming and adoption of technology in agriculture. The local farmers grow crops mainly for two purposes i.e. personal consumption and for commercial usage. Each farm whether modern or traditional has its own output value and process. The output obtained from the farm is an imperative source of economic building of the farmers' households. The farmers of the traditional farms experience income unattainability due to a variety of issues. The main reason behind this is financial pressure due to low productivity and the changing market price of crops. The dearth of technology and modern equipment and crop diseases results in low farm productivity.

All these components contribute to the economic issues of farms which reflects in the yield of each crop. The unstable economic conditions of the farms operated through traditional methods influences the farmers to change farming practices and skills which have guaranteed the viability of farms.

A traditional farmer narrated: "*Jera jaded tareqy way uc dy istamal nal faslan ich bau sara izafa hoye ay. Pehly mera bas ihya kuj hona aya ky ghary na nizam chalna ayaa. Magar hun ty mai jadoon da jaded tareqa shurh kita mai isa bary paymany tay vi istamal pya karna aan*" (The modern ways of cultivating crops have increased the output of the farm. Previously, I had been cultivating only for household food needs but now with modern methods I produce crops for commercial purpose too).

## **CHAPTER 7**

### **MODERN AGRICULTURE: ITS SOCIO-ECONOMIC IMPACTS**

This section of the report elucidates the impact of modern agricultural methods on the household economy of farmers and their social life that how the adoption of modern machinery and modernization in the field of agriculture has changed their socio-economic life.

#### **7.1 Stable Household Economy**

In research area, agriculture is recognized as the foundation of family income and a major source of generating livelihood. The modern agriculture methods has improved the living standards of the farmers by increasing the farm income which subsequently improved household economy. The quality of crop and production in modern farms is considerably better than traditional agricultural farms. The illustrations generated by research findings proves a strong link between the type of farm and its income, and the family economy of a farmer. It is well-acquainted fact that traditional agriculture requires more labor, thus gives employment opportunities to people of the area. Nevertheless, due to less daily or monthly earning from the farm, farmers considered the traditional ways of agriculture less satisfactory.

##### **7.1.1 Case Study**

It is the case study of a farmer who had been indulged in farming for past eight years. He is thirty-seven years old. He is married and have three children. Previously, he worked on a traditional farm. Agriculture is his family occupation. He had faced economic as well as working issues in traditional farms as he had to work for eleven to fourteen hours per day. Due to the unavailability of the machinery, he had a hectic work routine which generates insufficient income. Two years ago, he left the traditional farm and started working on a modern farm. Working on a farm using modern techniques of farming have facilitated him with increased monthly income.

He narrated: *“Me bau mushkil wela lghaya g jera time me rawayti bheti bari kiti q jy hor koi zariya ni aya kamanry naa. Ma kuj saal ay kam kitaa. Hunr ma jadeed machinry aaly faram /raqby ty kam pya karna wan. Ithy thrasher, tractor ty hor b bau sary zaraiye machina no jeriya mazdoor nalo zyada kam kar satniyan ty aamdan b zyada honi pai”* (I had spent hard time working in conventional farms. But due to financial needs, I kept on working for a couple of years. Now I am working in a modern farm. Here, thresher, tractor and other equipment are available which has reduced almost half of the labor with increased income).

The shift from traditional to modern methods has ameliorated the living standard with the economic conditions of the respondent. When he was working in traditional farm, he has acquainted with many financial constraints with high working hours and hectic routine. Due to nonfulfillment of financial needs in traditional farm, he has shifted to modern of farming. The adoption of modern technological tools and machinery has escalated the farm economy and made the occupation of farming economically sustainable.

## **7.2 Reduced Human Labor**

Farmers who have adopted modern agriculture methods work in more organized and better working conditions with the reduction of human labor. The use of technology and machinery have helped the farmers in managing farms more effectively and decreasing working hours. Based on research data, more farmers are willing to indulge in agriculture due to modern and improved farming practices. Besides the reduction of human labor, the health of the farmers has also improved due to less hectic routine at farms.

A respondent narrated: *“Jeri naway auzaar ty machina aaya pyan tractor ty rahi wahi alya in asan na changa bhala bhaar lah satniyan. Pehly zamany chy jeri rahi wahi hony ay us chy bandy aan bau qaziya karna pena aya naly time b bau lagna aya”* (The modern tools and machines including tractor and irrigation machines assist us in decreasing burden. In traditional way of preparing land and harvesting require much human effort and time).

The production of crop is directly linked with the household income which is better with the use of technology and modern equipment. Consequently, the employment of modern

methods gives a sigh of relief for workers by limiting the working hours and improving life quality.

### **7.3 Provisions in Social Life**

The occupation of a person highly influence the personal, economic and social life of a person. The well-being and social life of people working on farms are dependent on modern methods of farming due to various factors. Firstly, the crop yield of modern farms is considerably high in comparison with traditional farms. Due to better income, the farmers easily afford basic needs and live a satisfied life with health, care and education.

A respondent narrated: *“Jera dhiyari ya mahina ny hisab na ghary na kharcha panri kamany ayan baghair machinary aaly farm to us naal ty zrori saman b ni banrna aya. Asi itna jogy b na ayan k sacholan ni fesan ty hari bimari ghary alya ni poori kran”* (The daily or monthly household income earned from conventional farms were unable to satisfy basic life necessities. I was unable to afford school fees and proper health provisions for my family).

The modernization in agriculture does not only enhanced the economic life of farmers but also helped in managing the farm activities and labor. The farmers spend less time on farms and are able to spend proper time with their families.

Another respondent narrated: *“Pehlu Jery baghair machinary to raqbyn/farm no uthay dhiyari ty kam karny na bau okha tyme hona. Uthy subah sawery to ghin k nimashan howenyan kamy chy. Pr machinary istemal hony nal asa hunr bau sari sahulat hogy changa bhala tyme bach wena ty hunr ty me ghary alya naal b changa bhala tyme lgaha ginna ty is ne nal nal hor b so kam sanwar ginny aan”* (The daily working schedule of traditional agriculture farms is very strenuous. The working timing starts from dawn to dusk. The modern agriculture practices allow us to work efficiently by saving time and now I have decent hours to spend time with my family and to perform other social activities).

### **7.4 Benefits from Farm Management**

Modern agricultural method involves proper management of farm and agricultural products. Better management of farm particulars present full potentiality. It has helped the

farmers in operating crops by keeping details of crop type, breeding and pest management techniques. The farm life of farmers has also organized with farm management with a record of income obtained through each crop and activities performed in a farm. It has made agriculture occupation more sustainable, productive and profitable.

A respondent recounted: *“Jis time asan purana tareqa istamal larny aan asi koi hisab kitab na rkhny na fasla na ty na munafy na. Par hun asan nafa nuqsan da hisab rkhny aan ty san andaza vi hona ay. Ty jis waja toun asi farm da nizam barkarar rkhny aan”* (When we used old methods we did not keep any written record of the crops and profit. But now we better know the economic input of each crop, their breeding benefits and other finances that has assisted us in maintaining farm economy).

## **7.5 Poverty alleviation**

Modernization of the agriculture is associated with agriculture growth in the area. The reduction of poverty requires enhancement in agricultural yield which is made possible through modernization in agriculture. Farmers with few resources and obsolete practices are more likely to suffer with poor harvest and other ecological crisis. As modern farming gives access to a variety of better and alternative techniques, consequently the farmers have better economic conditions through which they can educate their children, make living better as well as have health care services and a better quality of life for their families.

## **7.6 Encouragement of Young Generation**

With the reduction of output and increase in farm productivity, the agriculture has become attractive for the young generation. The traditional method of agriculture is more confined to ancestral knowledge and it is practiced as an ancestral occupation. Likewise, the new generation of the traditional farmers view this technique as onerous and much time consuming. Consequently, they did not take part in agriculture.

The modernization in the field of agriculture have made it more reliable for younger people with proper education and training of agriculture. It has encouraged the young generation to learn about modernized and sustainable agriculture, food supply procedure which highlighted the pivotal role of modernization.

## **7.7 Wavering the Perception of Farmers**

There is a wide variation of farmers' perception about modern agriculture practices due to the challenges and outcomes associated with it. A positive shift in the perception of farmers regarding modernized ways of growing crops have been occurring. The reluctant behavior of farmers towards modern methods of agriculture have been changing with the positive outcome, relaxation and better yield by accepting modernization in agriculture. Change in the perception of farmers have positively impacting the socio-economic life of them.

## **7.8 Elimination of Unstainable Farming**

The use and output of modern agriculture is eliminating the obsolete, unsustainable and strenuous farming practices which use single crop approach. It requires farmers to spend needless energy on farms with low productivity. The modern agriculture has eradicated the typical farming practices and allows farmers to grow more crop on less land by sustaining soil nutrients. A complete change in the farming methods has caused changes in all domains of farming and life spheres of farmers.

## **CHAPTER 8**

### **SUMMARY, CONCLUSION & SUGGESTIONS**

#### **8.1 Summary**

This study begins with recognizing the types of agriculture in research area with the overview of production pattern. It was concentrated on exploring the determinants that influence the decision and worldview of the farmers about modernization in agriculture as well as the experience of farmers regarding the use of modern equipment. It also aimed at knowing the social and economic impacts of modern methods on farmers. The research locale was the farms of Attock city. Forty respondents were selected from both the types of farms to conduct this research by focusing on comprehensively explaining the produce and techniques of different farming systems.

In research area, two types of agriculture systems was observed which both differs in their crop cultivation and harvesting system as well as the types of tools and techniques used for cropping. The agriculture system of the area is divided into small and large scale farms. The types of crops cultivated are wheat, rice, maize, millet and vegetables in both the farms. The types of soil present in locale includes sandy, silty, clay and loamy soils. The deep rooted ancestral knowledge of farming is used by traditional farmers for cultivation of crops. The cultural knowledge has been influencing farms from many years. Use of hand tools, lack of technical equipment, physical pest control methods and extensive labor constitute the conventional agriculture.

Another significant agriculture method used in research area was modern farming consisted of monoculture, use of machinery, proper irrigation method and chemical pest control and disease management. It is the modernized way of producing crops. The living and economic conditions of the farmers as well as the facilities are much better in modern agriculture.



The adoption of modernization in research site is much satisfactory with the adoption of drip irrigation method, wheat threshers and tractors. The farm size, age, education and the cultural values of the area plays a key role in adoption of the modern methods. A considerable amount of the farmers have positive response towards mechanized way of agriculture and applying modern techniques.

Some of the farmers also negatively perceived the modern agriculture methods due to their inability of operating equipment successfully and poor economic conditions. A few of the farmers also believe that chemical control method is harmful for the health of the crops and soil. The shift from traditional to modern agriculture is caused by several factors including increased productivity of the farm, lack of labor and increased human work. The modern agriculture methods are more economically sustainable than traditional agriculture. The modification in agriculture is not only linked with the farm economy but also the household economy of the farmers.

There is an inescapable connection with the farm and family income and the type of agriculture practiced by the farmers. The physical, social, economic and personal life conditions of the farmers have positively affected by modern agriculture. The modernization in agriculture not only contributed to the better farm management but also provide improved socio-economic life provisions of farmers which were absent in traditional farming methods.

## **8.2 Conclusion**

Agriculture is one of the principal professions in many areas of the country. The findings of the research illustrate that the conventional methods of cultivating crops is at risk in research area due to less productivity and slow adjustment rate with modern era. The large and medium scale farmers usually apply modern methods as modern agriculture needs changes responses from the farmers.

The small scale farmers of the area only employ conventional knowledge and practices. Farmers who have failed in applying modern techniques have many reasons of their failure. Thus, there is a dire need to ameliorate the knowledge of agriculture and the proper use of

mechanized methods. In *Attock*, it is widely observed that only the large scale farmers and those with sustainable economic conditions have complete access to technological equipment.

The size of the farm and income has a deep connection with the adoption of modern techniques. The lack of proper inputs is identified as a constraint for the generation of satisfactory outcome by using modern methods. Nevertheless, mechanized farming has contributed in the management and welfare of the farms and provided many life facilities to the farmers which conventional methods of agriculture remained abortive to supply

### **8.3 Suggestions**

- The traditional farmers lack capital for technological equipment. Proper machinery and loans should be provided to them.
- Farmers of the area experience difficulty in employing modern methods due to lack of proper knowledge. Government should launch proper farming training programs.
- Emphasis should be placed on farm organization and marketing of the product for better finances of farmers and agricultural development.
- Integrate beneficial traditional knowledge with modern methods for better yield of crops.
- Promotion of more sustainable agriculture and land reforms are required.

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## APPENDICES

### Interview Guide

- Q. When did you start farming?
- Q. Which types of crops do you grow?
- Q. What kinds of seeds do you use to cultivate crops?
- Q. What did you grow when you started farming? Do you still grow same crops?
- Q. What kinds of tools are used in farming?
- Q. What types of livestock used in farming?
- Q. What role animal play in farming?
- Q. Describe the condition of farming land on which you are working?
- Q. How do you protect animals from diseases?
- Q. What is the most prevalent issue in farming?
- Q. Do you use any kind of spray for pest control or what kind's pest control measures do you use in your farm?
- Q. What type of skills or training is required for farming?
- Q. From where do you learn the skills/methods of farming? Is it your family profession?
- Q. Are you using the similar methods of farming for past years?
- Q. If yes, then why you shift to the new methods of farming and production?
- Q. What are the reasons you think that lead to the shift of farming methods?
- Q. What role technology and machinery play in farming?
- Q. How to you take the products to market?
- Q. What type of methods are used for increase production of farm?

- Q. After using modern methods have you observe any change in the quality/quantity of crops?
- Q. What types of problems you have faced in the farm?
- Q. In your farm what type of facilities are available?
- Q. What kinds of differences you have noted / adopted from the time you started farming till now?
- Q. Do you think the machines and technology is making any difference or human labor is enough in farming?
- Q. Have you change any difference in maintaining your livelihood after adopting new methods?
- Q. Is working in a farm your major source of income?
- Q. Is working in farm is sufficient to fulfill your financial needs?
- Q. Have you face any problem related to labor in your farm?
- Q. What is your health condition? Is working in a farm has affected your health status?
- Q. Is your social status related to farming?
- Q. Having a huge and productive land result in prestige in society?
- Q. Is your household economy is affected after the change in farming methods?
- Q. Is using modern technology and methods are costly?
- Q. Identify the technologies related to production and management of farms?
- Q. What are the sources of information available in farms related to better production?
- Q. What are the methods used in transfer of information in your location?
- Q. What are the factors related to adoption of farming technologies?
- Q. According to farmers, what is the most important factor of production?
- Q. What do you think the important advancement in farming?



Q. Do you think the contemporary tools used in farming are necessary for better production and to stay competitive?

## Socio-economic Census

S. No	Name	Age	Level of Education	Household size	Marital status	Religion	Working Duration		Mode of Income			
							Hours per day	Years of working	Daily	Monthly	Seasonally	Annually