An Analysis of the Land Utilization Patterns in Punjab using Land Record Management Information System (LRMIS) Data

Punjab Economic Research Institute

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Preface

The motivation of this research originally stemmed from the idea of former Chairman Planning & Development Board (P&DB), Dr. Mohammad Jehanzeb Khan to conduct a study focusing on rural dynamics of caste system with special reference to agriculture in Punjab by utilizing Land Record Management Information System (LRMIS) data developed by the Punjab Board of Revenue. To materialize the idea of the then Chairman P&DB, the concept and structure of the study was designed. The main purpose was to trace out new evidences of the change in land patterns of Punjab based upon the analysis of LRMIS data.

In view of nature of the study, historical literature on hierarchical social structure in the subcontinent focusing the division of people into tribes, castes, clans and other guilds based on kinship was reviewed. Being an important geographical region, Punjab is greatly dependent on agriculture as the single largest employment sector. Land ownership in different castes and kinship groups shapes the socio-economic and cultural aspects of the rural economy in this region. Land titles influence the choice of occupation by the people. Despite the important role of land titles play in social arrangements and interactions of people in rural areas, the pattern of changes in land title among different classes in the society is least studied in literature. Punjab had a paper-based land administration system inherited from the British and maintained at different administrative levels. Therefore, it was very difficult to trace out the patterns of transferring of land titles from agriculture castes to non-agriculture castes over the centuries. Thanks to Government of the Punjab on establishing Punjab Land Record Authority in 2017 through PLRA Act-2017 under the administrative control of the Board of Revenue Punjab. The Authority established Land Record Management Information System (LRMIS) to compile and computerize the land records of the province. The data contain detailed information (at the land parcel level) on land holders' caste along with other details; gender, type of land held (in terms of cultivation status), and area of the land holding. Apart from the availability of information at the land parcel level, what makes the PLRA dataset unique is that the caste of the landholder is also recorded for each land parcel.

The land use and cropping pattern with respect to different castes and land holding by agricultural and non-agricultural castes have been analyzed in this study by mining the PLRA data with the Agriculture Census (AC) data. The castes and kinship groups are also redefined by historical evidence from literature by categorizing 57000 uniquely identified castes of Punjab into eleven broader caste categories and then further dividing these as agricultural and non-agricultural castes.

Originally the study was conceived for only district Attock with limited scope of work and was outsourced to Mr. Abid Raza Khan. During the course of study and discussions held with experts from Punjab Land Record Authority and Planning and Development Board, the scope of the study was enhanced covering a detailed analysis of four districts of the Province of Punjab i.e., Attock, Jhang, Rahim Yar Khan and Sheikhupura. In view of the volume and complexity of the scope of work, the PERI research team completed this manuscript.

This research will prove to be of immense significance for various avenues of public policy. Further continuation and expansion of this work, covering all the districts of the province of Punjab will unearth important hidden aspects of the social fabric and will reflect their impacts on agricultural and socio-economic dynamics of the rural economy. The efforts put in by authors to accomplish this complex task are highly appreciated.

Dr. Shahid Adil
Director

Acknowledgment

The authors would especially like to acknowledge the cooperation of the Punjab Land Records Authority (PLRA), Government of Punjab for providing dataset of the Land Record Management Information System (LRMIS). We are also thankful to the Pakistan Bureau of Statistics (PBS) for providing micro-data of the Agriculture Census (AC) for 2010. We are grateful to Mr. Yasir Javvad for helping us with the definition of ten broad caste classifications. We are also grateful to Dr. Mohammad Jehanzeb Khan, former Chairman of the Planning and Development Board (P&D), for his keen interest and valuable input throughout the process of this research. This would be incomplete if we do not say special thanks to Mr. Faiz-ul-Hassan, Additional Director (Projects), Punjab Land Record Authority for reviewing the report and providing valuable input. We also say thanks to Dr. Asad-ur-Rehman, Doctoral Researcher at Ecole des Hautes Etudes en Sciences Sociale (School for Advanced Studies in the Social Sciences), Paris, France, for giving feedback on the content of the report. Our deepest acknowledgements for the guidance and support provided by Dr. Muhammad Avais Tahir, Chief of Research (PERI) throughout the course of this report. We would like to express our sincere gratitude to Dr. Shahid Adil Director, Punjab Economic Research Institute (PERI) for his guidance, valuable suggestions, and constant encouragement. Being a member of the Provincial Management Service, his knowledge and experience helped us throughout the course of study and he played a vital role in improving the quality of this research. We would like to express sincere thanks to the review committee for helping us in improving this research . We would also like to express our gratitude to our colleagues for keeping us motivated during the course of this project.

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Executive Summary

In the rural economy, agriculture occupies the central role as it is the single largest employment sector, a status this sector holds for the entire country. The ownership of the agricultural land provides unique control to the landlords, not just related to their own land, but also in wider economic, social, and political settings. This study aims to explore patterns of landholding, land fragmentation, and cropping patterns and their inter-relationship with gender, castes, and kinship groups in the province of Punjab, Pakistan. This report covers a broader horizon by considering three more agro-ecological zones of Punjab in addition to the rain-fed zone. Four districts were selected to represent four different agro-ecological zones. As alluded to above, district Attock represents the rain-fed areas of Punjab. From the mixed cropping zones district Jhang was selected. District Sheikhupura represents the rice-wheat cropping zone and district Rahimyar khan represents the cotton-wheat cropping zone.

For the most part of this analysis, a unique dataset (LRMIS) was used which records land parcel level information on the caste, gender, and ownership status of landholders as well as land type, irrigation source, and cultivation status for most of the rural land in Punjab. This dataset became available following the computerization of the land records by the Punjab Land Records Authority (PLRA). The PLRA data, as of mid-2016, is used to analyze the patterns of land holding.

Apart from the availability of information at the land parcel level, what makes the PLRA dataset unique is that the caste of the landholder is recorded for each land parcel. The hierarchical social structure in the subcontinent which is rooted in the division of people into tribes, castes, clans, and other guilds based on kinship continues to play an important role in social arrangements and interactions of people living in the rural areas. Based on the survey of literature and with the help of renowned experts having enormous knowledge and understanding of the caste system in the sub-continent, the castes and kinship groups of the PLRA dataset were categorized in 11 broader groups . Furthermore, based on the existing literature, we were able to classify Awan, Baloch, Gujjar, Jatt, Pathan, and Rajput as the agricultural castes. The remaining caste groups are classified as the non-agricultural castes.

The PLRA dataset in its standalone form does not enable the study of cropping patterns, agricultural productivity and land fragmentation. So, in order to make use of the available information on these and other variables of interest, micro-data of the Agriculture Census (AC) for 2010 was obtained from the Pakistan Bureau of Statistics (PBS).

Given, the six-year difference between the PLRA and the AC 2010 datasets, our analysis hinges on a rather strong assumption that the share of landholding for different caste groups remained constant between 2010 and 2016. Additionally, in order to consolidate the two datasets, we had to aggregate the data at the village level in both datasets. Unfortunately, the AC 2010 dataset, does not contain information on any measure of agricultural productivity. However, productive use of land for agricultural purposes can be inferred from this dataset. These two datasets allow us to study the following four important questions related to the rural economy of the Punjab province.

i. What is the gender wise distribution of land holdings?

ii. What is the effect of land fragmentation on land utilization?

iii. Does land utilization differ across agricultural and non-agricultural caste groups?

iv. Does cropping pattern differ across agricultural and non-agricultural caste groups?

The PLRA data shows that on average, gender wise land distribution is not equitable in Punjab. Female own only 17 percent of land while male land holders account for a much larger share of land (83 percent). Interestingly, our analysis shows that kinship groups falling under the categories of Religious and Foreign castes are relatively more equitable in terms of gender wise land distribution with females having 22.80 percent share in their total landholdings. Alternatively, out of the total area of land held by members of the Arain caste group, female landholdings are only amount to 13.47 percent.

There are numerous reasons which may cause changes in land parcel distribution. Inheritance can cause land parcels to get divided into smaller sized parcels. As per the law of land inheritance, demise of an owner leads to distribution of land amongst the heirs, which, if more than one, shall frequently cause the land to be fragmented. Similarly, sometimes interventions by the government (acquiring land for a road, civic amenity, etc.) can also break-up farms or redistribute them over more than one contiguous parcel. These factors cause the average farm size to shrink. Reduction in the farm size, in turn, affects productivity and efficiency through its impact on farmers' decisions involving crop choice and capital intensity, etc. The data under study reveals that approximately 62 percent of the farms have an area of less than five acres. This is in line with the literature which shows that the average farmer in Punjab operates on a small scale.

[1] This includes the 'Miscellaneous' category for castes not classified elsewhere.

In terms of the share of total cultivated area in each of the representative districts, wheat has the largest share followed by cotton, whereas rice is the third largest crop in terms of its share in the total cultivated area. Chickpea, peanuts, and maize are some of the other notable crops.

Results depict that in aggregate, agricultural castes hold at least 75 percent of the land in 63 percent of the villages amongst the selected districts within the province. Non-agricultural castes hold 75 percent or more land in 6 percent of the villages in our dataset. Whereas, 14 percent of the villages have agricultural castes holding between 25 percent and 50 percent of the total area, whereas 18 percent of the villages in our dataset are those, where the land held by members of agricultural castes accounts for 50 to 75 percent of the total area.

The overall findings of this study suggest that the economic vulnerability of women in rural Punjab can be reduced if they are entitled with property rights. This preliminary work suggests that agricultural castes grow crops other than major crops like wheat due to greater knowledge and resources to experiment with different crops. This implies that extension services should be diverted towards non-agricultural castes as their cropping choices lack diversity.

Chapter 1

Dynamics of Caste System in Rural Economy

1. Dynamics of Caste System in Rural Economy

This report sheds new light on questions related to landholders' characteristics by making use of two independent data sets – the Punjab Land Record Authority's (PLRA's) dataset on rural land ownership (henceforth referred to as LRIMS) and the Pakistan Bureau of Statistics' (PBS's) Agricultural Census (AC) 2010 dataset. The LRIMS data is being used for the first time for motivating a discussion in policy circles on the subject of agriculture, while the AC 2010 dataset complements the analysis. This section highlights the importance of this study from the policy standpoint.

1.1 Land Holding and Agricultural Castes

TThe practice of sharing land in order to drive mutual benefits roots back since the beginning of mankind. But with the passage of time, the concept changed and holding land was considered a sign of power for opting influential position in the community both in economic and political terms. (Khan, Dasti, & Khan, 2013). The conceptual framework of land ownership evolved over time and across regions as it is highly influenced by religious faith, tradition and culture (Cinnirella & Hornung, 2011). Ellis (1992) defined land as "A finite, non-reproducible consumption resource held as a source of livelihood and a financial security transferred as wealth across generations". In Islam whole land belongs to ALLAH as it is indicated in Holy Book the Quran that, "All that is in the heavens and on the earth belong to Allah." (Surah-An-Nisa (4): 126 & 134) In another place, it is stated, "To him belongs whatever is in the heavens and on earth." (Surah An-Nahl (16): 52). In Islam humans can use resources but here is a concept of dual ownership in Islam (Allah and Man). Prophet Muhammad (Peace be Upon Him) said that land belongs to the person who converts the uncultivated piece of land into a cultivated land and no one else can be the owner of that land forcefully. In case he leaves that land, and does not cultivate it for three years, he would lose the ownership of that piece of land. Prophet Muhammad (PBUH) also says, "The person having land more than his necessity should give it free of cost to others for cultivation". (Al-Haq, 1954, pp. 4–11). But, in human terms it belongs to the person who cultivates it. It is also forbidden to possess the land which is more than necessity.

Over the course of history, the land ownership and utilization kept on changing. From Delhi Sultanate to Mughals and then from Taimur to Colonial system, the land ownership systems kept on changing. Mughals organized the land taxation system that was further elaborated by the colonial administration of India. In Bombay and Madras, the local Indians were given the cultivable land but this settlement was not based on heredity. It was not a permanent settlement as the underlying objective was to tame the local communities for cultivation and taxation systems (Sharma, 1985). The permanent settlement was introduced in 1793 by the British colonial administrator of Bengal. Through this settlement, the right to private ownership of land was given to the Indians. Registration of the land as a private property was started in 1846 and continued to 1863. The British Indian Government in Punjab was more focused on the Permanent Settlement Act and after this Act in 1887 they introduced the Punjab Land Revenue Act. Before this, the land tax was on the one sixth of the gross production while after this Act the land revenue was raised to one half of the landholder's net production. Consequently, the landlords started to grow cash crops in order to pay tax under this new Act. The failure to pay tax and debt resulted in land alienation through the Court of Civil Judge. This led to increase the landlord's borrowing from local money lenders. To meet the tax requirement, the borrowings increased, and they started to mortgage land and consequently there was a steady increase in sale of this mortgaged land to the non-agricultural castes. The bankruptcy of the traditional agricultural castes led to weaken the social support for the British Colonialism (Rahman, 2012). Then in 1901, the Punjab Land Alienation Act created a distinction between the so-called "agricultural" and "non-agricultural" tribes. This law regulated the transfer of land from an agricultural tribe to a non-agricultural tribe. The main objective of this law was to provide a legal basis for categorizing some occupational groups and land-owning groups. This law reinforced the existing association between occupations and kinship groups. Despite many amendments, the essential features of the legal framework governing the land administration remain unchanged.

Caste system is amongst the major factors affecting electoral politics of the country (Javid, 2011). A study conducted by Mohmand and Gazdar (2007) in seven villages across Punjab found that caste is an important feature of the village life defining the access to livelihood, social services and even political powers. The land remains concentrated among certain class groups through different social practices such as avoiding the sale outside caste group or even immediate family. This results in low social mobility and makes some castes or group of people remain dependent on the other caste or group of people. This economic dependence also marks the political control of a certain community in the village and decision making usually remains with people belonging to the agricultural castes.

The word caste is derived from Portuguese meaning lineage, breed or race. Caste and kinship groups have existed as status hierarchies in almost all the societies and will continue to do so (Gorringe et al., 2017). In Punjab, the record of the traditional village was based on the identification of the people on the basis of caste and paternity and a genealogical tree that was traced through the male side. In villages the ownership of land (both cultivated and in the inhabited part of the village) was considered a privileged form of property right. These people were usually referred as the "original owner". Then there were those who had cultivated area but did not hold land ownership in the uncultivated area of the village. Next are the non-owner tenants, the officially recognized cultivators, and then agricultural laborers. The "original owners" were those with whom the first land settlement was made during the mid of 19th century. But, in the

modern villages, settled as a result of canal irrigation system, the states' lessees enjoy a privileged status and got the ownership of non-cultivated land also. Although they were not "original owners", yet the right of preemption was like that of the traditional village.

During the colonial era, the conditions were not conducive for the working classes and peasants (Merillat, 1970). So, it can be said that the origin of landed aristocracy in the history of Pakistan dates back to the pre partition politics and colonial era (Hussain, 1979). In 1947 Pakistan was an underdeveloped agrarian nation. The political positions were occupied by the less educated landlords of that time who mostly favored caste or biradri system in the administrative set up of the country (Aziz, 2001). The social stratification classified in the British era continues to exist till date. The land reforms of 1959, 1972 and later in 1977 proved not much successful in the country. According to the economic analyst Ronald J. Herring, the aim of the land reforms was only forced sale of the marginal land by some of the landlords to some tenants just to alter the agrarian structure up to some extent. The genuine redistribution of land did not take place. Moreover, the land was granted to the civil servants and army officers who also converted to the landed aristocrats. Retired army men also received the generous land grants at highly subsidized rates such as Rs. 20 to Rs. 60 per acre (Siddiqa, 2007). These transfers changed the agrarian structure up to some extent and some non-agricultural castes also emerged as the landlords. Another important category of contemporary landowner are emigrants, who upon their return to Pakistan, purchased lands and started cultivations which changed the agrarian outlook established by the colonial era. Despite the significance of castes and kinship groups for the rural economy, the Population Censuses and major surveys carried out since independence do not report data based on caste (Gazdar and Mallah, 2012). The conceptual framework for understanding the land ownership is little ambiguous (however this study attempts to investigate the land use of the agricultural and non-agricultural castes and several other aspects keeping in view the agrarian landownership structure of Punjab). The LRMIS data compiled by the PLRA is a first of its kind which contains detailed information (at the land parcel level) on land holders' caste along with other details like gender, type of land held (in terms of cultivation status), and area of land held.

At international level even the Sustainable Development Goals which reflect to ensure the reduction in inequalities, abandon the discriminations in law, social practice and policy with socio economic inclusion of all irrespective of sex, age, disability, ethnicity religion, origin or any other status (SDG 10.2). But this does not mention caste specifically. Although, this form of inherited identity remains an important factor affecting the lives of one fifth of the world population (Mosse, 2018). Land holdings and castes (generally based on baradari / zaat) have strong ties in the context of Pakistan and especially in the rural agrarian economy of the Punjab, since it plays an important role in the socio-economic interactions as well as the choice of occupation. It shapes everyday life of the people and also plays an important role in occupational choice (Abdullah, 2015). Therefore, the study of the pattern of land holding by different kinship groups or castes can play an important role in determining and suggesting policies for the progress of the agriculture sector. The caste-based distinctions are also important because farmers from the same caste often grow similar crop varieties. There are similarities even in utilizing the extension services and use of pesticides and other agricultural inputs (Abdullah, 2015).

In a geographical area, the proportion of total cropped area under the cultivation of different crops at a point in time is called cropping pattern. It is primarily the farmer's choice; whether he wants to adopt a more diverse cropping pattern or cultivates only few crops depends on the availability of resources (Mandal and Bezbaruah, 2013). For the growth of the agriculture sector, cropping pattern has important implications for determining the economic conditions of farmers. The relation between cropping pattern and economic status of farmers is bi-directional; cropping pattern determines the economic status of farmers while the economic status of the farming household affects the choice of crops. Moreover, several infrastructural, institutional and risk factors also affect the choice of crops. The present study is an attempt to analyze the cropping pattern in the representative regions of the Punjab province. It provides new insights about the socio-economic conditions of landholders and their crop choices.

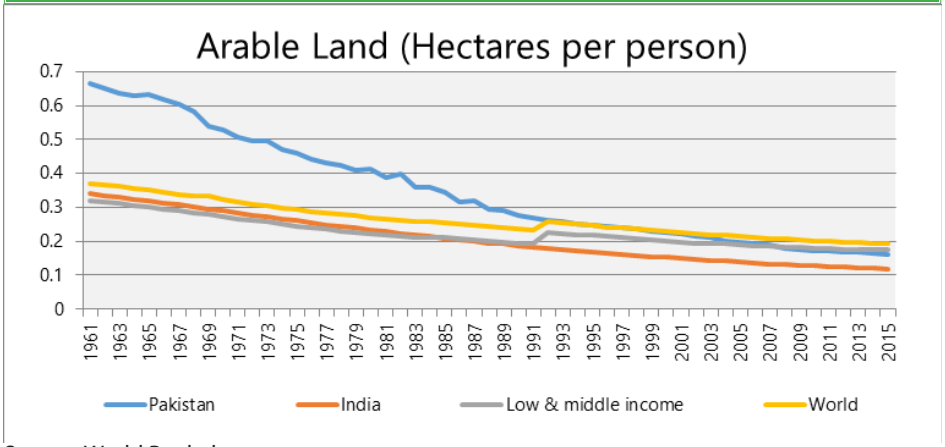
The study of cropping pattern by castes can reveal important information about farming practices of those kinship groups which are traditionally regarded as agricultural and compare these with farming practices of non-agricultural caste groups

1.2 Size of Landholding and Land Fragmentation

Land fragmentation is a state of division of holdings into discrete parcels that are dispersed over a wide area and usually farmed as single units (Binns, 1950; King and Burton, 1982). In Pakistan, the average per capita arable land holding has decreased from 0.60 hectares per person to 0.16 hectares per person, a rate far greater than that of other comparable regions.

The above graph shows that the average arable land holding per person in Pakistan has declined more rapidly in Pakistan than in other comparable regions. Major factors responsible for this observed land fragmentation are inheritance laws and the constant sub-division of land into progressively smaller parcels. A rapid decline in the average arable land holding per person is a major hindrance in the way of efficient labor utilization, input productivity, and commercialization of agriculture without which improvement in the quality of life of the farmers remains a tall order. Besides the smaller size of land parcels, land fragmentation also leads to physical dispersion of the parcels.

Figure 1: Per capita Land holding Comparison



Source: World Bank data

The land fragmentation occurs in two parallel directions - horizontal dispersion and vertical subdivision. The vertical subdivision results in a gradual reduction in the size of land holding whereas horizontal dispersion results in increasing the distance of land parcels from the area where the farming family resides (that is, when land parcel(s) are non-contiguous and distant from one another) which ultimately results in increasing the cost of production, decreasing the access to credit, and consequently, giving rise to subsistence farming. This also results in labor-intensive agriculture as returns to mechanization are low due to small scale of operation (Berry and Cline, 1979). With the passage of time, land holding has increasingly become fragmented due to the inheritance structure and the absence of formal land consolidation processes such as those which were implemented during the British rule. While the notion of increasing land fragmentation might be true logical, it may be contestable on grounds that unplanned land consolidations due to market transactions may offset the fragmentation due to inheritance. Theoretically, increased land fragmentation reduces productivity, thereby reducing the marginal benefits from land. In turn, a decrease in the marginal benefit would lead to greater probability of land changing hands, essentially leading to land consolidation through the market process. An intertemporal land use study is needed to settle this question. However, to the best of our knowledge, such panel data does not exist, at least not representative of the entire province, which would enable us to explore this question. We therefore try to study this issue by the means of cross-sectional comparison. We believe that even this preliminary exercise will be useful for formulating relevant policies because landholding size influences the likelihood of adoption of new technologies and practices such as crop diversification which ultimately affects the socio-economic status of farmers.

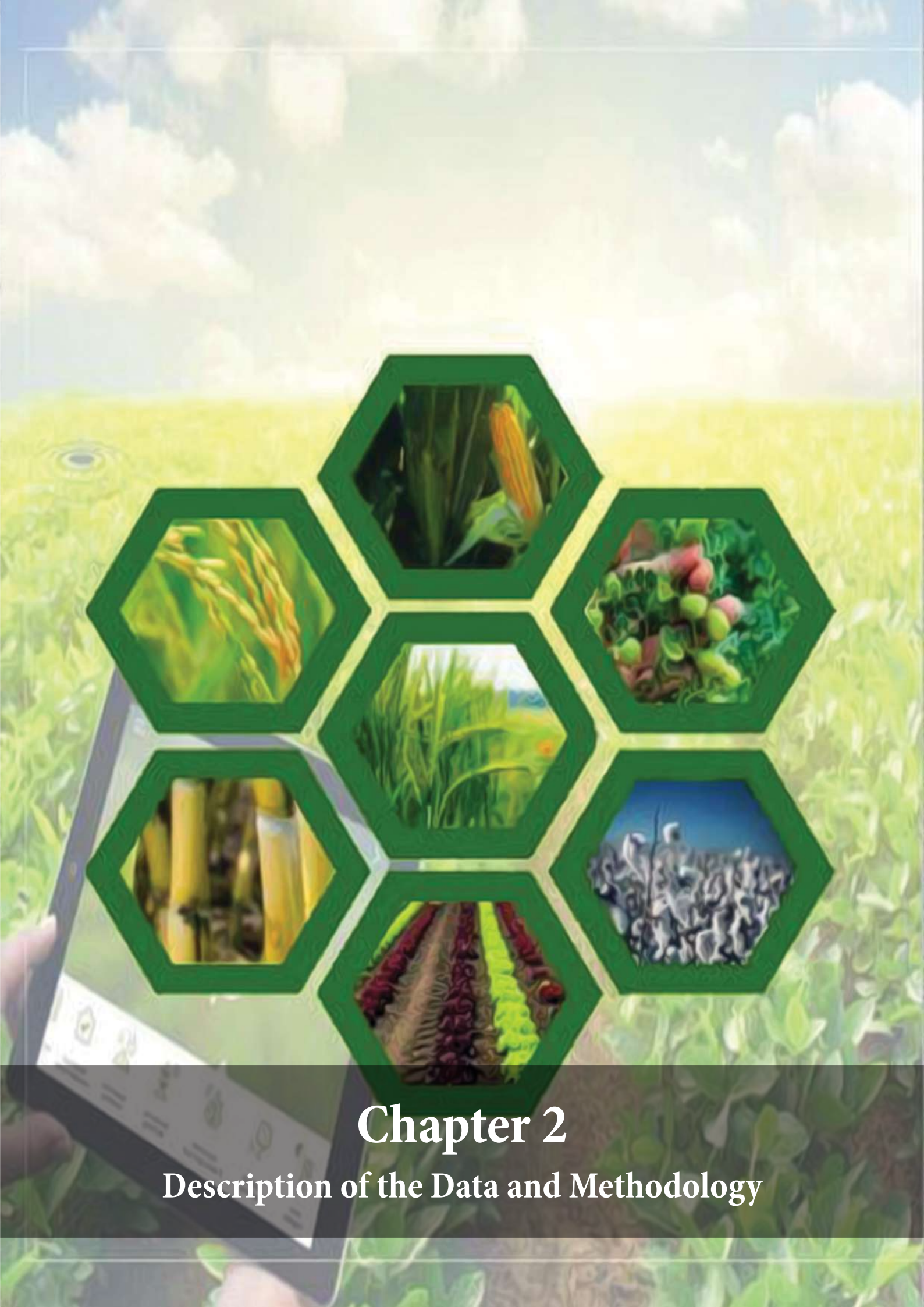
To study the structure of agrarian relations in Pakistan is a little more difficult due to data paucity. The agricultural research has remained driven more by a technocratic approach focusing more on physical input-output relations, prices incentives and growth structure of the agriculture sector. For example, in 1960's the agricultural research almost exclusively focused on the relationship between Green Revolution and growth while in 1970 it was mostly focused on studying the inequalities between East and West Pakistan. In this decade, the literatures emerged on the urban bias and inter sectoral transfer of resources and agricultural taxation. The conditions of the agricultural workers and tenants were also studied. However, the approach of 1960's remined dominant in 1970's also. In 1980 there was a powerful shift from the Pakistan People's Party's (PPP) social democratic policies. So, the research on the agrarian relations also shifted in the same direction. It was a view to eradicate the landlordism completely which paved the way to think about alternative employment opportunities for the rural poor (Rahman, 2012). While in later decades the research focus was on the technological contribution in the field of agriculture, the issue of food security and the impacts on different sectors of agriculture. In short, the research rarely considered the dynamics of class structures in the rural stet up. The connection between hierarchical social structure in rural areas based on caste, kinship, or biradri and agriculture is extremely strong and profound (see Binswanger & von Braun (1991), Kijima (1999), Ito (2009) for further discussion). This report is part of a larger project that aims to provide new insights about the interplay between landholding by different caste groups and cropping pattern as well as land fragmentation. This report attempts to answer four important questions:

i. What is the gender wise distribution of land holdings?

ii. What is the effect of land fragmentation on land utilization?

iii. Does land utilization differ across agricultural and non-agricultural caste groups?

iv. Does cropping pattern differ across agricultural and non-agricultural caste groups?



Chapter 2

Description of the Data and Methodology

1. Description of the Data and Methodology

This section explains the datasets used in this study and the methodology employed to analyze the data.

2.1 Historical Importance of the LRMIS data

Management of the land records is a necessity especially in an agrarian economy where relevant policies can be formulated only after analyzing various patterns of land holding. The province of Punjab is the hub of agricultural activity among all four provinces of the country. The system of land record management is centuries old and the main reason of record management, historically, was to collect taxes by the rulers. This tradition was continued by the British when they took over Punjab in 1848. In 1953, the first settlement operation was started to settle revenue and as a result, detailed records of ownership and tenancy were prepared. Since then, almost the entire agricultural land of the areas now constituting Punjab have had detailed records of land including records of ownership, tenancy, type of land and the crops sown. However, the quality of land record management in Pakistan deteriorated over time (Bhutta, 2008). This system was initially designed for an era when land holdings were large with low population density which made it easy to maintain records on paper. But today, the case is entirely different as there are more than 22 million recorded unique landowners in Punjab. The need for reform was felt by the Government of Punjab (GoPb) and over the past two decades, it has gradually reformed the system of land records management by digitizing the records and preparing a consolidated database of land owners and tenants. The objective of the LRMIS project in Punjab was to create a secure, reliable, efficient, accountable, and equitable system of management of land records and within just five years, almost 10 million pages of old records were scanned, while over 55 million landholders' records were digitized (98 percent of all records across the province). All of this digitized rural land title information was then made available online for the reference of land holders (GoPb, 2017). This system has increased title security and reduced transaction costs. Prior to the launch of this project, it took two months to complete the land transaction in Punjab. Today, it takes a rural resident in Punjab only 50 minutes, in two turns, to receive a digitally recorded and legally registered land title from one of the 152 newly created land record offices across all 36 districts of the province. This has helped the province of Punjab to enhance the transparency of land administration while securing land rights for its people, including women farmers who were denied their land rights in the old system (Vasquez, 2017).

2.2 Uniqueness of the LRMIS data

It is estimated that only 3 out of the 10 people worldwide have legally registered their land. Many difficulties are associated with land registration system which results in the inequality of the land distribution and tenure insecurity and ultimately hinders the social and economic development of people living in rural areas. The province of Punjab was also facing challenges such as the lack of easy access to land titles and improper management and protection of the land titles (Vasquez, 2017). To tackle these issues, the Government of the Punjab made use of the digital technology to turn the existing paper-based land tenue system into the modern digitized land administration system.

The LRMIS data is unique since it records land parcel level information on the caste, gender and ownership status of landholders as well as the land type, irrigation source, and cultivation status for most of the rural land in Punjab . This dataset became available following the computerization of land records by the Project Management Unit (PMU) of the PLRA. We used the snapshot of the LRMIS data as of mid-2016.

Apart from the availability of information at the land parcel level, what makes the LRMIS dataset unique is that the caste of the landholder is recorded for each land parcel. The hierarchical social structure in the subcontinent which was rooted in the division of people into tribes, castes, clans, and other guilds based on kinship continues to play an important role in social arrangements and interactions of people living in rural areas. These hierarchical divisions were as much economic in nature as they were social with the promulgation of the Punjab Alienation of Land Act in 1901 as a clear expression of the recognition of the significance of kinship groups in the lives of people of the sub-continent by the British rulers of the time.

For the first time, due to the availability of the LRIMS data, we can empirically explore the pattern of land ownership by different caste groups for the rural land in Punjab and analyze its association with different indicators of agricultural activity. However, this entails a tedious exercise in data cleaning and aggregation.

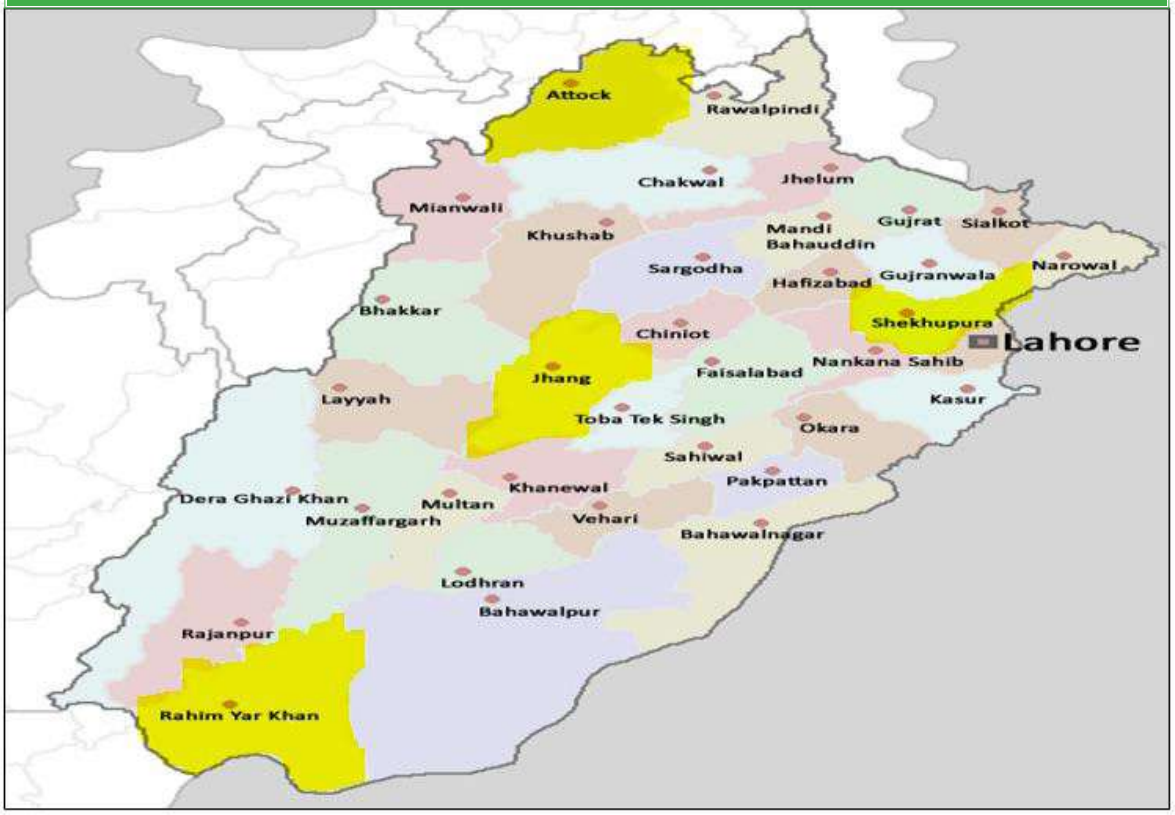
2.3 Description of the Study Area

The selection of the representative districts was based on agro-climatic zones of the province Punjab. As a preliminary work, and to draw inferences at the level of the province, we selected one district from each zone. Below is the list of the chosen districts representing the different agro-ecological zones

[1] This includes the 'Miscellaneous' category for castes not classified elsewhere.

i. District Attock represents rain-fed areas of Punjab
ii. District Jhang represents mixed cropping zones
iii. District Sheikhupura represents rice-wheat zones
iv. District Rahimyar Khan represents cotton-wheat zones

Figure 2-1: Location of the Study Areas in Punjab Province



2.3.1 Attock

Today, there are six tehsils in this district that include, Attock ,Hazro, Jand, Hassan Abdal, Fateh Jhang and Pindi Gheb. Total population of Attock is approximately 1.7 million out of which 1.3 million reside in rural areas. There are 455 mauzas (villages) in the district with a crop area amounting to 2,430 square kilometers. The district is located in the North of the province of Punjab and bordered by Chakwal in the South, Mianwali in the South-West, Rawalpindi in the Eastern boundary and Kohat in the West, Attock district is adjacent to Haripur in the North and Swabi in the North-West. Major crops grown in the district are wheat, peanut, maize chickpea, sorghum, and millet. Wheat and chickpea are Rabi crops while maize, peanut, sorghum, and millet are Kharif crops.

2.3.2 Jhang

Jhang District is situated in the central Punjab and is adjoined by Toba Tek Singh and Faislabad in the East, Hafizabad in the North-East, Khanewal in the South, Sargodha in the North, Khushab, Bhakkar, and Layyah in the West. It spreads over an area of 8,809 square kilometers and comprises of tehsils: 18 Hazari, Ahmedpur Sial, Jhang, Shorkot. The total population of Jhang as per Punjab Development Statistics (PDS) 2015 is approximately 2.5 million. Most of the land in the district is cultivable except for the area near the bank of River Chenab, near Kirana Hills. The major crops of this district include wheat, cotton, rice, sugarcane, maize, and grams. The main fruits are mango, orange, and lemon.

2.3.3 Sheikhupura

Sheikhupura is a district of Punjab bounded in the North by Gujranwala and Hafizabad, in the North-East by Narowal, in the West and South-West by Nankana Sahib, and in the East by Lahore. It is spread over an area of 3,280 square kilometers and comprises of the five tehsils: Sheikhupura, Ferozwala, Muridke, Sharaqpur, Safdarabad. The history of Sheikhupura goes back to 100 B.C. Sheikhupura is not an old city but its surroundings have an immense historical importance. The founder of Sikhism, Gurunanak, preached in Talwandi, Nankana Sahib. The total estimated population as per the PDS 2015 is approximately 3.1 million. Major crops and fruits grown in this district include sugarcane, wheat, rice, and guava. A variety of vegetables are also grown in Sheikhupura. It is one of the major districts in the province with a developed industrial base.

Major crops and fruits grown in this district include sugarcane, wheat, rice, and guava. A variety of vegetables are also grown in Sheikhupura. It is one of the major districts in the province with a developed industrial base.

2.3.4 Rahimyar Khan

Rahimyar Khan is situated by district Muzaffargarh in the North, in the East by Bahawalpur, in the South by Jaisalmer (India) and Ghotki (Sindh province), and in the West by Rajanpur. It has a total area of 11,880 square kilometers with an estimated population of around 4.6 million approximately as per the PDS, 2015. There are four tehsils in district Rahimyar Khan: Rahimyar Khan, Sadiqabad, Khanpur, Liaqatpur. The geographic area can be divided according to three main physical features including riverside area, canal-irrigated area, and desert area (Cholistan). Rahimyar Khan is amongst the top cotton producing districts of the province..

2.4 Method Adopted for Caste Identification

For the purpose of this analysis, we first identified 57,139 cases of uniquely spelled castes, tribes, septs, or other kinship groups in the LRMIS dataset for the entire province of Punjab. Based on the studies by Rose (1911), Ibbetson (1916), and with help of Mr. Yasir Javvad (the Urdu translator of these referenced manuscripts), we were able to come up with following broad categories of kinship groups:

- Arain.
- Awan.
- Baloch.
- Gujjar.
- Jatt.
- Kashmiri & Northern Races.
- Mughal.
- Pathan.
- Rajput.
- Religious & Foreign Castes.

2.4.1 Agricultural Castes

Based on the studies by Cassan (2010) and Gazdar and Mallah (2012), the following castes have been grouped as agricultural castes:

- Awan.
- Baloch.
- Gujjar.
- Jatt.
- Pathan.
- Rajput.

Arains have not been included due to its historical status as a non-agricultural caste (Koul, 2017). Mughals also have a conflicting evidence on their agricultural status. So, these two and the remaining caste groups have been categorized as Non-Agricultural Castes.

2.5 Agriculture Census Data

A major limitation of the LRMIS data is the scarcity of dimensions (variables). The dataset in its standalone form does not enable the study of cropping patterns, agricultural productivity, or of land fragmentation since information on the relevant variables is not recorded in it. In order to make use of the latest available information on these variables of interest, we obtained the micro-data of AC 2010 from the PBS. The AC is conducted by the PBS after every ten years and uses statistical survey techniques to capture the sowing patterns and agricultural land utilization across Pakistan. The dataset surveys all farms of size greater than 100 acres, while smaller farms are systematically surveyed using established statistical techniques.

Given the six-year difference between the LRMIS 2016 and the AC 2010 datasets, our analysis assumes that the share of landholdings for different caste groups remained fairly constant between 2010 and 2016. Additionally, in order to consolidate the two datasets, we aggregate the data at the village level in both datasets (the smallest aggregate feasible). Unfortunately, the AC 2010, does not contain information on any measure of agricultural productivity. However, productive use of land for agricultural purposes can be inferred from this dataset.

2.6 Merging of the Two Datasets

We have used the data for those villages which were covered in the LRIMS as well as the AC 2010 datasets. As mentioned above, the variables have been aggregated at the village level. The Data for the variable named 'share of area held by agricultural castes' comes from the LRIMS dataset. We have created four categories for this variable, which are as follows:

i. Villages where members of agricultural castes (as defined above) hold less than one-fourth of the total land
ii. Villages where members of these castes hold at least one-fourth but less than half of the total land
iii. Villages where they hold at least half but less than three-fourth of the total land, and
iv. Villages where they hold at least three-fourth of the total land

Formally, we define the set of agricultural castes, A, as follows A = {Awan, Baloch, Gujjar, Jatt, Pathan, Rajput}.

$$\text{Let, } I_{Aij} = \begin{cases} 1 & \text{if the caste of landholer of parcel } i \text{ in village } j \in A \\ 0 & \text{otherwise} \end{cases} \text{ be the indicator}$$

variable taking the value '1' if land parcel i in village j is held by a member of an agricultural caste and '0' otherwise.

Then, $L_{Aj} = \sum_i I_{Aij} p_{ij}$ where p_{ij} indicates the area (in acres) of land parcel i in village j and I_{Aij} is defined above. Therefore, L_{Aj} represents the total area (in acres) in village j which is held by members of agricultural castes. The total area in a village, L_j, can simply be expressed as: $L_j = \sum_i p_{ij}$. Therefore, the variables of interest, S_{1Aj} through S_{4Aj}, demarcating various thresholds of the share of area held by agricultural castes, can be defined as follows:

$$S_{1Aj} = \begin{cases} 1 & \text{if } \frac{L_{Aj}}{L_j} < \frac{1}{4}, \\ 0 & \text{otherwise} \end{cases} \qquad S_{2Aj} = \begin{cases} 1 & \text{if } \frac{1}{4} \leq \frac{L_{Aj}}{L_j} < \frac{1}{2}, \\ 0 & \text{otherwise} \end{cases}$$

$$S_{3Aj} = \begin{cases} 1 & \text{if } \frac{1}{2} \leq \frac{L_{Aj}}{L_j} < \frac{3}{4}, \\ 0 & \text{otherwise} \end{cases} \qquad S_{4Aj} = \begin{cases} 1 & \text{if } \frac{L_{Aj}}{L_j} \geq \frac{3}{4} \\ 0 & \text{otherwise} \end{cases}$$

The Land fragmentation and cropping information was aggregated at the village level using the AC 2010 dataset. We then categorized each village according to its average farm size into the following categories:

i. Villages where the average farm size is less than 5 acres, villages where the average farm size is between 5-12.5 acres;
i. Villages where the average farm size is between 12.5-25 acres, and
i. Villages where the average farm size is 25 acres or more.

The data on cropping pattern or productive use of the land for agricultural purposes was also obtained from the AC 2010. For each village, the area of land dedicated to the production of various crops in each of the two cropping seasons of Rabi and Kharif was computed.

2.7 An Overall Snapshot of the LRMIS Dataset

Next chapters show salient features of the land holding patterns in the province of the Punjab, based on the data analyzed from the sample districts (Attock, Sheikhupura, Jhang, Rahimyar Khan (RYK)) selected for this report (the rationale for sampling has been discussed earlier).

The discussion is grouped into six sub-sections

i. Land Holding Pattern by Gender

ii. Land Holding Pattern by Caste

iii. Distribution of Land Parcels by Farm Size

iv. Concentration of Land held by Agricultural Castes

v. Cropping Pattern by Farm Size

vi. Cropping Pattern by concentration of land held by Agricultural Castes

The PLRA data shows that on average, gender wise land distribution is not equitable in the province of Punjab. The females own only 17 percent of land while the male land holders account for 83 percent of the land. Results depict that in aggregate, agricultural castes hold at least 75 percent of the land in 63 percent of the villages in the selected districts within the province. On the other hand, non-agricultural castes hold 75 percent or more land only in 6 percent of the villages in this dataset.

Chapter 3

Gender Wise and Caste Wise Distribution of Land Holding

3. Gender wise and Caste Wise distribution of Landholding

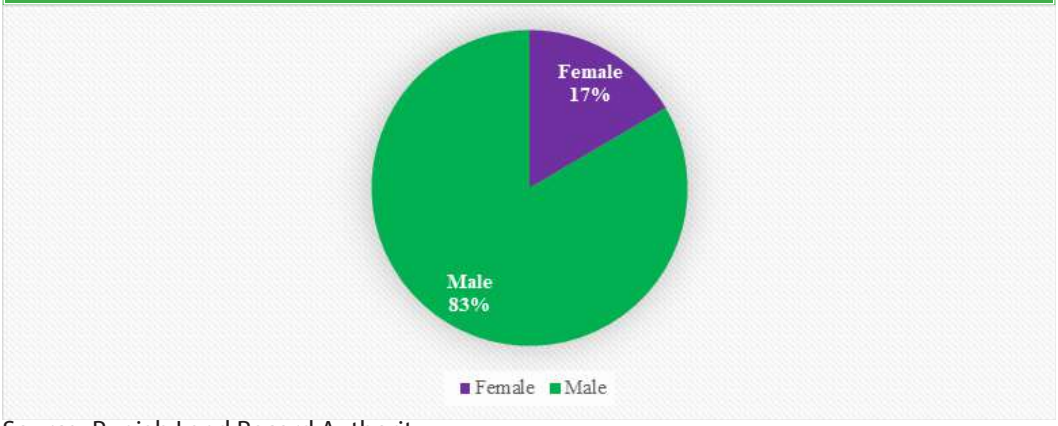
3.1 Gender Wise Distribution of Land Holding

3.1.1 The Punjab Province

Globally, population census displays almost an equal male-female population distribution. Pakistan is no exception, where female population is slightly greater than the male population. If the land holding followed the same principle, one can assume equal land holding between the two genders. However, this would be an imprudent yardstick for Pakistan. Note that approximately 97 percent of the population in Pakistan is Muslim, and in an Islamic tradition a woman receives half of the land inheritance than her brother would inherit i.e. the division between a brother and sister would be two-thirds and one-third respectively (PCSW, 2015). But, quite unfortunately during last two decades the status of women's land ownership has actually been deteriorated (FAO, 2015).

The following chart shows the distribution of land holding by gender for the province of the Punjab based on the sample from the LRMIS data.

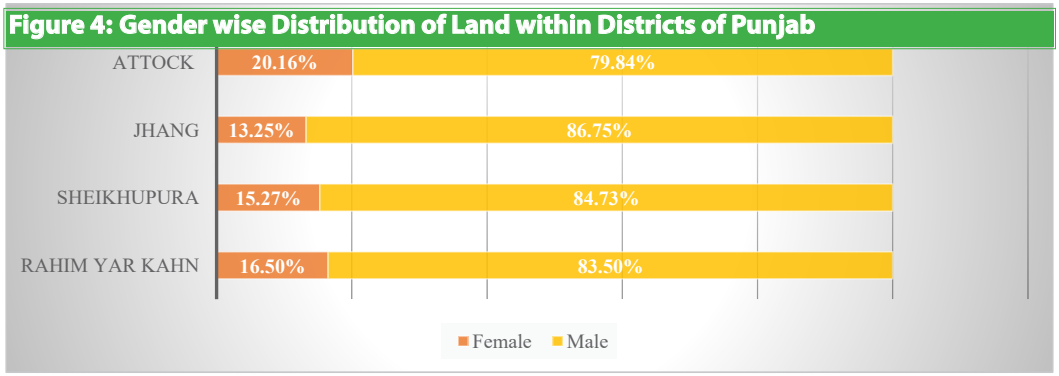
Figure 3: Distribution of Land Holding in Punjab by Gender



Source: Punjab Land Record Authority

The data reveals that females own 17 percent of the land which is significantly less than the 33 percent expected. Male land ownership is, consequently, much higher at 83 percent. While the snapshot of the gender-wise land holding patterns in all four selected districts is presented in the following figure

Figure 4: Gender wise Distribution of Land within Districts of Punjab

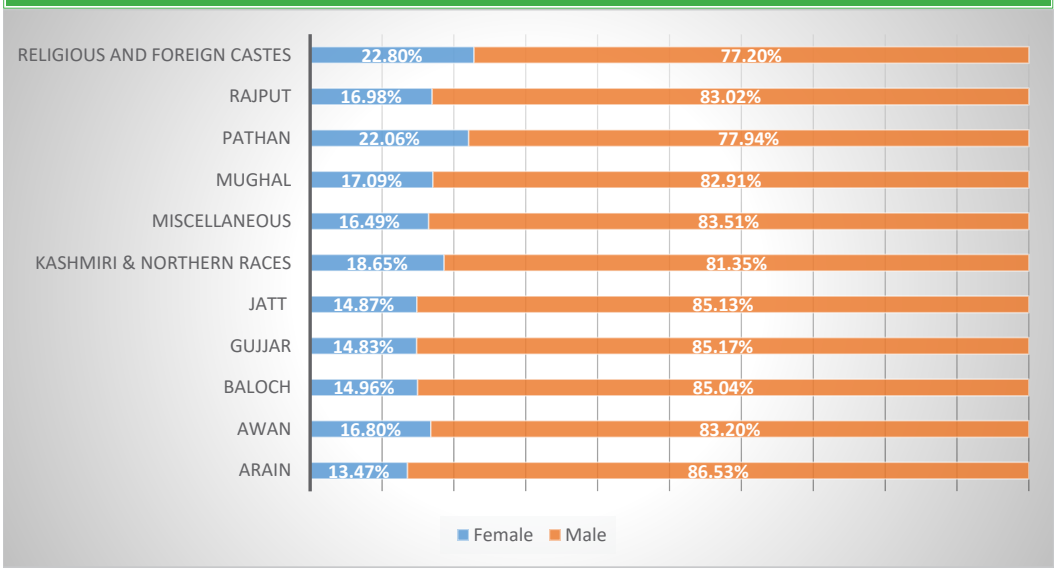


As discussed earlier the districts represent the agroecological zones in the province of Punjab. Females in district Attock own 20.16 percent of land, at par with the global ownership pattern. District Rahimyar Khan represents cotton wheat zone where females land ownership is 16.50 percent. Districts Sheikhupura and Jhang have female land ownership at 15.27 percent and 13.25 percent of the land respectively.

Considering the differences among castes in terms of relevance to agricultural economy and norms related to inheritance, an important aspect of this discussion is the land holding patterns by the two genders among different castes. The following figure presents such information.

While figure 5 displays variations in the land holding based on caste, the gender wise distribution of land in the province of Punjab reveals that none of the castes and kinship groups are much skewed towards females' land ownership. A detailed analysis makes it clear that the kinship groups falling under religious and foreign castes achieve higher female ownership, i.e., 22.80 percent, in terms of gender wise land distribution, followed by Pathans at 22.06 percent.

Figure 5: Gender wise Distribution of Land within each Caste Group in Punjab



Castes in the category of Kashimiri and Northern races depict 18.65 percent of land ownership distribution followed by Mughals at 17.09 percent. Ignoring the miscellaneous category, females own 16.80 percent of total land among Awans, while Baloch, gender wise land ownership among Jatts and Gujjars stands at 14.96 percent and 14.87 percent respectively. Out of the total area owned by Arains, females own a total of 13.47 percent of the land ownership which is the least as compared to the other castes.

The relevant academic literature suggests reasons for such deviation including the manifestation of unequal property rights, greater role of male population in agriculture, and differences in asset holding preferences between genders. These alongside other reasons discussed in the relevant literature suggest that the deviation from expected is an important area of research and requires detailed analysis beyond the scope of this work (Agarwal, 1988; Gray & Kevane, 1999; Arun, 1999). Giving women their due share in land rights can significantly contribute to achieves the Sustainable Development Goal of eliminating poverty and hunger and gender equality (Sircar, 2016).

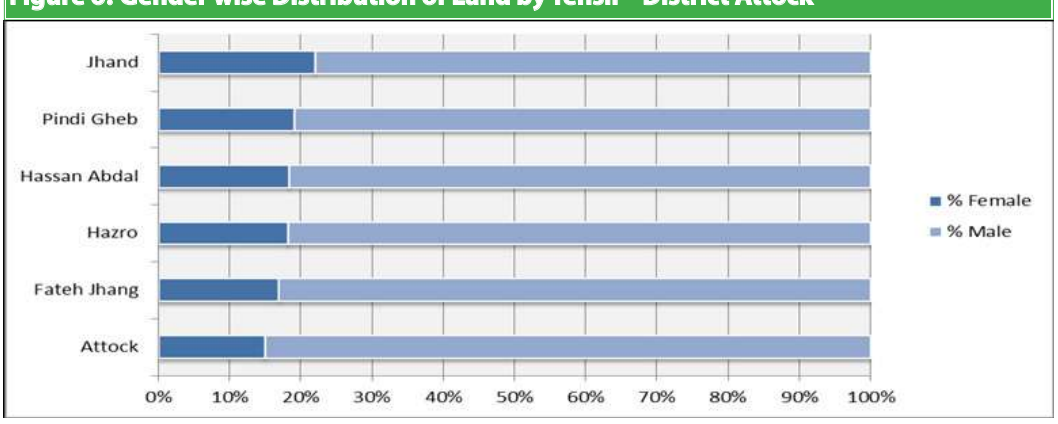
The following sub-sections further analyze the gender-wise land distribution patterns for four selected districts of province of Punjab. The analysis for each district will comprise of:

i. Land holding by Gender for the district
ii. Gender-wise distribution of land holding by Tehsil
iii. Gender-wise distribution of land holding by Caste group for the District
iv. Gender-wise distribution of land holding by Caste group within each Tehsil

3.1.1.1 District Attock

This section explains the gender wise distribution of land in district Attock. Unsurprisingly, 81 percent of the landholdings, in terms of land area, in Attock district belong to males.

Figure 6: Gender wise Distribution of Land by Tehsil – District Attock



In relative terms, Jhand is the most equitable of all six tehsils within the district as far as gender-wise distribution of land is concerned, with a share of females adding up to 22 percent of the tehsil's total land area. Attock itself is the

least equitable tehsil with female landholdings accounting for only 15 percent of the total land area of the tehsil. The female landholding in Jhand of 22 percent is 3 percent better than the district average of 19 percent

Figure 7: Gender wise Distribution of Land by Caste Group - District Attock

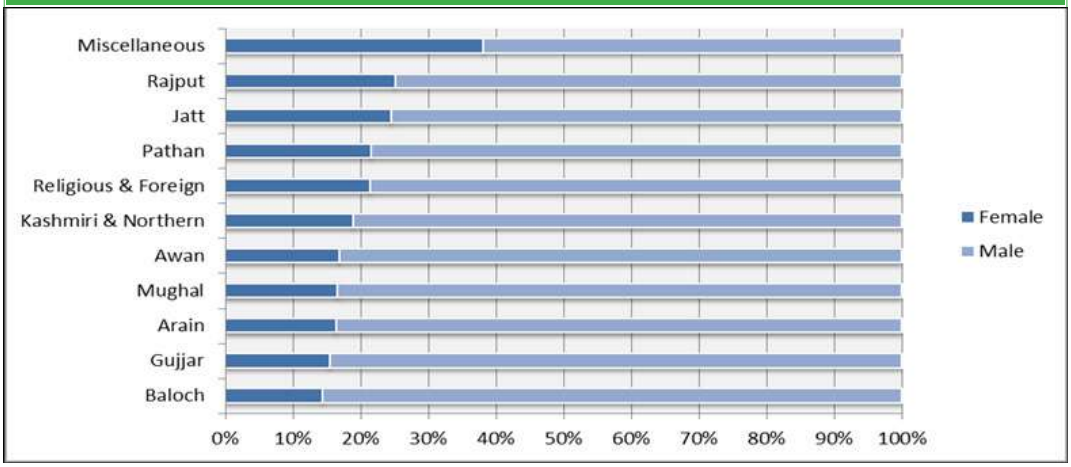
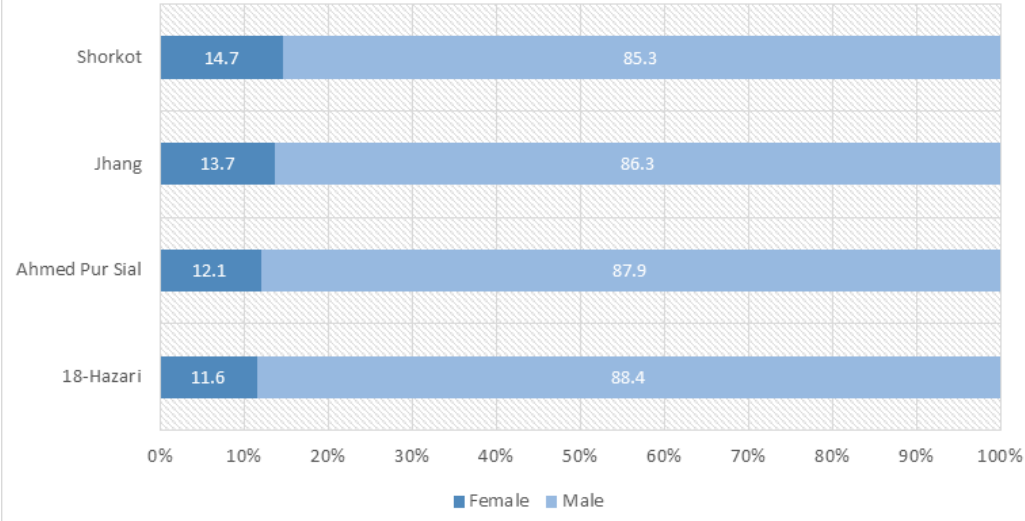


Figure 7 explains that in terms of gender parity, the Rajputs perform best in relative terms with slightly above 25 percent of their landholdings belonging to females (ignoring the Miscellaneous caste group). The Balochs perform the worst in this regard with female accounting for only 14 percent of the total landholdings, while the Rajuts have slightly more equitable land distribution among males and females along with Jatts and Pathans.

3.1.1.2 District Jhang

The major share of rural land in this district accrues to the Jhang tehsil followed by Shorkot, 18 Hazari, and Ahmedpur Sial. The overall picture of the gender-wise distribution of land in district Jhang shows that females hold only 13 percent of the land with males' share being as high as 87 percent.

Figure 8: Gender wise Distribution of Land by Tehsil – District Jhang

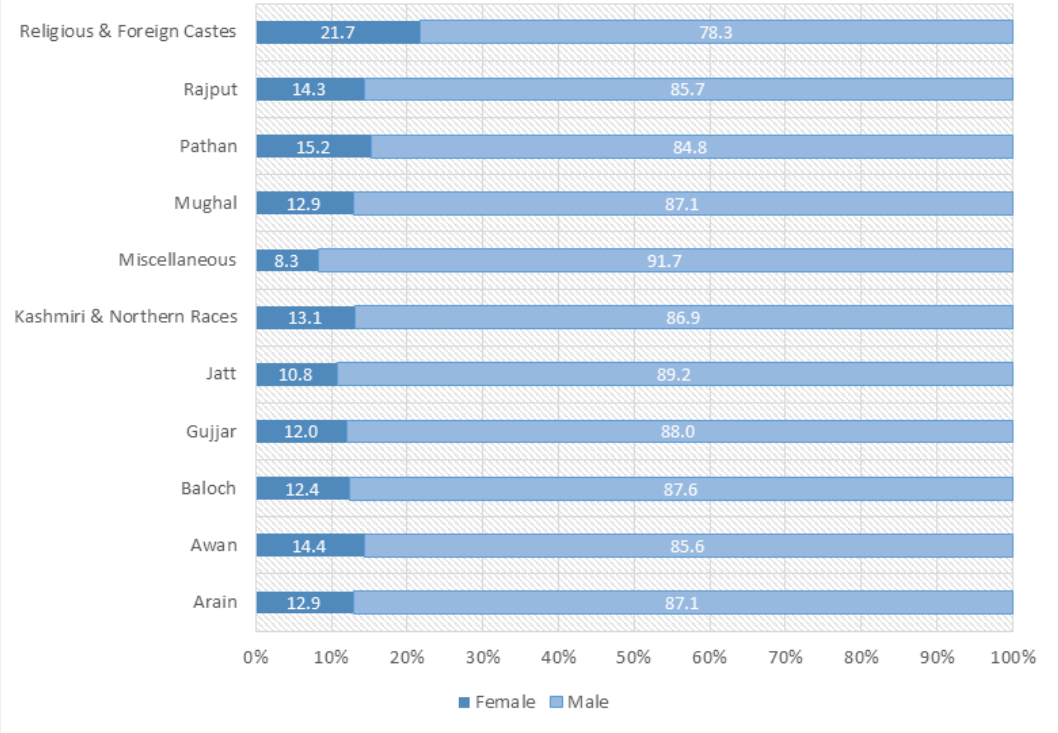


The graph shown above provides a breakdown of gender wise distribution of land at the tehsil level. It shows that the share of females' landholdings does not exceed 15 percent in any tehsil of this district. In the tehsil of Shorkot, female landholdings are 14.70 percent, which is the highest amongst all four tehsils of this district. The 18-Hazari has the lowest share of female landholdings amounting to only 11.65 percent of the total area of the tehsil. All four tehsils in district Jhang have less equitable distribution of land across the two genders than the least equitable tehsil within Attock district (i.e. Attock tehsil).

Figure 9 explains the gender-wise distribution of landholdings within each caste group in district Jhang. It manifests that the castes falling in the category of Religious and Foreign castes have relatively more equitable distribution of land between males and females, with males, holding 78.30 percent of land, while females own 21.70 percent of land respectively. In the Pathan caste group, females have 15.20 percent share in land holding and males account for 85.70 percent of land. In Rajputs, 14.30 percent land is held by the females, while 85.70 percent held by the males while in Awans, 14.40 percent land is held by the females, while 85.60 percent is held by the male. Males dominate the

landholdings of Kashimiri and Northern races with a share of 86.90 percent, while females account for 13.10 percent of the total land held by members of this caste group in district Jhang. The share of females in the total landholdings of Mughals, Arains, Gujjars, and Jatts in district Jhang is 12.88 percent, 12.90 percent, 12 percent, and 10.80 percent, respectively. The overall picture shows that in this district, except Religious and Foreign castes, female members of no other caste group account for more than one-fifth of the total landholdings.

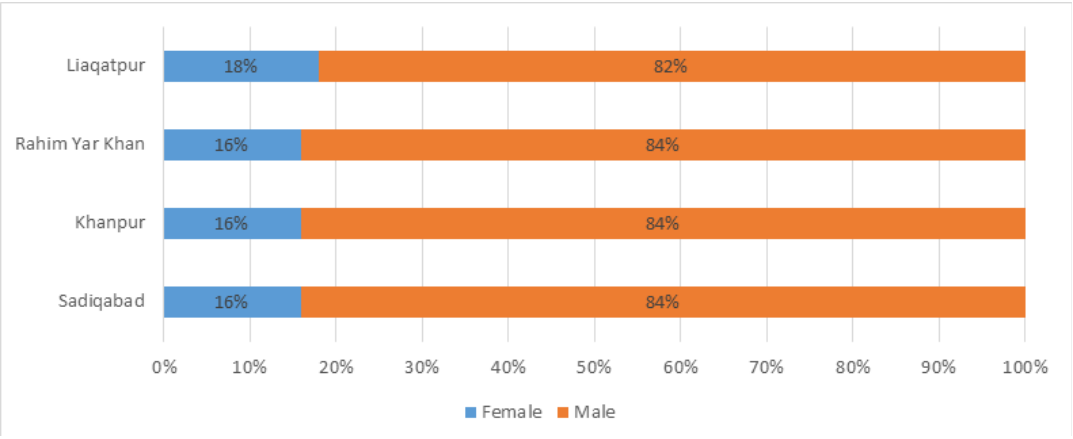
Figure 9: Gender wise Distribution of Land by Caste Group – District Jhang



3.1.1.3 District Rahimyar Khan

The gender based distrbutio of land in all the tehsils of doistrcit Rahim Yar Khan is also not much equitable.

Figure 10: Gender wise distribution of land by Tehsil – District Rahimyar Khan

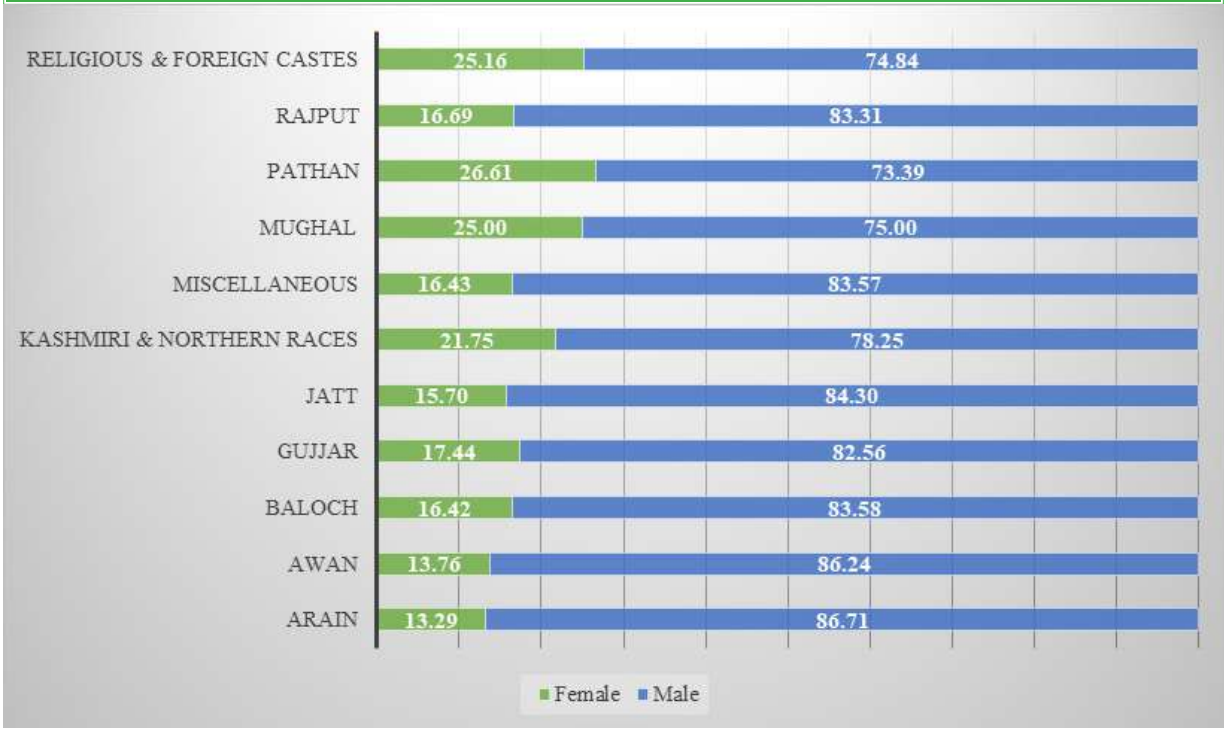


Tehsil Rahim Yar Khan, Kahnpur and Sadiqabad have equal distribution of land between male and females while Tehsil Liaqatppur is 2 percentage point above all other three tehsils in terms of women land ownership.

The analysis of the gender wise distribution of land within each caste group in district Rahimyar Khan in figure 11 shows that Pathans have the most equitable distribution of land holding as 26.61 percent of the total owned is held by females followed by Religious and Forign castes and Mughals. The graph also presents that in district Rahimyar Khan, Arains have the least equitable distribution of land with respect to gender as there is only 13.29 percent share of female land holders in total land holding. While, in Religious and Foreign castes and Kashmiri and Northern races, females have 25.16 percent and 21.75 percent share in the total land holding within district. Although Mughals are less in numbers, but their females also own one fourth of the total land holding. The female share of land holding in Gujjars, Rajputs, Balochs, Jatts, and Awans is 17.44 percent, 16.69 percent, 16.42 percent, 15.70 percent, and 13.76

percent respectively. The overall picture shows that in district Rahimyar Khan, females in almost all castes own not more than one fourth of the land.

Figure 11: Gender wise Distribution of Land within each Caste Group in the Rahimyar Khan District



3.1.1.4 District Sheikhupura

Overall picture of the district reveals that 81 percent of landholdings in Sheikhupura district belong to the males while only 15 percent belong to females.Figure 12 reveals that in relative terms, distribution in Tehsil Muridkey is slightly more equitable of all tehsils within the district as far as gender-wise distribution of land is concerned, with a share of females adding up to 16.09 percent of the tehsil's total land area. In terms of gender parity, tehsil Sheikhupura is observed to be performing as better after Muridkey as district taken in terms of the relative share of female landholders. The female landholding in Sheikhupura is 14.95 percent. Sharaqpur is the least equitable tehsil, with female landholdings accounting for only 13.39 percent of the total land area of the tehsil.

Figure 13 shows that in terms of gender parity, the Pathans perform best, in relative terms, with slightly above 24 percent of their landholdings belonging to the females. Awan perform the worst in this regard with female landholdings accounting for only 11.76 percent of the total landholdings.

Figure 12: Gender wise Distribution of Land within each Tehsil of Sheikhupura District

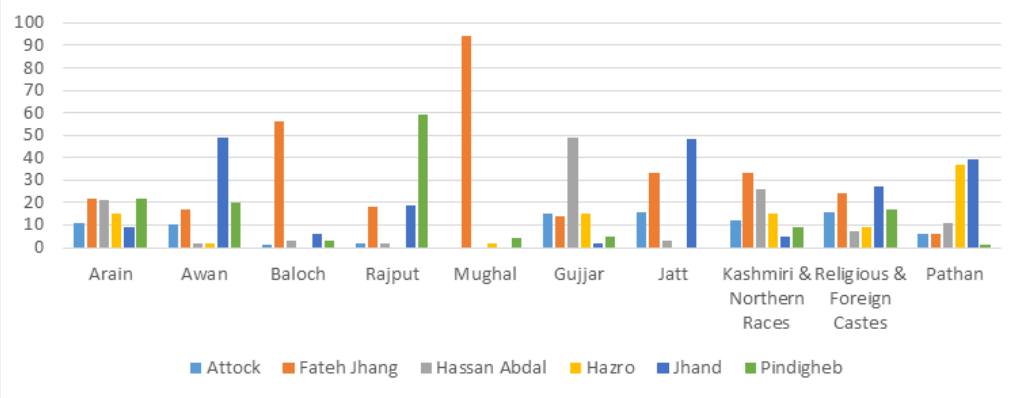
Figure 13: Gender wise Distribution of Land within each Caste Group in Sheikhupura

3.2 Caste Wise Distribution of Land Holding

This section presents the distribution of landholding in each caste at district level and provincial level.

3.2.1 District Attock

Figure 14: Tehsil wise Distribution of Landholding by Castes in District Attock



Landholdings of Arains are relatively well spread across all six tehsils of Attock district with Fateh Jhang, Pindi Gheb, and Hassan Abdal recording the highest share at 22 percent each. Jhand has the lowest share in total landholdings of the Arains in the district, while the share of tehsil Hazro is 15 percent. Awans is the most dominant group in the district as almost half of their landholdings are concentrated in tehsil Jhand with Hazro and Hassan Abdal having the least share of their landholdings at 2 percent each. Balochs being the least dominant group in the district, have more than half of their landholdings concentrated in Fateh Jhang whereas, Pindi Gheb accounts for slightly more than one-third of their landholdings. Tehsil Attock has least share in total landholding of the Balochs. Rajputs have most of their landholdings concentrated in Pindi Gheb. Jhand and Fateh Jhang, represent approximately one-fifth of the Rajput landholdings in the district. The Mughals have more than 90 percent of their landholdings concentrated in Fateh Jhang tehsil and thus, are the extreme case of concentration of land in a tehsil.

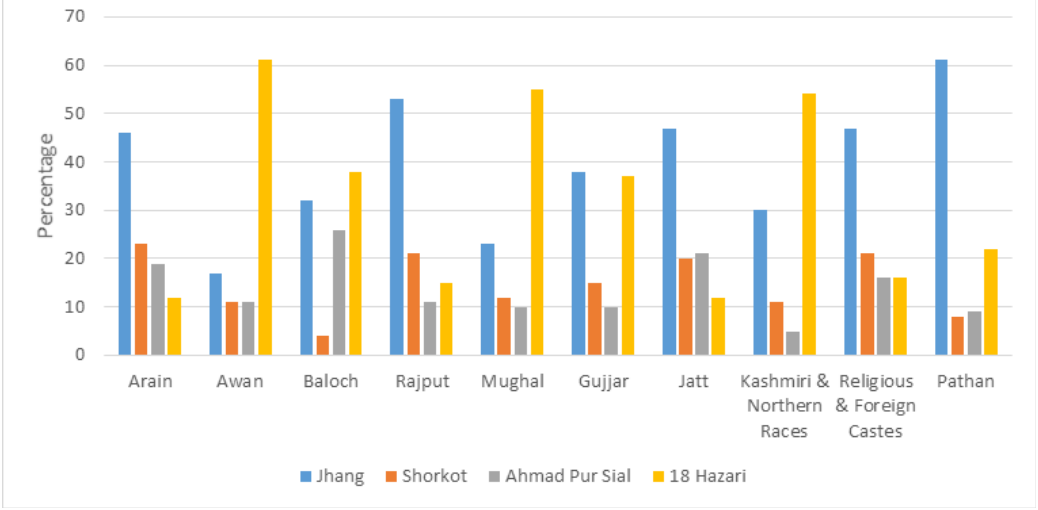
Almost half of the landholdings of the Gujjars are concentrated in tehsil Hassan Abdal. Tehsil Jhand has the lowest share in the total landholdings of Gujjars. Jatts, on the contrary, have most of their landholdings concentrated in Jhand. Tehsil Fateh Jhang represents one third of their landholdings, whereas Hassan Abdal has the least share in the total landholdings of Jatts in district Attock. The second least dominant caste group of the Kashmiri and Northern races has its landholdings relatively well spread across the district with no tehsil representing as much as half of their total landholdings. Fateh Jhang and Hassan Abdal, represent 33 percent and 26 percent landholdings of these races, whereas Jhand represents the least share of their landholdings in Attock district. Religious and Foreign races have their landholdings well spread across the district with Jhand representing the largest share and Hassan Abdal having the least of their landholdings. For the rest of the castes which could not be classified under any of the above discussed ten caste groups, the highest share of their landholdings is in tehsil Jhand, and the lowest is in tehsil Attock. The Pathans have their landholdings primarily concentrated in Jhand and Hazro tehsils. Pindi Gheb represents the least share of the Pathans' landholdings in Attock district.

3.2.2 District Jhang

TThe major of portion of the land held by the Arains lies in the tehsil Jhang i.e., 46 percent while in other tehsils Arains hold relatively less land with a least share of land i.e., 12 percent, in 18-Hazari. The Awans are more dominant in tehsil 18-Hazari with 61 percent of the land holding being concentrated in the tehsil, while 11 percent of the land is held in Ahmad Pur Sial and Shorkot, each along with 17 percent land ownership is in tehsil Jhang. The Balochs have

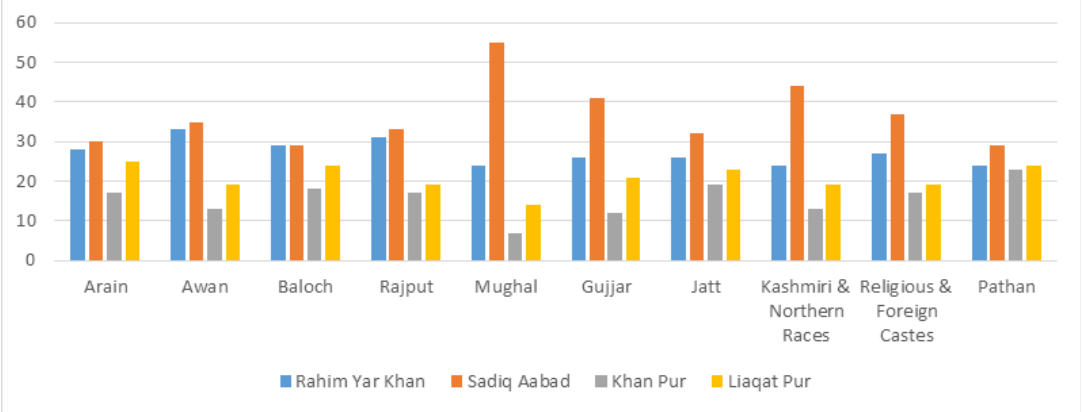
major share of the land in tehsil 18-Hazari i.e., 38 percent, and in Jhang i.e., 32 percent. The concentration of land held by Balochs in Ahmad Pur Sial is 26 percent, while minimum land holding of 4 percent is in Shorkot. While more than half i.e., 53 percent of the land owned by the Rajputs is in tehsil Jhang of district Jhang. Out of the total land owned by the Balochs, 21 percent lies in Shorkot while 15 percent and 11 percent in 18-Hazari and Ahmad Pur Sial respectively. More than half i.e., 55 percent of the land ownership by the Mughals is in the 18-Hazari followed by tehsil Jhang where 23 percent of the total land ownership, while in tehsil Shorkot and Ahmad Pur Sial, they own 12 percent and 10 percent of the total land, respectively. Gujjars have almost equal concentration of land in tehsil Jhang i.e., 38 percent and 18-Hazari i.e., 37 percent. In Shorkot and Ahmad Pur Sial, the land area is 15 percent and 10 percent, respectively. The land ownership by the Jatts is more i.e., 47 percent in tehsil Jhang, while in Ahmad Pur Sial and Shorkot, the land ownership is 21 percent and 20 percent, respectively. Out of the total land owned by Kashmiri and Northern races in district Jhang, tehsil 18-Hazari has the maximum concentration i.e., 54 percent of land with the least concentration i.e., 5 percent of land in Ahmad Pur Sial and 11 percent in Shorkot. Out of total land, 47 percent owned by the Religious and Foreign castes is in tehsil Jhang while in Shorkot their concentration of land ownership is 21 percent. The land share of the Kashmiri and Northern races is 16 percent in tehsil 18-Hazari and Ahmad Pur Sial. The land owned by Pathans is more concentrated in tehsil Jhang followed by 18-Hazari where they own 22 percent out of total land in district Jhang. Shorkot and the Ahmad Pur Sial have 8 percent and 9 percent of their total landholdings, respectively. Shorkot and the Ahmad Pur Sial have 8 percent and 9 percent of their total landholdings, respectively.

Figure 15: Tehsil wise Distribution of Landholding by Castes in District Jhang



3.2.3 District Rahimyar Khan

Figure 16: Tehsil wise Distribution of Landholding by Castes in District Rahim Yar Khan

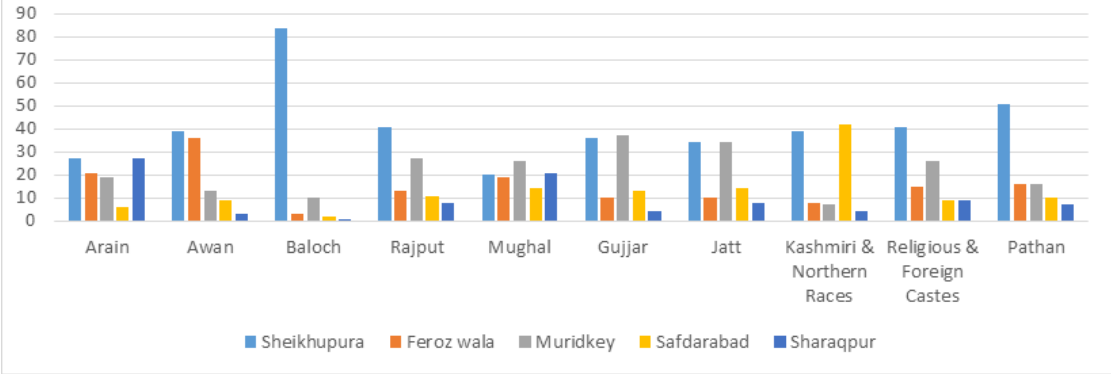


The chart shows that out of the total land holding by Arain caste in district Rahimyar Khan, 30 percent lies in tehsil Sadiqabad followed by tehsil Rahimyar Khan. Their share in the land of Liaqatpur is 25 percent, while in Khanpur the landholding share of the Arain caste is least i.e., 17 percent among all other tehsils. The land holding status of the Awan caste in district Rahimyar Khan depicts that out of total land held by Awans, one third lies in tehsil Rahimyar Khan, while 35 percent is in tehsil Sadiqabad. Rest of the landholding in Rahimyar Khan is in tehsil Liaqatpur i.e., 19 percent and Khanpur i.e., 13 percent. The land ownership status of the Baloch caste in district Rahimyar Khan is almost same in all tehsils with 29 percent land holding in tehsil Sadiqabad and same in tehsil Rahimyar Khan, while out of total land held by the Baloch caste, 24 percent is in tehsil Liaqatpur, while in Khanpur land held by the Baloch caste is only 18 percent. Figure manifests the land ownership distribution pattern of Rajputs in district Rahimyar Khan. Out of the total land held by Rajputs in the district, one third is in tehsil Sadiqabad and 31 percent in tehsil Rahimyar Khan. While land share in tehsil Liaqatpur and Khanpur is 19 percent and 17 percent respectively. The land ownership status of the

Mughals in district Rahimyar Khan manifests that out of the total land held by Mughals, major share i.e., 55 percent is in tehsil Sadiqabad, while in the tehsil Rahimyar Khan the share of the land held by the Mughals is 24 percent followed by tehsil Liaqatpur i.e., 14 percent and Khanpur i.e., 7 percent. The figure shows that out of the total land held by the Gujjars in district Rahimyar Khan, maximum land holding is in Sadiqabad i.e., 41 percent while in tehsil Rahimyar Khan, 26 percent of the land is held by the Gujjars and in tehsil Liaqatpur, they hold 21 percent of the land along with 12 percent land ownership in tehsil Khanpur. The figure depicts the pattern of land ownership distribution of Jatts in all tehsils of district Rahimyar Khan. Almost one third of the land held by Jatts is in tehsil Sadiqabad, followed by tehsil Rahimyar Khan, where land holding share of the Jatts is 26 percent, while in tehsil Liaqatpur and Khanpur, the land ownership status of Jatts is 23 percent and 19 percent respectively. The figure also shows the land ownership distribution of the kinship groups falling in the category of Religious and Foreign castes. The major share of this group is in tehsil Sadiqabad with 37 percent out of the total land held in district Rahimyar Khan. In tehsil Rahimyar Khan, the share of the land ownership by this group is 27 percent, while in tehsils Liaqatpur and Khanpur, the share is 19 percent and 17 percent, respectively. The land ownership distribution status of the castes falling in the category of the Kashmiri and Northern races is depicted in this figure. It shows that major share of this group is in tehsil Sadiqabad i.e., 44 percent, while in tehsil Rahimyar Khan, the total land share is 24 percent along with 19 percent in tehsil Liaqatpur and 13 percent in tehsil Khanpur. The Pathan caste has more equitable land distribution in all tehsils of district Rahimyar Khan with 25 percent land holding in tehsil Sadiqabad, 24 percent in tehsil Rahimyar Khan along with same share in tehsil Liaqatpur followed by 23 percent in tehsil Khanpur.

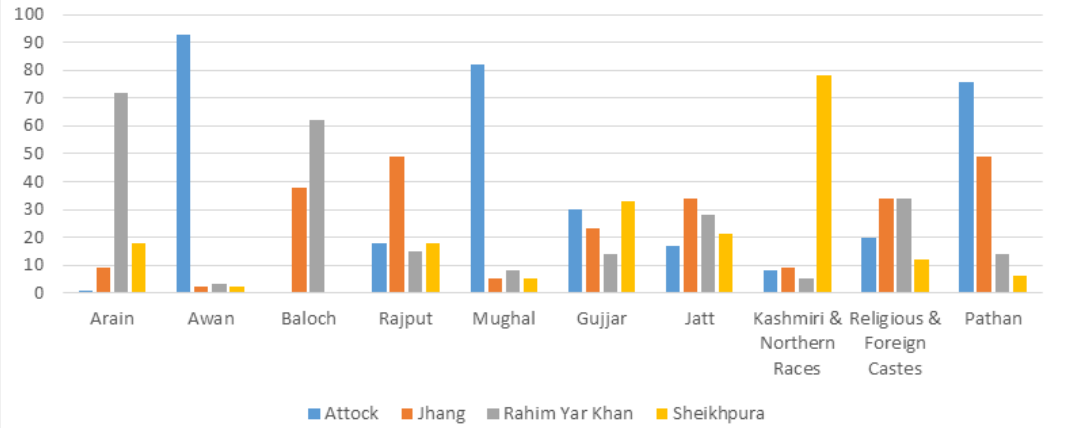
3.2.4 District Sheikhupura

Figure 17: Tehsil wise Distribution of Landholding by Castes in District Sheikhupura



Landholdings of the Arain group are well spread across all five tehsils of Sheikhupura district with tehsil Sheikhupura and Sharaqpur recording the highest share of 27 percent each. Safdarabad tehsil has the lowest share in total landholdings of Arains in the district and stands at 6 percent. While the share of tehsil Ferozewala and Muridkey is 21 percent and 19 percent respectively. The Awans' landholdings are spread among five tehsils with most of the share concentrated in Sheikhupura and Ferozewala tehsils with 39 percent and 36 percent share of land holdings, respectively. Sharaqpur is at bottom with 3 percent. Share of Muridkey is 13 percent, while that of Safdarabad is 9 percent. The landholdings of Balochs are mostly concentrated in Sheikhupura tehsil at 84 percent. Sharaqpur and Ferozewala have 1 percent and 3 percent, while Muridkey and Safdarabad have 10 percent and 2 percent of the Balochs landholdings. Rajputs also have an inequitable distribution of landholdings with more than 40 percent of the land concentrated in Sheikhupura alone. Muridkey is second with 27 percent, while Sharaqpur is at the bottom with only 8 percent share. The Mughals have relatively well spread shares of landholdings among five tehsils. Muridkey has a share of 26 percent which is slightly higher than other tehsils, Sharaqpur has 21 percent, Sheikhupura has 20 percent, Ferozewala has 19 percent, and Safdarabad has 14 percent land share by the Mughals. Gujjars have 37 percent and landholdings in tehsil Muridkey and 36 percent in Sheikhupura tehsil. Safdarabad with 13 percent share of landholdings is followed by 10 percent share of landholdings of Gujjars in Ferozewala tehsil. Least share of Gujjars in district Sheikhupura is in tehsil Sharaqpur, where they have only 4 percent landholding. The Jatt caste has 34 percent of landholding in tehsil Sheikhupura and Muridkey. They have landholdings of 14 percent in Safdarabad, 10 percent in Ferozewala, and 8 percent in Sharaqpur respectively. The Kashmiri and Northern races have their landholdings mostly concentrated in Safdarabad and Sheikhupura tehsils i.e., 42 percent and 39 percent, respectively. Ferozewala with 8 percent and Muridkey with 7 percent come at third and fourth place. Sharaqpur has the lowest landholdings of Kashmiri and Notherns races of 4 percent share. Religious and Foreign castes have 41 percent of their landholding in Sheikhupura tehsil followed by Muridkey and Ferozewala with 26 percent and 15 percent respectively. Safdarabad and Sharaqpur are at the bottom with 9 percent of landholding each. Pathans have an inequitable distribution of landholdings with more than half of the total landholdings in Sheikhupura. In tehsils Ferozewala and Muridkey land held by Pathans is 16 percent each.

Figure18: Distribution of Landholding by Castes in Selected Districts of Punjab



The basic motivation of the analysis in this section is to highlight the land holding status of all major categories of the castes that provides a distribution of the agricultural land in all four districts of the province of Punjab which represent the 4 agro-climatic zones of the province. The Arains are found to be more concentrated in district Rahimyar Khan with 72 percent of the land holding. Awans are found to be more concentrated in district Attock with 93 percent share in landholding. Balochs are found to be holding more land in district Rahimyar Khan i.e., 62 percent, while in Jhang they own 38 percent of land. While out of total land held by the Rajputs, the area share is more in district Jhang i.e., 49 percent. The concentration of land in all other districts is well spread like 18 percent landholding in Attock and Sheikhupura along with 15 percent in Rahimyar Khan. After Awans Mughals are also a dominant caste in district Attock with 82 percent share in total land holding. Concentration of the Gujjars is very well spread across all districts with 33 percent of the landholdings in Sheikhupura, 30 percent in Attock, 23 percent in Jhang, and 14 percent in district Rahimyar Khan. While on the other hand, the land holding status of the Jatts is not much skewed towards one district. They own almost one third of the land in district Jhang, while in district Rahimyar Khan, they own 28 percent out of the total land holding in four districts. In Sheikhupura, they own 21 percent of land while, in Attock their share is 17 percent.

The landholding pattern of the castes falling under the category of the Kashmiri and Northern races is not very well spread. They have more concentration of land i.e., 78 percent in the Sheikhupura while in rest of the districts, they own less than 10 percent of land. Concentration of the Religious and Foreign castes is also more in Rahimyar Khan and Jhang with one third of the land owned in each of these districts. Out of the total landholding in Sheikhupura they own 12 percent of the land while in Attock, their landholding is 20 percent. Out of the total landholding of Mughals and Pathans, they own more land in district Attock i.e., 82 percent and 76 percent respectively. While land holding of Awans is also more concentrated in district Attock which clearly manifests that with respect to the land holing status of these castes in district Attock, the Awans, Pathans and Mughals are more dominant among all other kinship groups.

Chapter 4

Distribution of Land Parcels by Farm Size and Land Holding of Agricultural Castes

4. Distribution of Land Parcels by Farm Size and Land Holding of Agricultural Castes

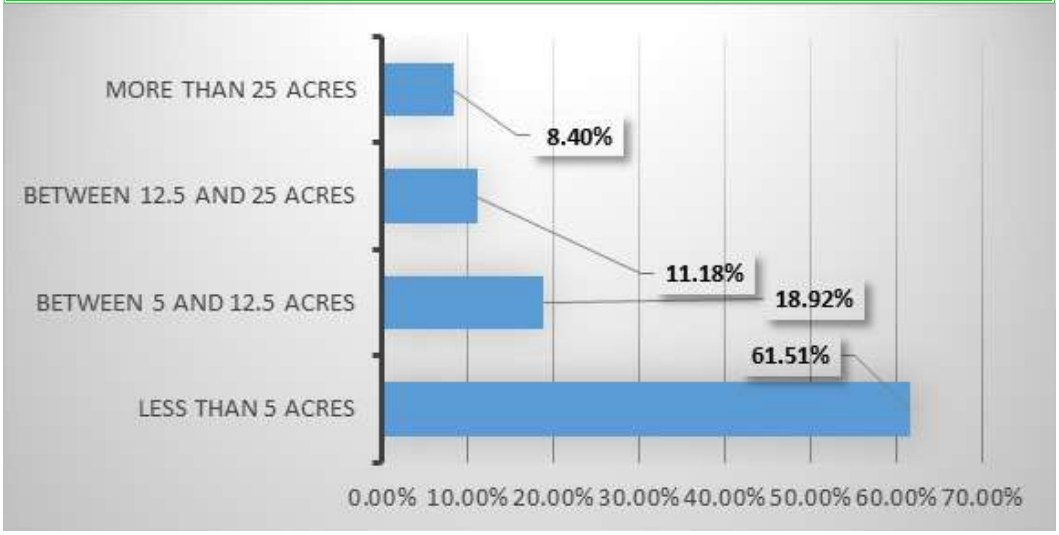
4.1 Distribution of Land Parcels by Farm Size

This part shows the findings when the LRMIS data was combined on same level with the AC data. These are village level aggregations which reveal the cropping pattern and size of the land holdings by each caste.

4.1.1 District Attock

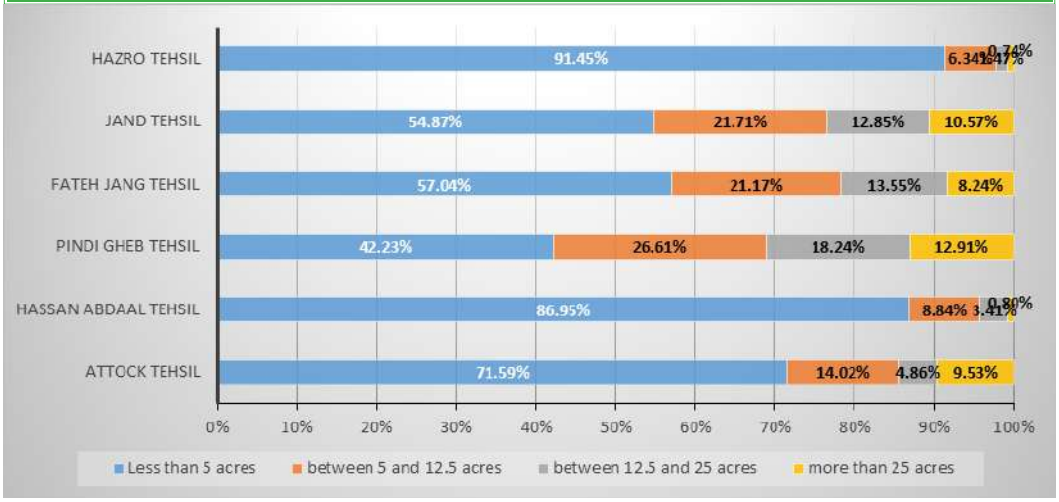
The Attock district is located in the North-West of the province of Punjab and has different history as well as land attributes compared to the mainland of the province. At the district level, farms of size less than 5 acres and between 5 and 12.5 acres are slightly less than the provincial average. This difference manifests itself in the increased share of farms of size between 12.5 and 25 acres.

Figure 19: Distribution of Land by Farm Size in District Attock



Within district, the tehsils display greater variation. Figure 19 reveals that Hazro and Hassan Abdal tehsils have much greater proportion of smallest size farms, at approximately 91 percent and 87 percent respectively. Pindi Gheb tehsil has the smallest proportion of farms size less than 5 acres, that are only 42.23 percent of the total farms in the sample. This is the smallest percentage of such farms amongst all the tehsils studied. Pindi Gheb, Fateh Jang, and Jand have medium sized farms of size 5 to 12.5 acres in greater proportion compared to the provincial average i.e., 26.61 percent, 21.17 percent, and 21.71 percent, respectively. Attock district is famous for its peanuts, a crop typical of smaller sized farms. Given the relation just discussed, this provides the ground to consider the causation between these two variables, namely the farm size and the crop choice.

Figure 20: Distribution of Land Parcels by Farm Size in District Attock



4.1.2 District Jhang

The Jhang is situated in the Central Punjab and represents different ethnicity as well as land properties compared to the other three districts. At the district level, the farm size distribution is almost same as the provincial distribution.

This is also true for all tehsils except the Shorkot tehsil. In Shorkot, farms of size less than 5 acres are less than the provincial average; the mantle shared with farms of size 5 to 12.5 acres.

Figure 21: Distribution of Land by Farm Size in District Jhang

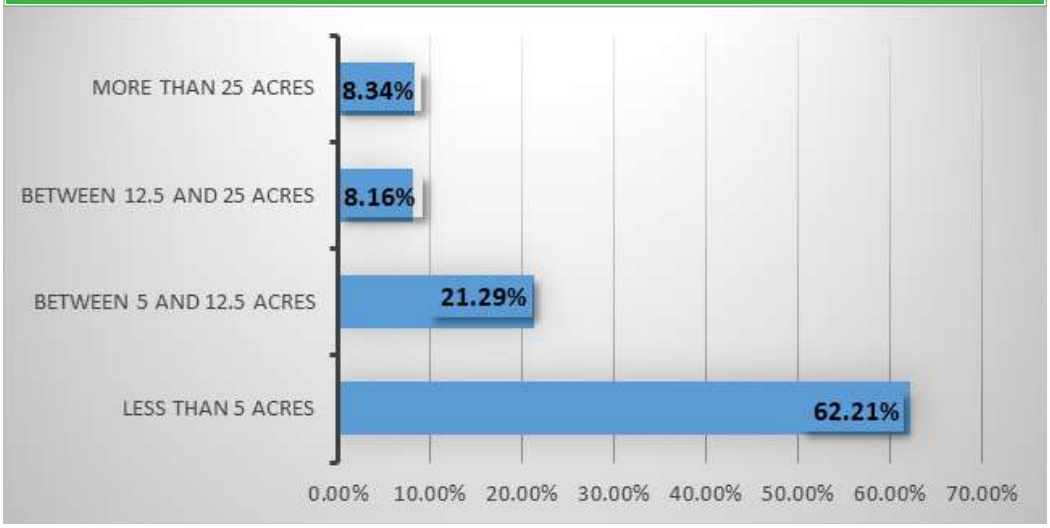
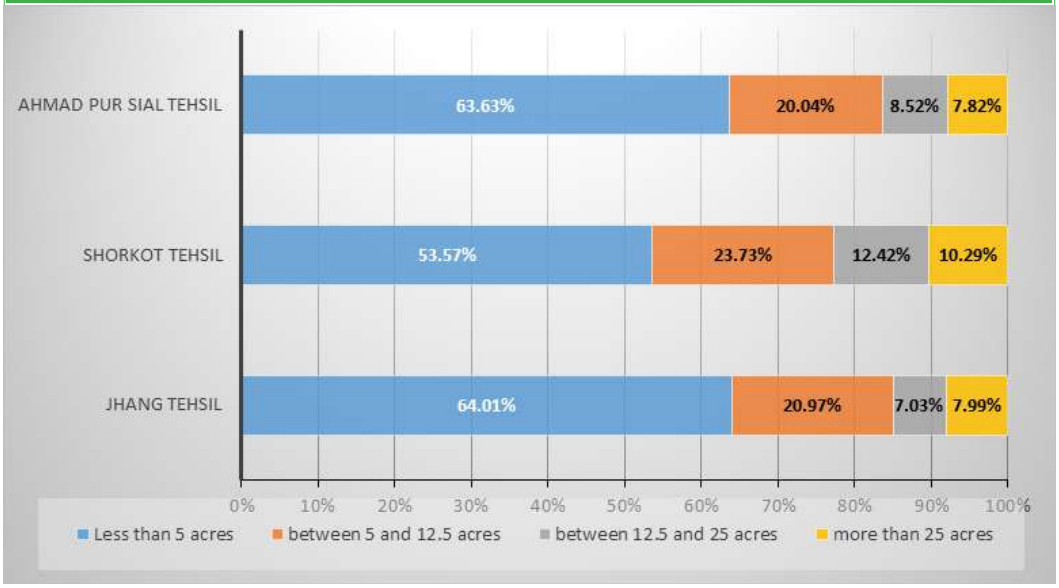


Figure 22: Distribution of Land Parcels by Farm Size in District Jhang



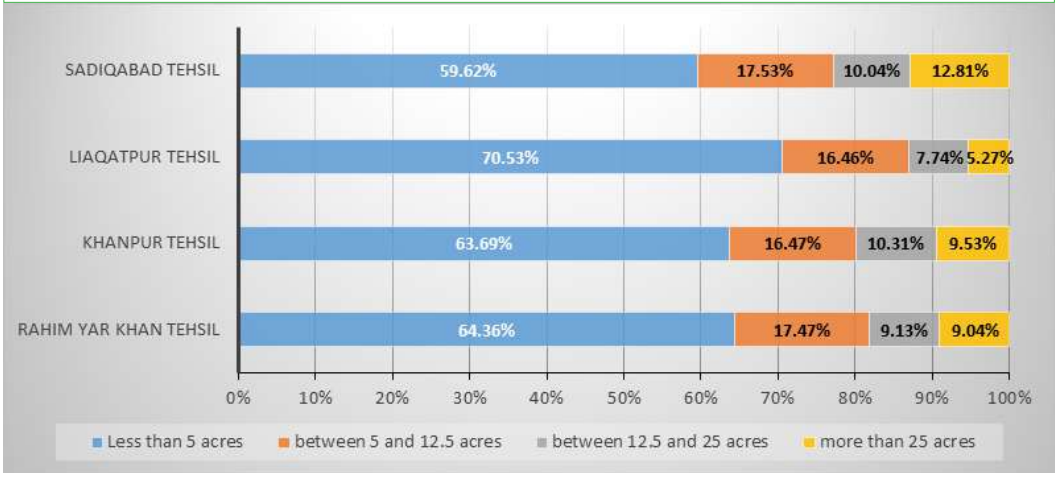
This figure shows that in tehsil Jhang has 64 percent area where farm size is less than 5 acres while tehsil Shorkot and Ahmad Pur Sial 54 percent and 64 percent areas dedicated to smaller farm size of 5 acres. Tehsil Shorkot has farm highest share (23.73 percent) of the farm size between 5 to 12.5 acres. Tehsil Shorkot has also highest share of the farm size 12.42 percent and 10.29 percent between 12.5 to 25 acres and above 25 acres respectively. while on the other hand tehsil Jhang has highest share of small category of land which less than 5 acres. Farm sizes in about 20 percent area is between 5 to 12.5 acres.

4.1.3 District Rahimyar Khan

The Rahimyar Khan is representative of the Southern part of the province of Punjab. At the district level, the data shows a higher proportion of smaller farms of size less than 5 acres at approximately 64 percent. Individual tehsils are similarly distributed, with the Liaqatpur tehsil slightly bottom heavy.

Figure 23: Distribution of Land by Farm Size in District Rahimyar Khan

Figure 24: Distribution of Land Parcels by Farm Size in District Rahimyar Khan



The overall snapshot of the district represents that maximum land (64.36 percent) is less than 5 acres in tehsil Rahim Yar Khan this size of land holding is highest (70.53 percent) in tehsil Liaqatpur. The highest share between 5 to 25 acres of land size is found to be in tehsil Sadiqabad followed by tehsil Rahim Yar Khan. Tehsil Sadiqabad also has the highest share (12.81 percent) of farm size above 25 acres followed by tehsil Khanpur.

4.1.4 District Sheikhupura

The Sheikhupura is part of the North East of the Punjab. Due to its proximity to some of the largest cities in the province, Sheikhupura has greater access to markets and greater urban influence compared to all the other districts in slected sample.

At the district level, the distribution of farms is like the distribution at province level. From this dimension, the Sheikhupura can be used as the representative district for the province.

Figure 25: Distribution of Land by Farm Size in District Sheikhupura

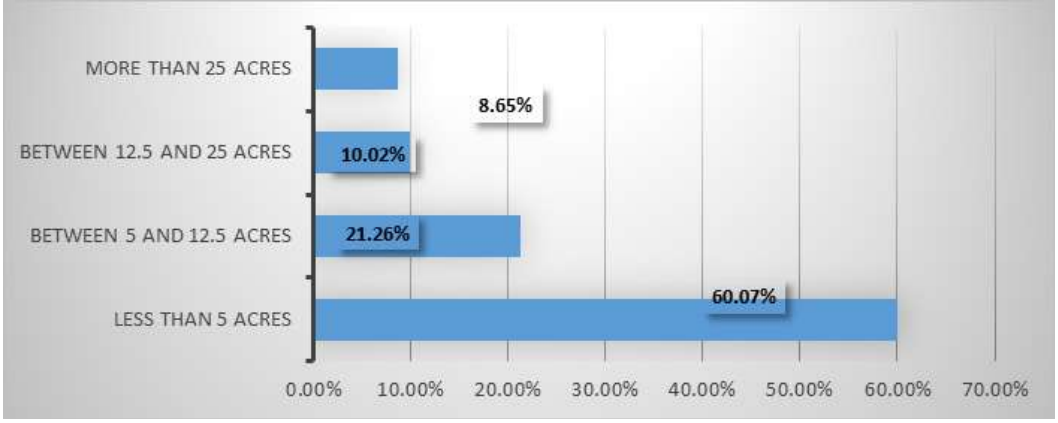


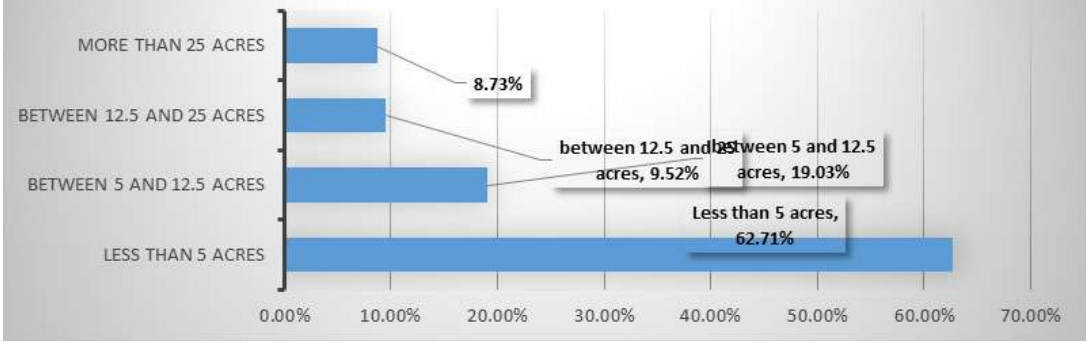
Figure 26: Distribution of Land Parcels by Farm Size in District Sheikhupura

4.1.5 The Punjab

At the aggregate, the data shows that approximately 62 percent of the farms have an area of less than five acres. This is in line with what is widely believed in the literature that the average farmer in the province of Punjab operates at a small scale. This can be expected to have serious repercussions on the crop choice, capital intensity, political economy, etc., some of which shall be discussed in greater detailed later in this document.

Approximately 19 percent of the farms in the sample have area between 5 and 12.5 acres, while approximately 9 percent of the farms in the sample have area between 12.5 and 25 acres, and 9 percent of the farms in the sample cover an area greater than 25 acres.

Figure 27: Distribution of Land by Farm Size in Punjab



4.2 Concentration of Land held by the Agricultural Castes

The ownership of the agricultural land provides a unique control to the landlords not just related to their own land, but also in wider economic, social, and political settings (Rahman, 2012). It has already been discussed earlier how the castes in the South Asia, especially in the Sub-Continent, have originated from such classifications based in the agricultural economy (Land Alienation Act, 1901). The British formalized this role, by classifying castes into agricultural and non-agricultural categories. These structures continued to exist even after the partition, and even after the creation of Pakistan the class structure continues to play its role in the rural economy, especially in the agriculture sector (Gazdar, 2009).

Although with an expansion of market economy and presence of the principle of constant rate of profit across industries, one can expect new players to emerge and old ones to subside, yet, the caste (Biradri) system is still intact, its role in the agricultural economy is an important debate to explore. To venture into this arena, it is important to understand the landholding patterns (Javid, 2011). So, the following discussion will shed light on the distribution of land by castes. As already discussed, due to resource constraints, primarily time, the following discussion is limited to four districts of the province. The selection of these districts is based on their geographical location in the province, which allows us to assume with confidence that this is a representative sample.

4.2.1 Definition and Discussion

Due to data matching constraints, our unit of analysis is a village, referred to as mouza in the official data. For each village, the land parcels owned by the agricultural castes and the non-agricultural castes were distinguished.

Following four groups are created;

i. Villages where agricultural castes hold more than 75 percent of the total area

ii. Villages where agricultural castes hold between 50 percent and 75 percent of the total area

iii. Villages where agricultural castes hold between 25 percent and 50 percent of the total area

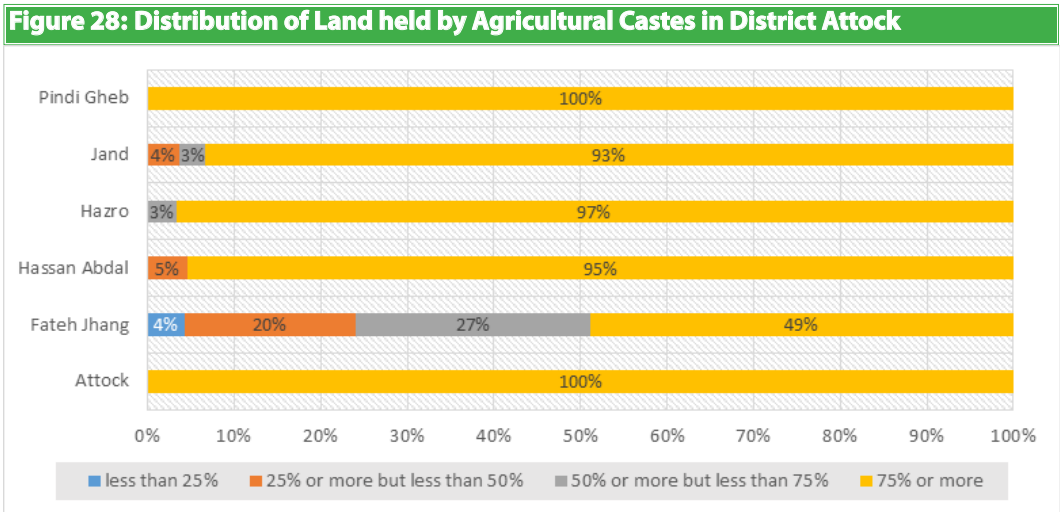
iv. Villages where agricultural castes hold less than 25 percent of the total area

All the villages in the dataset are classified using this technique. The distribution of such villages is presented and discussed below.

4.2.2 District Attock

At aggregate level, entire Attock district seems to be dominated by agricultural castes when it comes to land ownership. The variations become visible once we delve into the tehsil level data. Fateh Jhang stands out as half of the villages have agricultural castes owning 75 percent or more of the total land. This can be attributed to its proximity to urban centers, and frequent migration in and out of this tehsil over the years. Tehsil Pindi Gheb and Attock are most dominated by the agricultural castes, as all villages in the sample had ownership of more than 75 percent of land with the agricultural castes. This is an indication that the land mutations over the years did not dilute the caste ownership structure in most of the tehsils of the district Attock, barring the Fateh Jhang.

Figure 28: Distribution of Land held by Agricultural Castes in District Attock

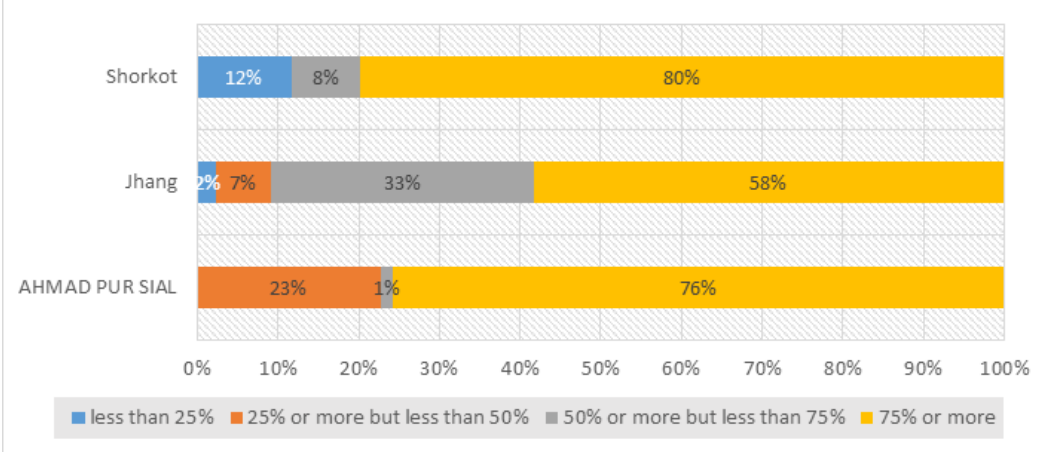


4.2.3 District Jhang

The Jhang district is the Central Punjab, and has witnessed greater flows of people over time. The distribution of land is more concentrated than the provincial average, but less than what is witnessed in district Attock. Comparatively more rural tehsils, Shorkot and the Ahmad Pur Sial, have greater concentration of villages i.e., 80 percent and 76 percent respectively where more than 75 percent of the land is owned by the agricultural castes. The tehsil Jhang is markedly different, where approximately 58 percent of the villages have more than 75 percent of land owned by the agricultural castes.

However, Shorkot is the only tehsil where a sizable portion of the villages i.e., 12 percent have agricultural castes owning 25 percent or less of the total area. Tehsil Jhang has only 2 percent of such villages, while the Ahmad Pur Sial has none. This is a significant distinguishing feature.

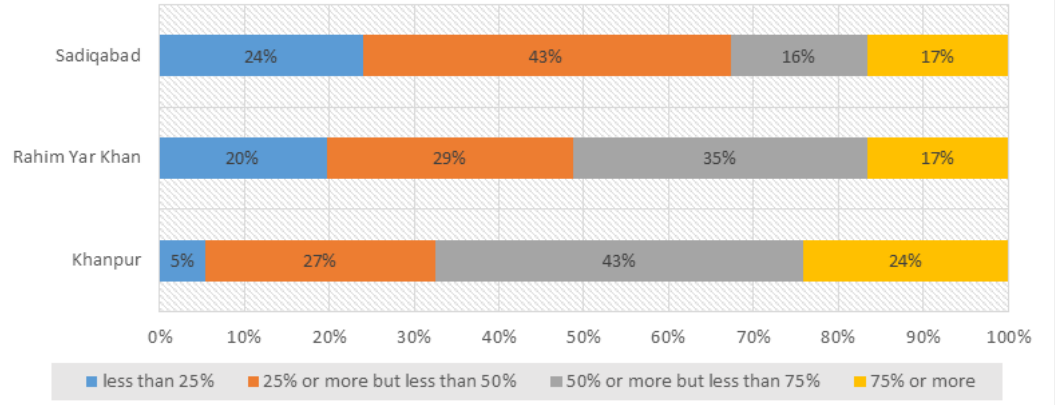
Figure 29: Distribution of Land held by Agricultural Castes in district Jhang



4.2.4 District Rahimyar Khan

District Rahimyar Khan represents the South Punjab in this sample. The distribution of villages based on the ownership by caste is markedly different in this district compared to the ones discussed above. Unlike districts Attock and Jhang, no tehsil in Rahimyar Khan is dominated by villages, where 75 percent or more of the land is owned by the agricultural castes. In Sadiqabad, 67 percent of the villages have agricultural castes owning less than 50 percent of the total area. This is an extreme change when compared to districts Attock and Jhang. The degree of variation seems to go from Sadiqabad to Rahimyar Khan to Khanpur, in terms of an ownership structure between the agricultural and the non-agricultural castes.

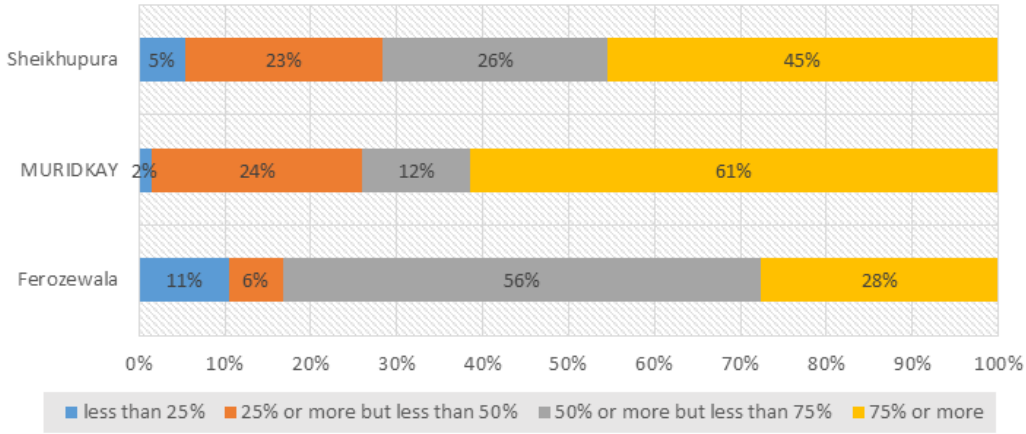
Figure 30: Distribution of Land held by Agricultural Castes in District Rahimyar Khan



4.2.5 District Sheikhupura

District Sheikhupura displays the most variety. On one side of the district is tehsil Muridkey, where 61 percent of the villages have more than 75 percent of the land owned by the agricultural castes. While this district is close to urban centers, its reliance on more traditional traits may be the reason behind this trend. On the other hand, we have Ferozewala tehsil, where only 28 percent of the villages have the agricultural castes owning more than 75 percent of the land. However, this does not imply a sizable number of villages with ownership dominated by the non-agricultural castes. The highest proportion of the villages where the non-agricultural castes dominate ownership among tehsils is Ferozewala. However, that proportion is 11 percent, dwarfed in comparison to tehsil Sadiqabad district Rahimyar Khan, where this proportion stands at 24 percent. Ferozewala tehsil is different, as most of its villages i.e., 56 percent have the agricultural castes holding between 50 percent and 75 percent of the land. This may indicate a pattern of change, with the non-agricultural castes increasing their share of landholding due to high growth of manufacturing industry in this region. In this analysis some tehsils of the districts were dropped as it has been mentioned in the methodology section that land records data was mined with the agriculture census data and this exercise was done using villages as the unit of analysis. So, some of the tehsils were dropped in this section where villages could not be matched with agriculture census data.

Figure 31: Distribution of Land held by Agricultural Castes in District Sheikhupura

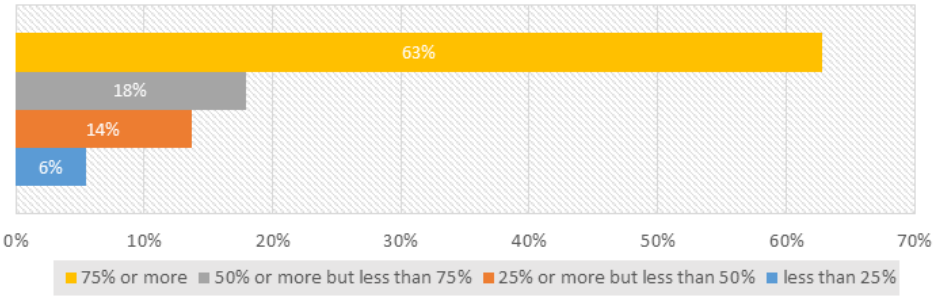


4.2.6 Punjab Province

At the aggregate, the data shows that in 63 percent of the villages across the province, the agricultural castes hold more than 75 percent of total agricultural area. 6 percent villages have ownership heavily dominated by the non-agricultural castes, 14 percent villages have the agricultural castes owning between 25 percent and 50 percent of the total area, while 18 percent villages show the agricultural castes ownership of between 50 percent and 75 percent of the total area.

If this is divided by 50 percent rule, we see that 81 percent of the villages show ownership dominated by the agricultural castes, while the remainder approximately 20 percent of the villages have ownership dominated by the non-agricultural castes.

Figure 32: Distribution of Land held by Agricultural Castes in Punjab



4.3 Distribution of Cultivated Area by Major Crops

In terms of the share of total cultivated area in each of the representative districts, wheat has the largest share in all four districts. In terms of variety, Rahimyar Khan and Jhang are two districts where in addition to wheat, three other crops account for at least 10 percent of the total cultivated area.

Considering each individual district in figure 33 , it can be observed that in Attock district, wheat takes up 62 percent share and peanuts account for 20 percent of the cultivated area. The maize and chickpea, combined, constitute 8 percent of the total cultivated area in the district. In case of Jhang district, wheat is grown on 42 percent of the district's total cultivated area, rice accounts for 19 percent, cotton 12 percent, chickpea 10 percent, and sugarcane 7 percent of the district's total cultivated area. In case of Rahimyar Khan district, the share of cultivated land on which wheat is grown is 37 percent with cotton accounting for 26 percent of the total cultivated area. Approximately 15 percent of cultivated area in the district is dedicated to the production of sugarcane, whereas rice is constituting 4 percent of the total cultivated area. Finally, in Sheikhupura, only two crops, namely wheat and rice, account for 97 percent of the total cultivated area with the former having a share of 49 while the latter's share being 48 percent.

Figure 33: District Wise Distribution of cultivated Area by Major Crops

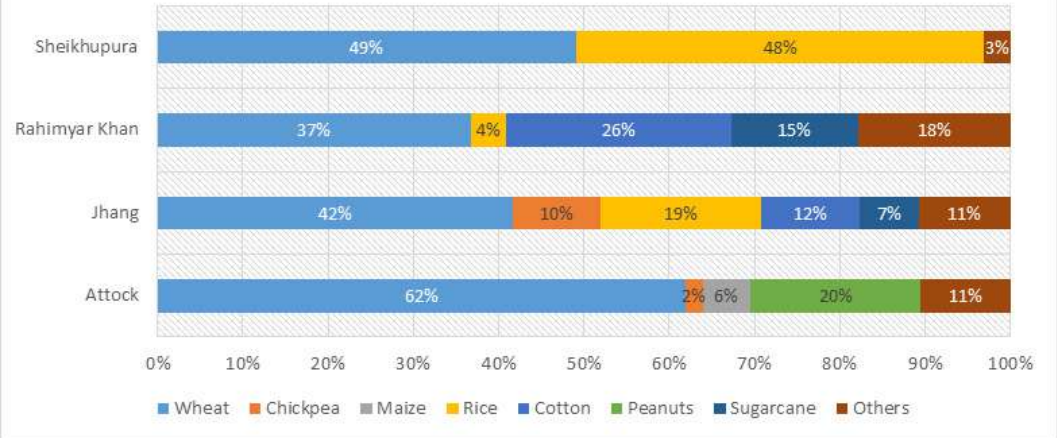
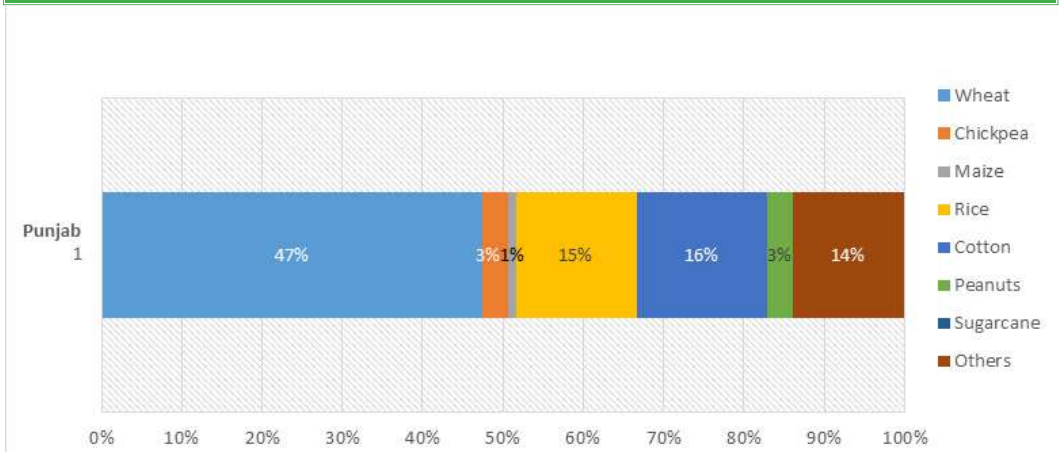
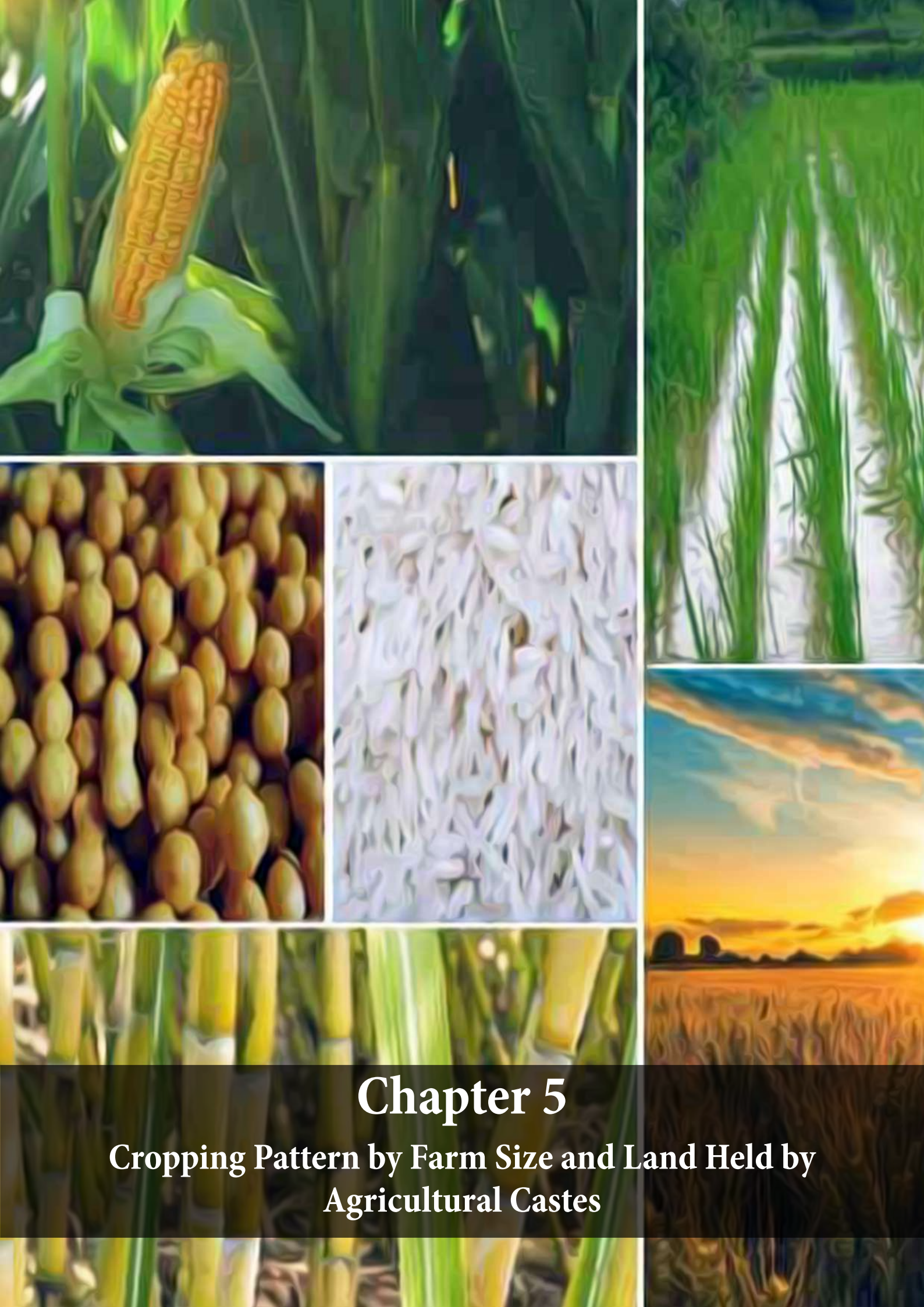


Figure 34: Distribution of cultivated Area by Major Crops in PUNJAB



It is not surprising to observe that in the four representative districts of the province, wheat has the largest share of the total cultivated area of 47 percent. The cotton accounts for 16 percent of the representative districts' total cultivated area, whereas rice is the third largest crop in terms of its share in the cultivated area at 15 percent. The chickpea, peanuts, and maize are some of the other slightly notable crops grown in the districts representing the province.



Chapter 5

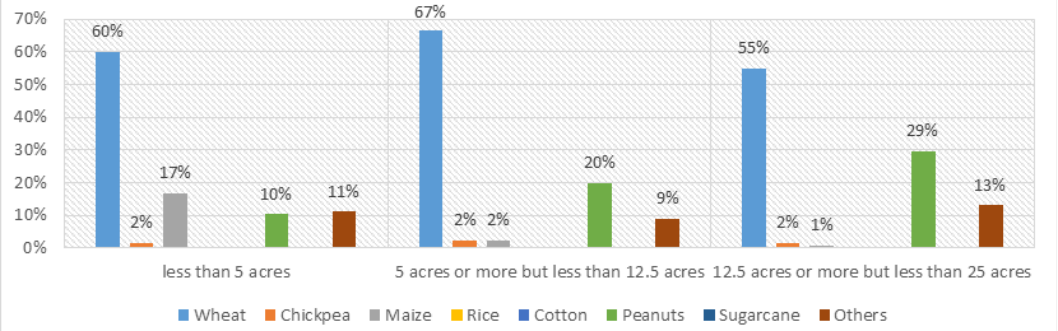
Cropping Pattern by Farm Size and Land Held by Agricultural Castes

5. Cropping Pattern by Farm Size and Land Held by Agricultural Castes

5.1 Cropping Pattern by Farm Size

5.1.1 District Attock

Figure 35: Cropping pattern by Farm Size in District Attock



In district Attock, for all farm size classifications, more than 50 percent of the district's land is dedicated to the cultivation of wheat crop. It is interesting to note that, villages where average farm size is relatively large, a significant area of land is dedicated to the cultivation of peanuts. It is also noteworthy that villages where average farm size is less than 5 acres, maize is the second largest crop after wheat in terms of the share of total area of these villages .

5.1.2 District Jhang

Figure 36: Cropping pattern by Farm Size in District Jhang

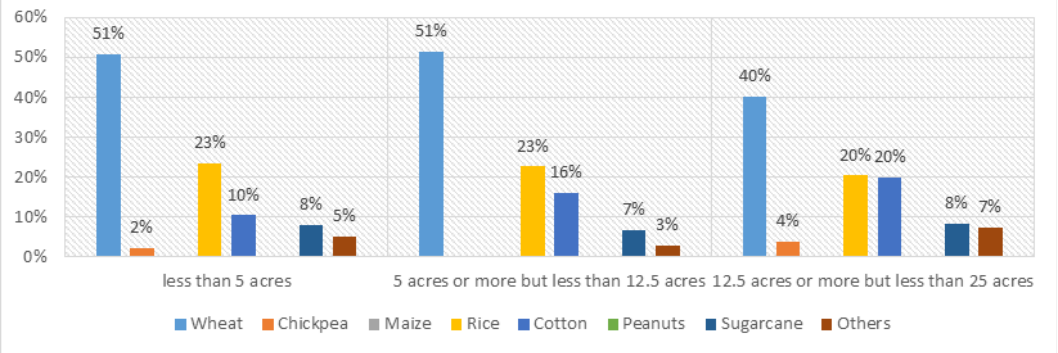
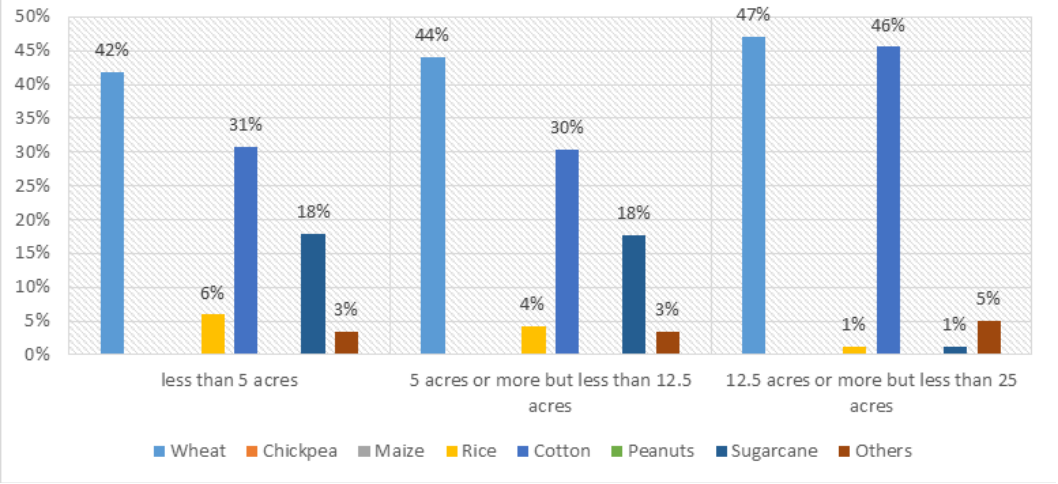


Figure 36 explaines that in district Jhang wheat is the largest crop in terms of the share of total area. Rice is the second largest crop across all farm size classifications in terms of the share of cultivated area of villages in this district. Additionally, it must be noted that for the case of villages with progressively large average farm sizes, relatively greater share of the cultivated area is accounted for by the cotton crop.

5.1.3 District Rahimyar Khan

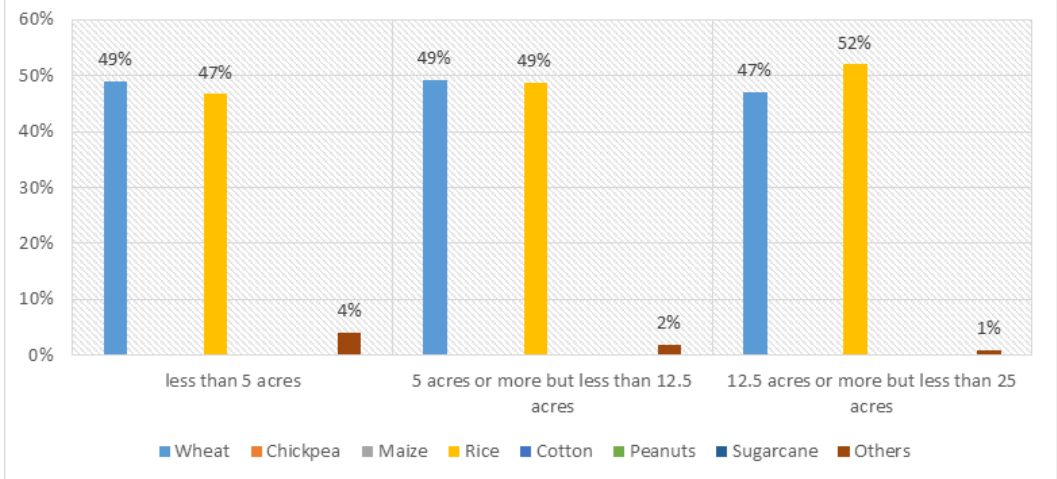
Figure 37: Cropping pattern by Farm Size in District Rahimyar Khan



In Rahimyar Khan, unlike the pattern which was observed for Attock and Jhang districts, share of cultivated land accounted for by the wheat crop is not significantly larger than the second largest crop, cotton. It must be noted that a relatively large share of the area in the villages with progressively larger farm sizes is dedicated to the cultivation of the cotton crop. It can be observed that cultivation of the sugarcane takes up a relatively large share of the total area in villages, where average farm size is less than 12.5 acres. A similar argument holds for the case of cultivation of the rice in this district.

5.1.4 District Sheikhupura

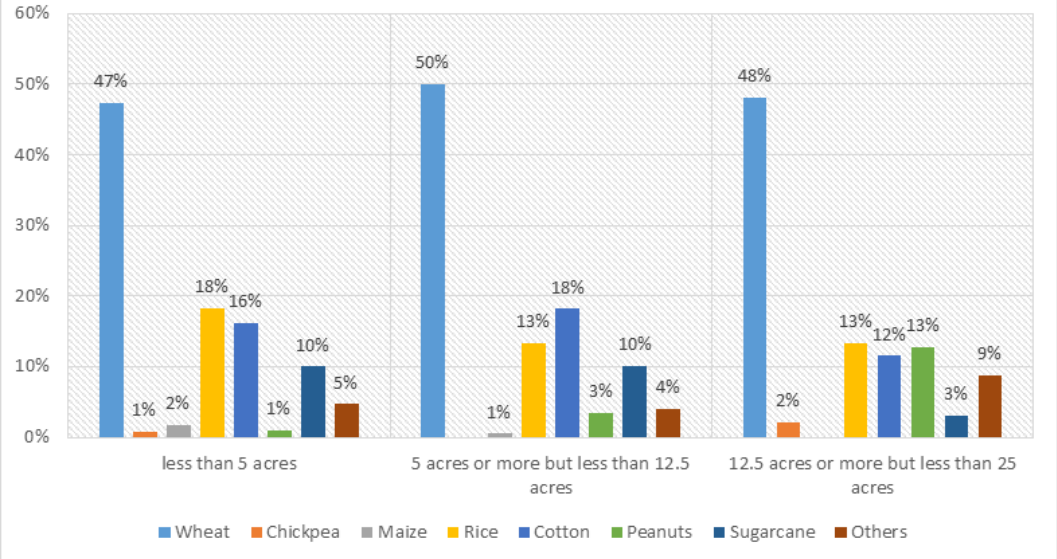
Figure 38: Cropping pattern by Farm Size in District Sheikhupura



In Sheikhupura , only two crops, namely wheat and rice, account for more than 95 percent of the total area of villages for all average farm size classificaitons. Also, it can be observed that the share of land dedicated to the cultivation of rice increases, in relative terms, to the share of area account for by wheat, with an increase in the average farm size of the village.

5.1.5 The Province of Punjab

Figure 39: Cropping pattern by Farm Size in Punjab



In the four districts representing the province of Punjab, the wheat accounts for the largest share of land across all farm size classifications. The share of land dedicated to the cultivation of rice is slightly higher in case of villages, where average farm size is less than 5 acres. Sugarcane is another crop which accounts for a larger share of total area in villages, where average farm size is not too big. Villages with progressively large average farm sizes have a relatively higher share of the total area accounted for by the cultivation of peanuts.

5.2 Cropping Pattern by the Concentration of Land Held by the Agricultural Castes

This section represents the cropping pattern with respect to the agricultural castes. The castes are divided into four categories;

i. Villages where the agricultural castes hold more than 75 percent of land

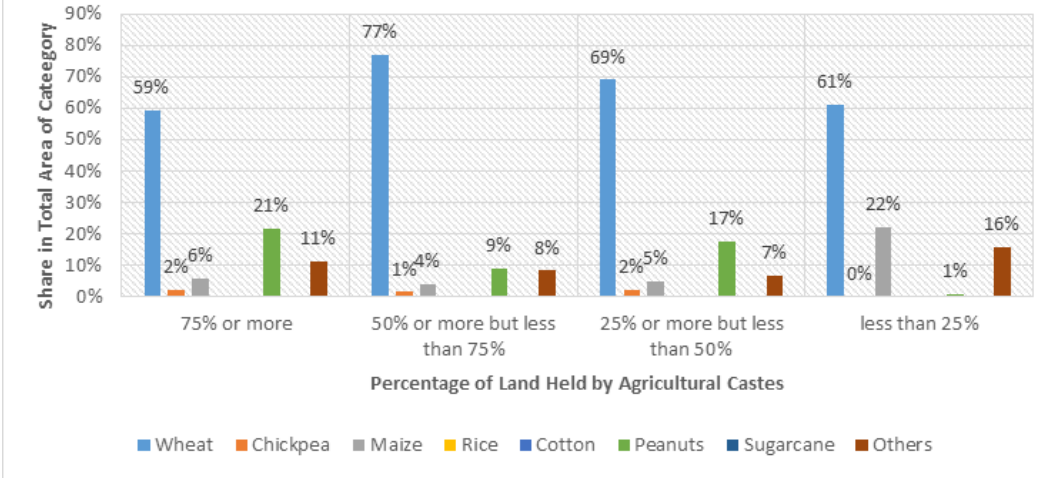
ii. Villages where the agricultural castes hold between 50 percent to 75 percent of land

iii. Villages where the agricultual castes hold between 25 percent to 50 percent of land

iv. Villages where the agricultural castes hold less that 25 percent of land

5.2.1 District Attock

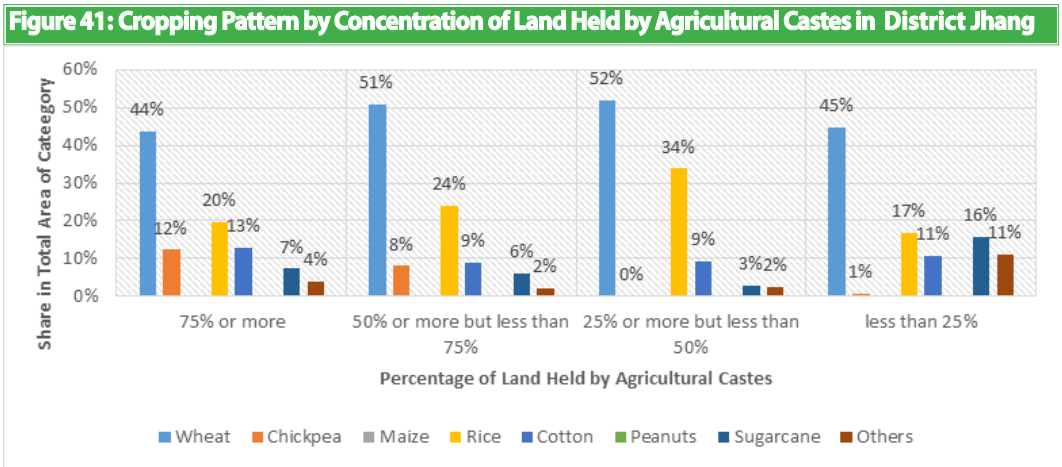
Figure 40: Cropping Pattern by Concenaftration of Land Held by Agricultural Castes in District Attock



The agricultural castes in district Attock tend to grow more wheat as compared to other crops. Pattern of growing wheat is almost same in all categories. Villages where agricultural castes hold more than 75 percent of land, more area is dedicated to wheat i.e., 59 percent while on 21 percent of the area peanuts are grown, and only 6 percent area is for growth of maize in the farms with the agricultural castes' ownership between 50 to 75 percent the share of wheat is 77 percent, while that of peanut is only 9 percent. Similarly, in category of villages with the agricultural castes' ownership between 25 to 50 percent, peanut is the major crop i.e., 17 percent after wheat, 69 percent, while in the category of villages where agricultural castes hold less than 25 percent of land, share of the wheat crop is 61 percent and that of maize is 22 percent. Here, the peanut assumes to be the third major crop choice by the farmers.

5.2.2 District Jhang

Figure 41: Cropping Pattern by Concentration of Land Held by Agricultural Castes in District Jhang



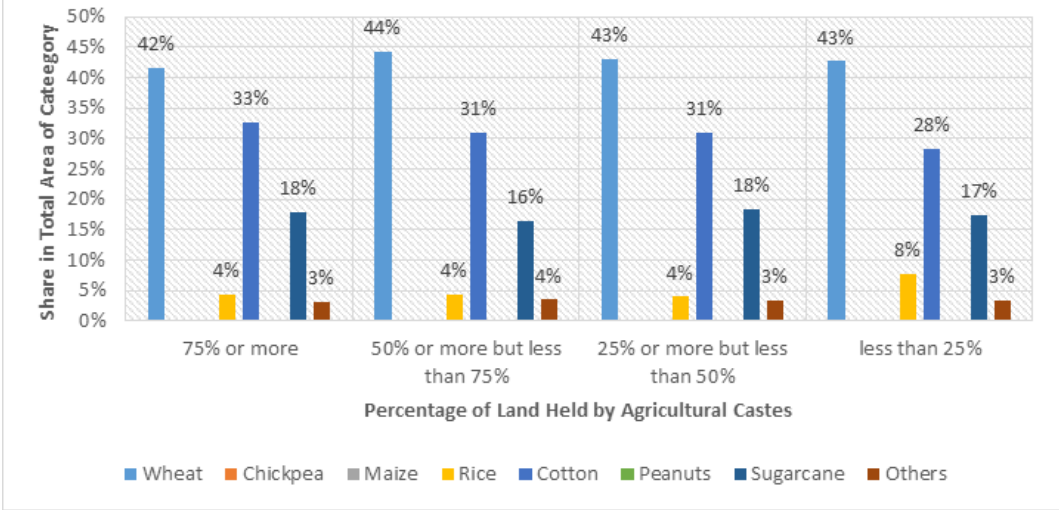
In distrcit jhang that represents the mixed cropping zone, the situation is different as compared to district Attock. Here, the farms with more than 75 percent ownership of the agricultural castes, slightly less than half i.e., 44 percent of the area is dedicated to the wheat crop. Other crops also share a reasonable area like rice is grown on 20 percent of land. The chickpea and cotton assume 12 percent and 13 percent of the land respectvely. In the villages with an agricultural land holding between 50 to 75 percent of land, 51 percent of the area is deicated to wheat. Here, rice assumes a better position with 24 percent of the total area, while the area share of the cotton and chickpea is 9

percent and 8 percent respectively. The category of the villages with the agriultural castes landholding between 25 to 50 percent, wheat is grown on almost half of the area i.e., 52 percent. Here, the rice assumes a better condition in terms of area share i.e., 34 percent. In last category, the area dedicated to the wheat crop is 45 percent. So, it reveals that there is not a consistent pattern to grow wheat. Instead, it can be said that wheat is the major crop choice of the agricultural castes in mixed cropping zone along with rice as the second. In the last category, the sugarcane has shown a little more significant area occupation of 16 percent.

5.2.3 District Rahimyar Khan

In district Rahimyar Khan that represents a cotton-wheat zone, results show that the agricultural castes from all categories grow wheat as their first preferred crop followed by cotton and sugarcane respectively. Rice is also grown but on a less area. In the category of villages, where agricultural castes hold more that 75 percent of land, area share of the wheat crop is 42 percent, while that of cotton is 33 percent and 18 percent for the sugarcane. The area share of all three crops is almost same across all categories with a difference of more or less than 2 percentage points.

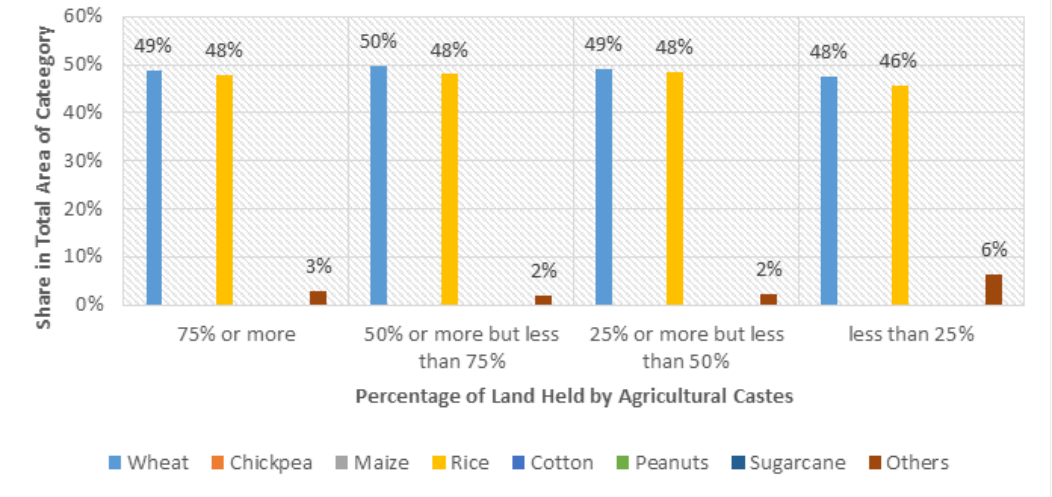
Figure 42: Cropping Pattern by Concentration of Land Held by Agricultural Castes in District Rahimyar Khan



5.2.4 District Sheikhupura

The caste wise cropping pattern in district Sheikhupura represents that major area share is of the wheat crop followed by rice. The area share of wheat across all categories is 49 percent, 50 percent, 49 percent and 48 percent respectively, and same is the case with rice with more or less difference of 2 percentage points.

Figure 43: Cropping Pattern by Concentration of Land Held by Agricultural Castes in District Sheikhupura

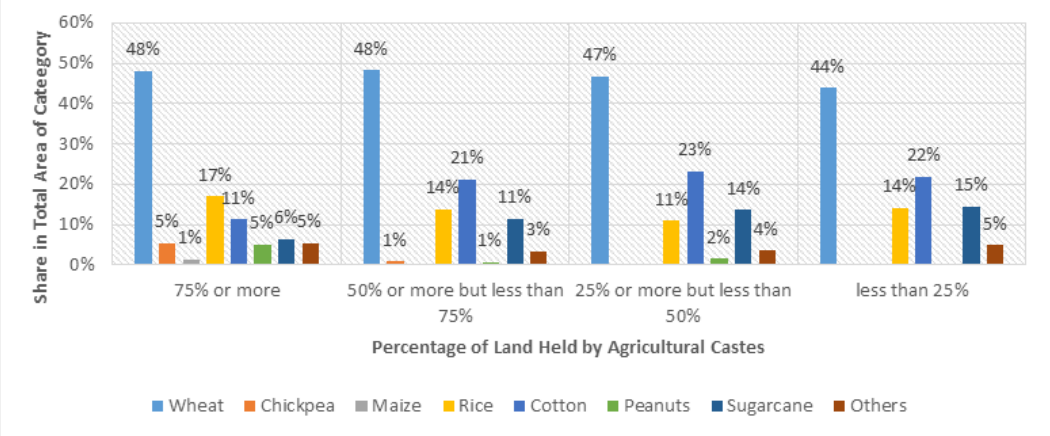


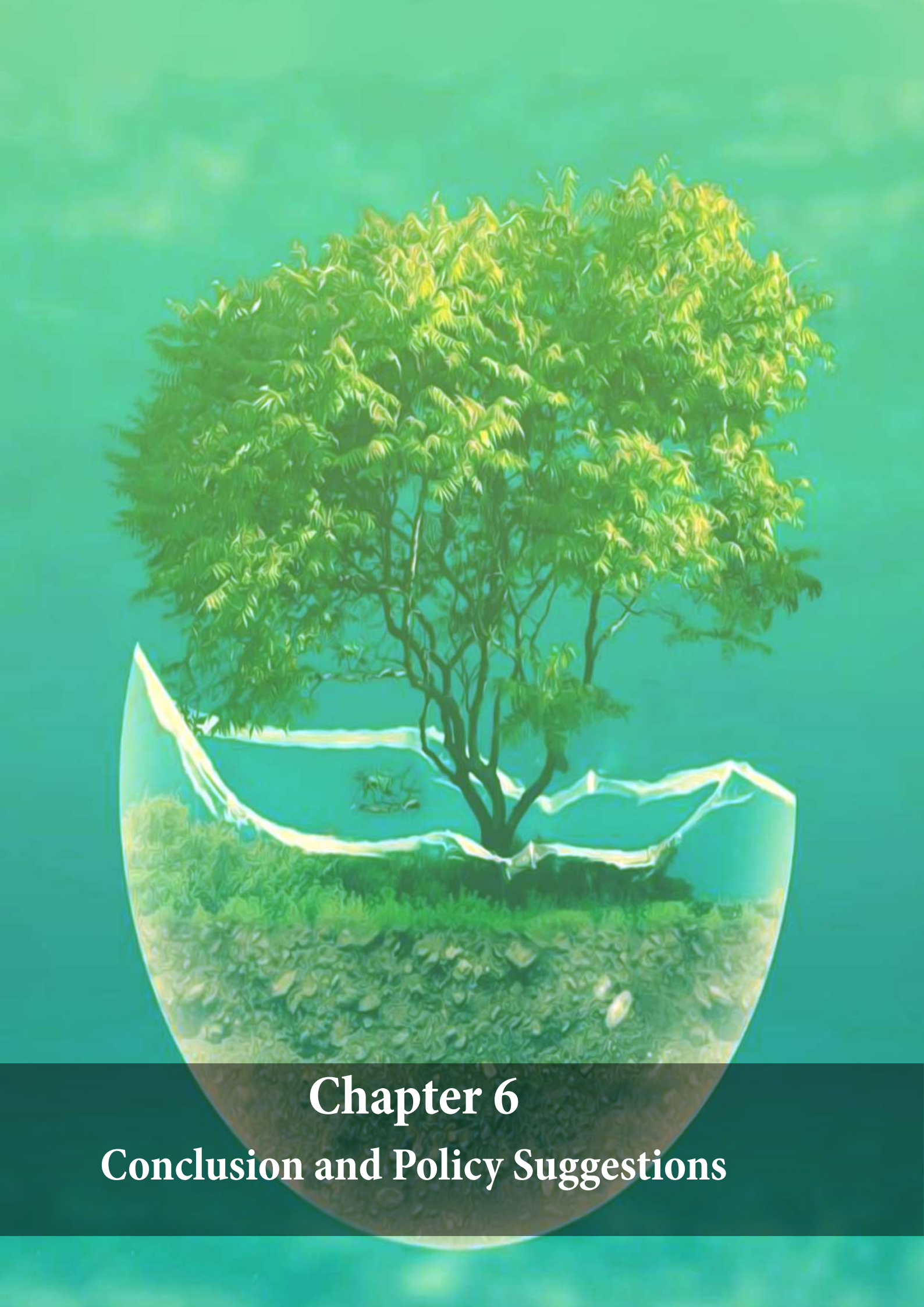
5.2.5 The Province of Punjab

The graph represents the cropping pattern of the agricultural castes across the province of Punjab. By merging the datasets of all four representative districts, we come up with the dominant crop choice in the province of Punjab. The results reveal that in all categories, the dominant area share is of the wheat crop, which is almost same across

all categories i.e., 48 percent each in first two categories of the villages where agricultural castes hold more than 75 percent of land and between 50 to 75 percent of land. In the first category, the second crop choice is of rice with 17 percent area share, while 11 percent area is dedicated to the cotton crop. In the second category after wheat, major area share is of cotton crop i.e., 21 percent. Same is the case in rest of the categories with 23 percent and 22 percent area shared in the category of villages, where the agricultural castes hold between 25 to 50 percent of land or less than 25 percent of land. In these two categories, the sugarcane emerged to be the second most grown crop followed by the rice with a slight difference in the total area share.

Figure 43: Cropping Pattern by Concentration of Land Held by Agricultural Castes in Punjab





Chapter 6
Conclusion and Policy Suggestions

6. Conclusion and Policy Suggestions

TThe LRMIS data has provided a unique information that allows research from a viewpoint that was never possible earlier. By merging the information from this dataset with that of the AC, this report is the first in discussing an important policy issue related to the agriculture sector. The aim is to bring out previously unknown substantiated patterns from using empirical techniques to be used by the stake holders for better informed policy formulation. The report sheds light on the overall picture of the landholding and the cropping patterns of four districts representing four agro-ecological zones of the province of Punjab. District Attock represents the rainfed area, district Sheikhupura represents the rice-wheat zone, district Jhang represents the mixed cropping zone, while district Rahimyar Khan represents the cotton-wheat zone. A gender-based landholding analysis manifests that on an average the gender-wise land distribution is not very equitable in the province of Punjab. The females own only 17 percent of the land while male land owners are much higher in number i.e., 83 percent. In terms of gender parity, ignoring the miscellaneous caste group, a detailed analysis makes it clear that the kinship groups falling under the Religious and Foreign castes category are most equitable i.e., 22.80 percent in terms of the gender-wise land distribution, whereas out of the total area owned by the Arains, the female land ownership is the least i.e., 13.47 percent as compared to the other castes. The Awans, Pathans and Mughals are found to be more dominant in district Attock, while concentration of the Balochs and Arains is found to be more in district Rahimyar Khan. The Rajputs have more land holding in district Jhang. The data reveals that the land ownership by the Jatts and Gujjar is relatively well spread across all districts. The Religious and Foreign castes have more concentration of land in district Rahimyar Khan and Jhang, while the Kashmiri and Northern races have more land owned in district Sheikhupura.

The village level aggregations manifest that approximately 62 percent of the farms have an area of less than five acres. In terms of the share of total cultivated area in each of the representative districts, wheat has the largest share in all four districts. In terms of variety, Rahimyar Khan and Jhang are the two districts where in addition to wheat, three other crops account for almost 10 percent of the total cultivated area. In four representative districts of the province, wheat has the largest share of the total cultivated area at 47 percent. The cotton crop accounts for 16 percent of the representative districts' total cultivated area, whereas the rice is the third largest crop in terms of the share of cultivated area at 15 percent. Chickpea, peanuts, and maize are some of the other notable crops grown in the districts representing the province.

In terms of farm size wise cropping pattern, wheat accounts for the largest share of land across all farm size classifications. The share of land dedicated to the cultivation of rice is slightly higher in the case of villages, where the average farm size is less than 5 acres. The sugarcane is another crop which accounts for a larger share of total area in villages, where the average farm size is not too big. The villages with progressively large average farm sizes have a relatively high share of their total area accounted for by the cultivation of the peanuts.

One of the main objectives of this research was to study the land holding and cropping patterns across all the castes in the province of Punjab. For this purpose, all sub-castes and kinship groups were categorized into 11 categories as representative kinship groups. Our results reveal that at the aggregate, in 63 percent of the villages across the province, the agricultural castes hold more than 75 percent of the total agricultural area while 6 percent of the villages have ownership heavily dominated by the non-agricultural castes.

It is evident that in order to carry further research, it is necessary to broaden the horizon of the work to the entire province with higher degree of robustness. This report is a preliminary work, on the basis of which it could be suggested that the agricultural castes have more knowledge and resources to experiment with different crops. They grow crops other than wheat which leads to suggest that extension services should be diverted more towards the non-agricultural castes who grow more of wheat considering it as a safe crop and do not have much diverse cropping pattern. So, to uplift the overall socio-economic status of the area, it is required that the non-agricultural castes should also be encouraged to adopt a profitable cropping pattern or inter cropping that is also a major source of diversification and allows for more profit margins. The government should also subsidize small land holders for growing cash crops in the area. This would not only incentivize the farmers, a more productive group in the sector, but also help in poverty alleviation. Our results also suggest that gender-wise land distribution is not equitable in the province of Punjab. It is, therefore, necessary that the property rights of the women should be ensured for gender-wise equitable distribution of the land. The incentives can be in terms of lower taxation rates or with higher subsidy rates for the landholders who show landholding of the female ownership. This will empower the rural women which is a big issue in our society.

In the context of the socio-economic system of our country having an agricultural land is a matter of pride and serves as a security in case the family faces any economic downfall. So, the non-agricultural castes either acquire agricultural land for commercial purposes, or they leave it fallow which causes an increase in the relative share of the non-cultivated area. In the light of this, to convert agricultural land to the commercial land, government may impose an obligation of

prior approval for converting agricultural land into commercial land. Pakistan is an agriculture-based economy where major economic activity is dependent on this sector so, a large share of uncultivated land is alarming. Government should announce an incentivized scheme for the landowner who have fallow land to bring it under cultivation. This can give a drastic uplift in the socio-economic status and overall gain of agriculture sector at the provincial level, and consequently at national level also. In the era of Good Agricultural Practices (GAP) along with the International Featured Standards (IFS), it is suggested that in order to reduce the effect of land fragmentation there should be some efforts to consolidate land with an overall objective of productivity enhancement. It is also suggested that government may fix the minimum size of the parcel in order to reduce the impact of land fragmentation.

6.1 Limitations of the Study

It must be noted that the discussion in this report concerning landholding patterns by various characteristics/groups in the four representative districts in the province of Punjab and its tehsils has specifically been restricted to those rural areas on which the data was available and not generalizable to the entire area/population of these areas. In addition to that, the land owned by the government and other non-person entities has not been accounted for the purpose of analysis. Furthermore, in case of the AC 2010, the data on rural households, who do not own a farm, has also been excluded.

It must also be noted that given the six-year difference between the PLRA and the AC 2010 datasets, our analysis hinges on a rather strong assumption that the share of landholding for different caste groups remained fairly constant between 2010 and 2016. Additionally, in order to consolidate the two datasets, we had to aggregate the data at the village level in both datasets which is bound to have resulted in at least some loss of detail. Moreover, the AC 2010 dataset, does not contain information on any measure of agricultural productivity. However, the productive use of land for agricultural purposes can be inferred from this dataset. For the four representative districts in the province of Punjab, we have used the data for 322 villages which were covered in the PLRA as well in the AC 2010 datasets. A total of 552 villages from the four districts i.e of Attock, Jhang, Rahimyar Khan, and Sheikupura were sampled for the AC 2010, however, we were able to find match for only 322 of these villages in the PLRA dataset.

Additionally, and more importantly, the tehsil level analysis presented in this document should be taken with a pinch of salt shown in the table below that only two villages were matched across the two datasets for the case of tehsil Safdarabad and less than ten matches for villages were found for the tehsils Sharaqpur, Hassan Abdal, Ferozwala, and Attock. These numbers are far less than what can be a representative sample of villages at the tehsil level. However, since this analysis is the first of its kind, therefore we have erred in the favor of coverage than precision, with the acknowledgement and recognition that there is plenty of room for improvement and hope that future works that will be built on these results will be with a marked improvement in statistical precision and accuracy.

Tehsil	Number of villages in the matched sample	Tehsil	Number of villages in the matched sample
Ahmedpur Sial	15	Liaqatpur	29
Attock	9	Muridkey	16
Fateh Jang	23	Rahimyar Khan	42
Ferozwala	6	Sadiqabad	32
Hassan Abdal	6	Safdarabad	2
Hazro	11	Sharaqpur	4
Jand	21	Sheikhupura	18
Jhang	28	Shorkot	13
Khanpur	35	**TOTAL**	**322**
Pindi Gheb	12		

6.2 Way Forward

This study has attempted to shed light on, amongst other factors, patterns of landholding, fragmentation of land, and agricultural activity by castes, tribes, or kinship groups within and across the four representative districts in the province of Punjab. These social guilds have played an integral role in the functioning of the rural economy in the Indo-Pak subcontinent and continues to do so. However, the unavailability of data for most part of at least the past three decades had precluded the discussion on the importance of this fundamental social construct for the rural economy in academic and policy circles.

This however is just a preliminary exercise which has been carried out within the bounds of the limitations and therefore has a room to augment this work and build upon it. One of the most important details which were not captured in the existing datasets which we had access to the agricultural productivity. The AC does not contain data on the agricultural productivity, and, to the best of our knowledge, there does not exist any such dataset representative at the tehsil level which was compiled no earlier than 2010. Therefore, in order to analyze patterns of agricultural productivity, such datasets need to be compiled. Additionally, when we acquired the PLRA dataset that did not cover the entire population of villages in the province of Punjab and also the unclean nature of this dataset with lack of validation checks performed coupled with the prohibitively large data size, perhaps due to the sub-optimality of storage method, made analysis less precise and difficult to carry out.

It is therefore important that future research on agriculture in the province of Punjab which makes use of the PLRA dataset must be done based on latest PLRA dataset. We hope that in future, this dataset will have improved data quality and better storage methods will be used by the PLRA. Furthermore, instead of relying on secondary data sources to obtain information on agriculture related variables, it would be better if the PLRA dataset is used as a sampling framework to take a representative sample of landholders and a primary survey is then commissioned to elicit information on the agricultural activity. This will also eliminate the need for aggregating responses at the village or any other level. It is also suggested that computerization of the Girdawari may be started immediately which would help in recording any change in the crop cultivation instantly. It is also important to take note that some questions can be better answered in terms of establishing causality using panel data i.e., by taking repeated cross-sections over time. In our case, the study of the land fragmentation and the cropping patterns by the dominance of agricultural castes in rural landholding could have been more rigorous, if we had access to older PLRA dataset at least dating as much as a decade back. This, along with another dataset on agricultural activity from the corresponding period would have enabled us to study co-movements in the agricultural activity and pattern of landholding by different kinship groups over time in each area. The changes in the pattern of landholding by caste groups over time are important since, it helps us in answering the question as to what happens to the agricultural activity when the share of landholding by agricultural castes changes over time. Similarly, land transactions and transfers which result in the fragmentation of land can also have a profound impact on the agricultural activity in a region over time. The land related transactions and transfers are important on their own since the characteristics of the party to which land rights are transferred can provide valuable insights on the future use of land. Given the lack of availability of a panel dataset comprising the required set of variables, we have attempted to answer some of the questions related to the land fragmentation and the cropping pattern by kinship groups using the available cross-section data.

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