

# **Analysis of Determinants and the Role of Commission Agent in Wheat Supply Chain: A Case Study of Pakpattan, Punjab**



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Registration No: PIDE2017-FMPHILECO13

**MPhil (Economics)**

*A Dissertation Submitted to the Pakistan Institute of Development Economics, Islamabad, Pakistan in Partial Fulfillment of the Requirement of the Degree Master of Philosophy in Economics*

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**Islamabad, Pakistan**

**2019**




# Pakistan Institute of Development Economics

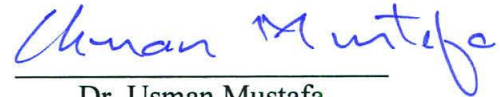
## CERTIFICATE

This is to certify that this thesis entitled: “**Analysis of Determinants and the Role of Commission Agent in Wheat Supply Chain: A Case Study of Pakpattan, Punjab**” submitted by Mr. Zeeshan Iqbal is accepted in its present form by the Department of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Philosophy in Economics**.

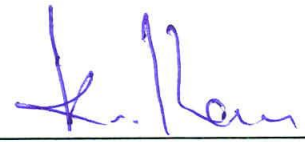
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## **Declaration**

I proclaim that this dissertation is exclusively my own endeavor, and has never been published or presented in any form elsewhere.

Zeeshan Iqbal

## **Acknowledgement**

Firstly, I thank the Almighty Allah for His blessing upon me in my whole life and providing me with the strength to carry out this study. I would also like to admire and thank to my supervisor Prof. Dr. Usman Mustafa for his knowledge, input, support and guidance throughout the stages of this study. I am really very grateful to him for all of his supports and efforts in the fulfillment of this study.

My sincere appreciation also goes to other lecturers specially, Prof. Dr. Asad Zaman and Dr. Atiq Rehman for providing me the Knowledge that has been very helpful to me for the completion of this study.

I also want to thank my family especially my Parents for their financial and emotional support, without which, I would not be able to complete my research work. I also acknowledge the true friendship and best companionship of my friends, Jalil Khan Bangush, Amir Azam, Ziawar Shah, Muhammad Ibrahim, Taqi Raza, Rana Hasam, Hafiz Adeel, Hafiz Sajid and Meer Hamza Khan who add beautiful memories to my life. May Allah bless them.

Finally, I am pleased to express my thanks to Pakistan Institute of Development Economics (PIDE), which provided me the good platform and opportunity of learning

## **DEDICATION**

My this effort is dedicated to my parents, who provided me with an opportunity to study in this prestigious institution with devoted teachers & supporting class fellows, without their support my this effort would have never been worth viewing.

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## **ABBREVIATION**

OLS	Ordinary Least Square
PASSCO	Pakistan Agriculture Storage and Services Corporation
GVC	Global Value Chains
GDP	Gross Domestic product
GMM	Generalized method of moments
CRS	Creative Research Systems
SAARC	South Asian Association for Regional Cooperation
FIR	First Information Report
PBS	Punjab Bureau of Statistics
PBS	Pakistan Bureau of Statistics
GOP	Government of Pakistan
CIAT	International Center for Tropical Agriculture
OPEC	Organization of Petroleum Exporting Countries



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## ABSTRACT

This study attempts to analyze the determinant and role of commission agent in wheat supply chain and also find the market channel and margin in Pakpattan Punjab Pakistan. This research work includes collection of primary and secondary data from various sources. This study estimate the determinants of wheat supply chain by using ordinary least square (OLS) technique to identify the factors which affect the quantity of wheat produced. The finding of this study shows that the size of land holding, farming experience, access to credit, education level, past price of other than government, improved Input seeds significantly and positively affect quantity of wheat produced. Additionally in this study the market channel and margin are graphically explained and also described the farmer preference regarding Middlemen (Arthi) by theoretically. The low government preference by farmers can be minimized by such policies oriented around farmers which helps farmers at time of cultivation and later on when farmers want to sell their stock unlike current conditions put by the government to buy wheat only from selected farmers.

# CHAPTER 1

## Introduction

### 1. Introduction

Agriculture is an important sector of Pakistan's Economy. It directly supports the country's population and has share of 18.5% in Gross Domestic Product. Furthermore 38.5% of labor force is engaged in agriculture. In Pakistan, almost 68% of population lives in rural areas and is directly or indirectly linked with agriculture sector (Government of Pakistan, 2019). The growth rate in agriculture sector was minimum initially with 1.43% right after the independence in the first decade of Pakistan between 1949 & 1958. It was realized at the end of 1959 that the growth in agriculture sector is important for the survival of the country and government decided to take part in the improvement of agriculture sector which is also called Green Revolution. 1960's is the year marked with concerns among economists in terms of economic and political effects of the economic policies implemented. It has been seen that the second half of Ayub Khan's rule has a significant growth of 6% in agriculture sector (Zaidi, 2015).

The growth rate of agricultural sector has been fluctuated between 1970-2015 with the 1970's average growth rate of agriculture sector was 2.4 %, which is the lowest recorded average and can be attributed to the structural changes like Organization of Petroleum Exporting Countries (OPEC) price shocks, the devaluation of Pakistani currency in 1972 and the severe floods of 1974 followed by decline the growth rate of 80's decade remained 5.4 % and the era witnessed the great transformation in agricultural sector in Pakistan as like that of 1960's and growth rate were 4.4 %, 4.4%, and 6 % in 1990's, 2000's and 2010's respectively (Chandio *et al.*, 2016).

Since we have seen many bright lights in the agricultural sector but in Pakistan agriculture growth rate have been low as compared to emerging economies. The main hurdles in the growth process are the illiteracy of our farmers, lack of modern technologies, gap between the peasant and landlord, soil erosion, shortage of water, less availability of credit, under developed infrastructure,

poor agricultural marketing and rising prices of major agricultural inputs. There is also a clear mismatch between the level of real economic activity taking place in agriculture and flow of formal credit to the sector: in 2010-11, lending to agriculture sector made up only 8 % of the banking sector's total advances and 7.6 % of private credit. According to the planning commission in 2011-2012 demand for agriculture credit is PKR 750 billion but the flow were PKR 294 billion only. The demand for agricultural credit is growing at a rate of 14.6 % per year over the last five years but actual disbursement has increased by 8.6 % they create large gap between supply and demand and this gap is fulfilled by informal sources (Haq et al., 2013).

Wheat is one of the most important crop used in a variety of components in case of Pakistan such as biscuits, bread, muffins, noodles etc. it has been observed that the gap between the production of wheat and its demand is increasing day by day. There has been surveys i.e. which conclude that the over years the production of wheat has not increased considerably as compared to increase in population which was seen to be 160 million from 137 million in a period of 1999 to 2005 which signifies it to be a rate of 2.5% per year. Presently the wheat production is estimated to be 16.8 million tons which is way too less than 22 million tons required to fulfill the needs of consumers presently. It also keeps us with a deficiency of 5.2 million tons per year. Here the role of policy makers is of much importance as the gap between the supply and demand will have to decrease to meet up the requirement of wheat. As it is difficult to provide more land and water resources to increase the production of wheat, it is important to find ways to escalate the yield per acre (Ali et al., 2011).

There are two types of land discussed in literature while specifying water shortage issues related to production of wheat. The land which uses water for irrigation from snow and glacier melting is considered to be 2/3 of the total production land. There are two main reservoirs used for storage of water to be further utilized for cultivation process i.e. Tarbela and Mangla. As the nation's irrigation system completed in 1970's, the water need increased to more than 50%, while the availability of water in the storage decreased by one-third due to silting. In short term the supply of water for irrigation has

not created any such problems but in the long run Pakistan is likely to have worsened situation to provide water for irrigation process. Using conventional methods for farming, dam silting and raising level of infrastructure due to increased level of population near areas of Chinab, Ravi and Indus rivers have declined the per capital water availability from 5000 cubic meters in 1951 to less than 1000 cubic meters in 2010 (Prihodko and Zrilyi, 2013). The wheat production which depends on irrigated water is thought to be 85% of total. The lands where cultivation depends on water from rain has been producing lesser in amount due to dry condition and poor soil moisture from September to December (Raza, 2017).

The recent statistics shown from Ministry of National Food Security and Research that the area available for irrigation in Punjab was 6914 during 2017-18 which makes it almost 42.3% of total area irrigated at the specified time. The area which actually cultivated was found out to be 6524 hectares on which the production was stated to be 19607 tons.

Raza (2017) mentioned in his work that Afghanistan is main export market for wheat produced in Pakistan due to ease in trading and access across borders and lifelong linkages from past. Presently, that market demand for Pakistani wheat is decreasing due to the fact that Pakistani wheat has higher prices as compared to its competitive due to increased prices of initial inputs at time of cultivation. There are three types of farmers who contribute to wheat production. First of all comes the small farmers who own less than 12 acres of land, then come medium farmers with land between 12 to 25 acres and lastly comes large farmers who produce on a land of more than 25 acres (Khan, 2014).

Supply chain is the process through which the raw material passes physically and converts into final products is called supply chain of that particular product. Supply chain management is managing the process efficiently and effectively to reduce cost, finish the process in time and increase production in order to provide the product in time with improved quality. The better management helps in reducing the risk associated with food safety and contamination, and decreasing the agricultural industry's response to changes in consumer demand for food attributes (Dunne, 2001).

Kotler and Armstrong (2003) was of view that the process of supply chain continues till the products are conveyed to final consumers. According to him it is a delivery mechanism and suggested that the concept of supply chain is different from demand chain. Internationally, supply chain includes every action carried out from production to end product or providing service i-e from supplier's and supplier to customer's customer. The main importance of supply chain is to bring efficiency and reduce cost (Usman, 2016).

Middlemen (Arthi) are present all over the world acting as the link between producers/sellers and consumers/buyers (Oguoma et al., 2010). Middleman acts as the sale agent for the farmer and facilitates the sale of the harvested crop in the market. Since Independence Pakistan's agricultural policy changed with respect to time. The main purpose of this research is to investigate the role of middlemen in agriculture sector of Pakistan.

In Punjab, middlemen are the largest informal source of credit but he is not credit worthy by banks. There are two types of middlemen working in grain market. One is Kacha and other is Pakka Arthi. Pakka Arthi is a buyer of the crop and also takes on the ownership of the crop once he strikes a deal with the farmer while the Kacha Arthi only works as a middleman and also charge the commission from the farmer. Mostly the Kacha Arthi deals directly with the farmer while the Pukka Arthi deals with the Kacha Arthi instead of the farmer. However, both operate in the local grain markets of the area. The number of Kacha Arthis are more than Pakka ones in the market. Thus, it is the Kacha Arthi that is playing the role of the informal money lender in the agriculture supply chain. He outside the box on the issue of banks and farmer not only gain profit but also manage his risk very well while providing a customized service as opposed to the cookie cutter approach of commercial banks. According to Singh & Daliwal (2011), the Middleman provides two major services written as follows;

➤ Firstly, he provides inputs on credit at the time of sowing of a particular crop.

➤ Secondly, middleman acts as the sale agent for the farmer and facilitates the sale of the harvested crop in the market.

The agriculture products are sold at commodity markets in Punjab, Pakistan. The average distance between commodity markets is almost 30 km which contains more or less 100 middlemen while the number of middleman becomes more in case of larger markets like those of Okara and Sahiwal. The role of middleman is seen more in B and C class markets while its comparatively low in A class markets where A class markets represent markets which generate annual income of Rs 1.6 million while B class has an annual income of Rs0.8 million while C class markets are markets with lowest income generated throughout the year which is calculated to be up to Rs 0.8 million (Haq *et al.*, 2013)

In the wheat sector, the wheat supply chain in Pakistan differs in respect to different time period. Before 1987, Government of Pakistan used to interfere in the wheat market through Ration Shop System which according to Ryan & Khan, Government brought wheat from trader and farmers and sold out to business firms with addition of some extra charge that further provided to consumer with their markup price that promoted dual market system in the economy. After the failure of Ration shop system the government of Pakistan promoted Price Leadership Model which induces reduction in flour/wheat prices through open ended sale from Government of Pakistan (Ryan et al., 1993).

### **1.1. Objectives of the Study**

The overall objective of the study is to find out the role of middlemen and determinants in wheat supply in Pakpattan, Punjab, Pakistan. Following are the objectives of the study:

- To investigate farmer's preferences regarding middleman (Arthi) and its role in wheat supply chain.
- To find market channels and margins in wheat supply chain.
- To examine the determinants of wheat supply.

## **1.2. Research Question**

This study has following research questions:

- Which are the factors that determine wheat supply?
- Why farmer prefers Arthi in wheat supply chain?
- Whether farmer chooses Kacha or Pakka Arthi?

## **1.3. Hypothesis**

This study has the following hypothesis

H<sub>0</sub>: Arthi have play no significant role in wheat production.

H<sub>1</sub>: Arthi play significant role in wheat production.

H<sub>0</sub>: Farmers do not Prefers Arthi.

H<sub>1</sub>: Farmers prefer Arthi.

H<sub>0</sub>: Farmers don't differentiate between Kacha and Pakka Arthi.

H<sub>1</sub>: Farmers differentiate between Kacha and Pakka Arthi.

## **1.4. Significance of the Study**

The study provides existing challenges, opportunities and entry points in the wheat supply chain. In addition, the study provides information on the determinants of wheat supply chain, role of middleman in wheat supply chain and also determine market margins and share of different actors which exist in the study area.

This study helps banks to improve their strategies by serving farmer more in providing them the resources on timely basis with a lower interest rate as compared to the concept of Arthi where the interest rates are relatively higher as discussed. This study also helps the government to achieve the goal of welfare it has to provide by giving a better living standard to the community related to



agriculture and farming. This work will be helpful as a reference for continuation of further research on the said topic.

This study filled the gap in different aspect of literature i.e wheat grower because agriculture sector absorb a large portion of disguised unemployment in Pakistan. Furthermore, the study provide information to authorities and policy maker about factors which effects the smoothening of wheat supply chain.

### **1.5. Limitations of this Study**

This study also has some limitations on human ends. These limitations include budget and time constraints due to which this study was conducted only in district Pakpattan and only one agriculture product i-e wheat was studied. This study could also be extended to division and province level depending on availability of resources. We have found determinants of wheat production by using only few variables which can be increased in a different scenario. The farmers include small farmers, middle farmers and large farmers which were used together in the same study which could be studied separately for better results.

## CHAPTER II

### Review of Literature

The concept of Arthi or informal money lender has been evolved within different countries as time passed. In today's real world economies, it is still considered an important factor with wider role in rural economy of developing countries. The literature provides view of middleman in two aspects. Besides its imperative role, some see Arthi as a disadvantage to farmers as it provides the loan with conditions trapping them in the cycle of debt-ness. Furthermore the literature will elaborate the market concepts, determinant of wheat supply chain and in final section we will highlight the market margin channel in different studied areas.

#### 2.1. Positive Role of Middlemen

Researchers think of middlemen as crucial because they provide capital to farmers who need it at the time of irrigation and by this way become reason for feeding millions of mouths indirectly. Before taking into account the advantages or disadvantages of Arthi's role, it will not be a mistake to notice its survivability over the centuries (Sharma & Chamala, 2003). The area where small middleman works towards their potential client's benefit by keeping stable relationships where both parties aim towards mutual welfare (Knomnga and Weijland, 1989). Middleman tends to store barley till the time it is needed to be used in the factory. The sellers of barley in such scenario sell it even if they have to compromise on a part of price to avoid the extra expenses on caretaking and storage, so the middleman's existence can increase or decrease the flow of barley to the factories (Medellín, 1987).

Spulber (1996) elaborates the intermediary as 'the agent that helps rural economy run through its role to act between buyers and sellers while also providing loan in their dealings. Thus it can be said that the middleman or intermediary concept does help in making ease of access to international trade (Spulber, 1996; Khandelwal et al., 2011) by becoming the pillars of global economy chain. As we take international trade in consideration the role of middleman was defined by Koch, (2013) who

stated that the firms which have low market capitalization or case of new entry in the market or firms with products of low quality tend to use intermediary often. The use of Intermediary is because of the extra cost such as storage cost avoided by new entry firms in the market as well as other firms already existing. This concept was also given by Bernard et al., (2015) by mentioning the importance of intermediaries when there are destination-fixed costs, less differentiated products and low contract intensity. However the trade economy literature does not specify or address which types of middleman or intermediaries are required in global value chains and what will be their specific role which was not even explained by governance model of Global Value Chains (GVC) as explained by Gereffiet et al., (2005).

Belavina and Gilotra (2012) provide a clear view of the role which middleman plays. According to them the intermediaries provide a quick adjustments of supplier base to changing buyer's need. The paper they presented supported the presence of middleman as a positive impact on supply chain management. Previous literature on the middleman or Arthi reveals that the introduction of middleman poses well-arranged coordination between the one who has excess of products to the one who needs it (Chung, 1991; Aghion, Dewatripont, and Rey, 1994; Nöldeke and Schmidt, 1995; Edlin and Reichelstein, 1996; Taylor and Plambeck, 2007).

Middleman in supply chain coordination worked on moral hazards in works of teams (Holmstrom, 1982), adverse selection (Mcafee and Reny, 1992) and incomplete contracting model (Baliga and Sjostrom, 2009). In that paper they found that the extra party in the supply chain that is if a middleman is present then the simple contractual solutions to every problem are easily accessible.

Arthi is considered important due to the fact that it provides loan on time without any delay required at time of production as compared to formal institutes like banks or micro financing firms (Gill, 2004; Quartey et al, 2012; Amjad and Hasnu, 2007). It has been noted by Choudhury (2004) that high interest rates are not considered bigger problem as the problem of providing the lending money on time. Also the repayment schedules are flexible as compared to banks. The acceptance of Arthi is

also due to the fact that it combines the lending and output transactions as compared to conventional banking policies i-e the Arthi demands repayment in terms of output (Aleem, 1990).

## **2.2. Negative Role of Middlemen**

However there are some drawbacks of using the money lending from an Arthi. The Arthi or informal money lender usually lends on higher interest rates than the formal institutes. The interest rate also differs from one lender to another which adds further to uncertainty regarding borrowing. Aleem (1990) stated that Arthi charged 78.5 % of average interest rate in Chambar where the interest rate charged by banks in Pakistan was 10% and the opportunity cost of capital to these moneylender worked out to 32.5%. Weijland (1991) found out by cross province regression analysis that the middleman existence has negative impact on local ruler rice price, regional productivity and agriculture productivity. Middleman and their profits are worth noticing in rural areas where households bear much burden because of it, which includes high transportation costs and market power of middleman (Goetz, 1992, and Sexton, Kling and Carmen, 1991). Their presence might affect the local farmers to get much benefits from recent globalization in dispersed agriculture (Nicita 2004, Hertel and Winters, 2005). The remoteness of location and the market power of middleman are suggested to be closely related.

Krishna (1963) worked on the short and long run elasticity of supply including crops of India and Pakistan Punjab, from pre-partition period of 1915 to 1942. He used simple OLS estimation and used the Nerlove model. He added other crops too beside wheat in his analysis. The result findings stated that price elasticity for short run and long run was 0.08 and 0.14 and adjustment coefficient was 0.58. The price factor was significant in case of wheat. The response in case of wheat in Punjab was lower as compared to other studies. Another study by Nosheen and Iqbal (2008) related to crops like sugarcane, wheat and cotton by using the Nerlovian model and using OLS method was conducted from the year 1971 to 2007. The short run price elasticity of wheat was 0.045 and long run elasticity was 0.0105 and adjustment coefficient was 0.44.

Hussain (2014) worked on wheat and his study showed that wheat does not only eliminate the food deprivation but it is also important in its contribution towards GDP. The share of wheat is more than 42% but its contribution in GDP is 2 %. He used data from 1981-82 to 2013-14. He used Nerlovian method and GMM analysis for panel data.

### **2.3. Market and Market Concept**

The geographical place where sellers and buyers meet for exchange of goods and services is called market. Everything that a person consumes does not produce on his own but buys it from others who specialize in producing it. To help out this activity buyers search for sellers in these markets. Markets are place of transaction resulting in people getting mutual benefit that would not be possible otherwise Ashenafi (2010).

Currently market is explained as an arena for managing and helping out the business transactions and by providing a platform for economic questions (Kohls and Uhl, 1985) mentioned the concept of market by question such as how much to produce? What products are to produce? How to distribute it among general public? A place, a time span, a group of consumers, the consuming items and a level of marketing system may define it. By deciding which market definition to use depends on the problem one is facing, Ashimogo (1995) narrated market as simple arrangements to facilitate exchange of one thing for another.

The characteristics of market which are worth mentioning are its pricing and exchange operations. This study takes the product oriented definition of market. Market can also be defined as public, monetary units and their inclination towards buying it (Stanton and Futrell, 1987). In this context, market is another name for demand (Andargachew, 1990).

Marketing of products is another close concept related to market. This concept came into use by labor division and specialization and latterly became in general use with urbanization and industrialization over years. Market has been found to be in debate among researchers and defined in a variety of ways.

The reason for this may be marketing specifically marketing related to agriculture projects (Kohls and Uhl, 1985).

Kohls and Uhl (1985) was of view that marketing is the performance of business entities which includes channels of product from the initial point where it is produced to the final point where it is in the hands of the final customers.

As time passed evolution played its role in changing the meaning of market from its different definitions and changed it to market oriented from product oriented. The economy filled with scarcity of resources and unlimited needs, the aim of business has changed to produce and provide goods through the use of modern technology (Crawford, 1997).

The process of marketing is defined as fulfilling the human needs by providing them products in eatable form, at right time and place. This definition is in the context of economics needs fulfillment by products in terms of time, form and place. Having products available at time and location where it is needed is important for a marketing system which in result depends on nature of products, goods and services included.

The marketing as a process can be explained as when people get what they need and by exchange the products of value with others and it involves some work. Marketing is different for different class of people where it's shopping for eatables for a housewife, for farmer its sale of product produced and fertilizer distributor, it means providing it to the cultivator Abbot and Makeham (1981). According to Kotler and Armstrong (2003), marketing is managing markets to bring about profitable exchange relationships by creating value and satisfying needs and wants.

### **2.3.1. Market System**

Marketing has one concept which is called marketing system. The marketing system as defined in the literature is the set of types of business entities which ensures passing of product during marketing process (Branson and Norvel, 1983). The marketing system is composed of many stable interconnected structures that beside production, distribution and consumption, strengthen the economic process

(Mendoza, 1995). Many layers of physical activities which include passing of product from farmers to final consumer can be called a marketing system (Elias, 2005), in other words, the collection of processes, middlemen and transaction activities which help in the distribution physically and economic exchanging of products (Kohls and Uhl, 1985). The living standards of people can be affected by efficiency of a marketing system working in a country. Marketing efficiency can thus be considered important for economic improvements of a country.

### **2.3.2. Market Function**

Marketing function basically aims to provide form, place, time and possession utility of customers' desires (Bztranson and Norvel, 1983). It is important to know how it market functions to transfer services and goods from initial point of production to final point of consumption. There are wide range of activities between these two points under the marketing system where assembling, storing, transporting, processing, grading, financing, risk bearing and market information.

### **2.3.3. Market Channel**

After discussing the literature about farmer preference about Arthi and importance of wheat taken for this study, it's important to view some literature about the channel through which wheat remains in supply process.

Marketing Chain is a term used to define the several links that attach all actors and dealings involved in the transaction of agriculture products from the farm or point of production to traders, consumers and final destinations (CIAT, 2004).

The marketing channel is a trade or distribution system and it is explain by Segetlija et al., (2011) as sets of inter-dependent groups or organizations involved in the process of producing the agriculture products or service offered for consumption. The channel follows a vertical structure where agri-products move from grower or producer to the ultimate consumer and in which actors interact at each market. Different marketers exist in channel arrangements to perform marketing functions that

contribute to the product move. Actors performing between grower and final users are recognized as intermediaries.

According to (Backman and Davidson, 1962) the word channel is derived from the Latin word canals, which means canal. The marketing channel can be observed as huge canal or pipeline through which products, their ownership, dealing and communication, payment and financing, and consequent risk move to the consumer. Formally, a marketing channel is a business edifice of interdependent group or organization that reaches from the point of product origin to consumer with plan of move products to their ultimate consumption destination (Kotler and Armstrong, 2003).

Marketing channel is the group of interdependence organization that swiftly the transfer of ownership as products move from grower to consumer (Bain and Howells, 1988). Usually marketing follows a fairly well organized channel from grower to consumers. Mendoza (1995) defined marketing channel as the way the goods or products follow from their sources of actual production to their ultimate destination for final use. Therefore, the inquiry of marketing channels is planned to provide a systematic knowledge of the stream of goods and services from their origin (producer) to their final destination (consumer).

#### **2.3.4. Marketing Margin**

Marketing margin is defined as the percentage of the selling price's final weighted average taken in each stage of the marketing chain. The difference in amount of what final consumer pays and what goes in pocket of the producers is called the total marketing margin. In another context it is the difference between retail price and farm price (Cramers and Jensen, 1982).in case cases the margin tends to be greater than others a wide margin represents usually high prices to consuming sector and low prices to farmers who produce. The total marketing margin is categorized into different subdivisions: all the costs connected to marketing services and the profit margins or net returns. While discussing the imperfect market the marketing margin is likely to be higher than other markets because



of the future expected abnormal profit. Real market cost is one reason due to which marketing margins can also be high, even in competitive market (Wolday, 1994).

Marketing margin can be estimated by three ways (Abbot, 1958): (a) following specific lots of consignments through the marketing system and assessing the cost involved at each of the different stages (time lag); (b) submission of average gross purchase by the number of units transacted for each type of marketing agency; and (c) comparison of prices at different levels of marketing over the same period of time (concurrent method). Because the first two methods are time consuming, in this study the third method will be used.

#### **2.4. Determinant of Wheat Supply Chain**

The channel of wheat supplying indicates how it goes through different intermediaries. Now it's critical to see the determinants of wheat supply chain as mentioned in our third objective Ayelech (2011) examined the factors influencing the marketable surplus of fruits by employing OLS econometric regression analysis. This study analyzed that fruit marketable supply was influenced by; household head, education level, size of fruit produced, skill in food production, extension contact, distance to market and lagged price.

Study of Mohammed (2011), using OLS econometric model, has examined the production of quantity of teff. In this study author take these variable, access to market information, marital status of the household head were found to have positive and substantial effect on marketable supply of teff. However, amount of wheat produced, and access to loan availability were found significantly and positive linked with marketable supply of wheat.

Abraham (2013), employing multiple regression model, in this study used to analyzed the influence of quantity of tomato produced, non-farm activities, skills relevant to vegetable farming, distance to nearest market and information about market have significant influence on marketable supply .

## 2.5. Literature Gap

According to literature Arthi plays both positive and negative role in economy. Those who say middlemen play positive role argue that middleman acts as the sale agent for the farmer and facilitates the sale of the harvested crop in the market and also say that he provides inputs on credit at the time of sowing of a particular crop. Those who say middlemen play negative role whose argue that middlemen gain extra profit because farmer do not weight to sale a product for long period of time he didn't bear the storage expenses. The channel follows a vertical structure where agri-products circulates from producer to the final consumer in which receivers and providers interact in each market. Different strategies exist in channel arrangements by some factors to perform marketing functions that helps the product move. The marketing margin is said to be calculated by involving the cost and purchase by the units and by comparing of prices at same time period. Many studies analyzed that wheat marketable supply was influenced by factors such as household head, education level, size of fruit produced, skill in food production, extension contact, distance to market and lagged price which provokes us to conduct our study on the mentioned topic.

After discussing the general research about this specific area this study focuses on district Pakpattan which is considered important agricultural land when production of wheat is taken into account and my work will help to understand the behavior of Farmer towards market preference and preference of farmers related to Arthi selection, channel and market margin of wheat supply chain in Pakpattan and the determinants of wheat supply chain for the said district has been ignored to the best of my knowledge by my predecessor researchers.

## CHAPTER III

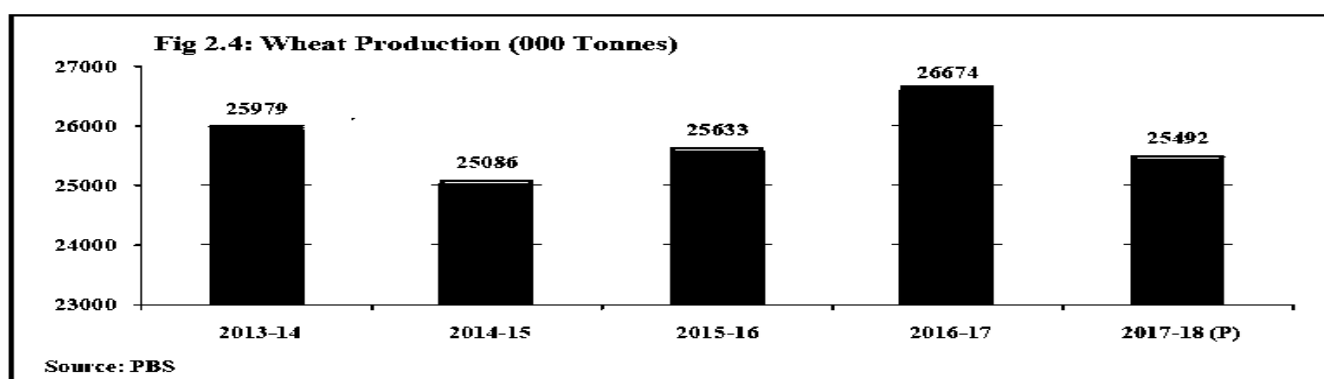
### Methodology

The methodology section pinpoints the specification of area where this study is conducted followed by theoretical and conceptual framework. The econometric model explains the variables in the model. The data and data sources is given and the ways to estimate and run regression analysis are explained in detail. The dependent and independent variables are stated with their reference and their relation in literature to one another.

#### 3.1. Specification of Study Area

This chapter focus on the features of our study area which is District Pakpattan. This section will provide glimpse of the features pertinent to the study; population, area of production and wheat production.

Agriculture sector is consider to be the back bone of the economy, its share in the GDP is 18.9 % and it provide job to 42.3 % of labor force (Pakistan Economic Survey 2018-19). Wheat is knows as major crops of Pakistan, used as leading and staple food grain for the diet of people. Pakistan is the 8<sup>th</sup> largest wheat producing country and produce 26.674 million tons of wheat in 2017 with area under cultivation was 8972 thousand hectares. Wheat's share in GDP is 1.7 % and value addition in agriculture sector is 9.1 %.



Punjab is ranked as number 1 in population with having population of 110,012,442 (Population Census, 2017). According to Revenue Department Punjab the total area of cultivation of this province is 12537 thousand hectars (52 % of total area) which is the highest ratio among all province. Total area for wheat farming in 2015-16 is 6914 thousand hectars which is 42.3 % of total area sown (Bureau of Statistics, Punjab). Production of the wheat from 2006 to 2016 as follows.

**Table.3.1: Area and Production of Wheat Punjab**

Years	Total	
	Area(Thousand Hectares)	Production(Tonnes)
2006-07	6433	17853
2007-08	6402	15607
2008-09	6836	18420
2010-11	6691	19041
2011-12	6483	17739
2012-13	6511	18587
2013-14	6901	19735
2014-15	6979	19282
2015-16	6914	19527

Source: Punjab Bureau of Statistics

District Pakpattan is located in Sahiwal division, Punjab Pakistan. It has population of 1824 million according to population census, 2017. District Pakpattan has total farming area of 273 thousand hectars but only 248 thousand hectars is cultivated (Punjab Bureau of Statistics). Total land use for wheat production in Pakpattan district is 162 thousand hectars and in 2015-16 this district produce 555 thousand tons of wheat. Following table show the wheat production of Sahiwal district form 2013-16.

**Table.3.2: Wheat production by Division & District Punjab**

Division/District	2013-14		2014-15		2015-16	
	Total	Irrigated	Total	Irrigated	Total	Irrigated
Sahiwal Divn.	1839	1839	1692	1692	1697	1697
Sahiwal	464	464	462	462	491	491
Okara	815	815	711	711	651	651
Pakpattan	560	560	519	519	555	555

Source :( PBS, 2017)

Thousand Tonnes

In Sahiwal division are 3 districts namely Sahiwal, Okara and Pakpattan. Aban haq et al., 2013. Conducted a comprehensive study on the role of commission agent in agriculture products but they neglected district Pakpattan. Our study will take into account the role of commission agents specifically in wheat production and supply mechanism in above table mention district.

### **3.2. Theoretical Framework**

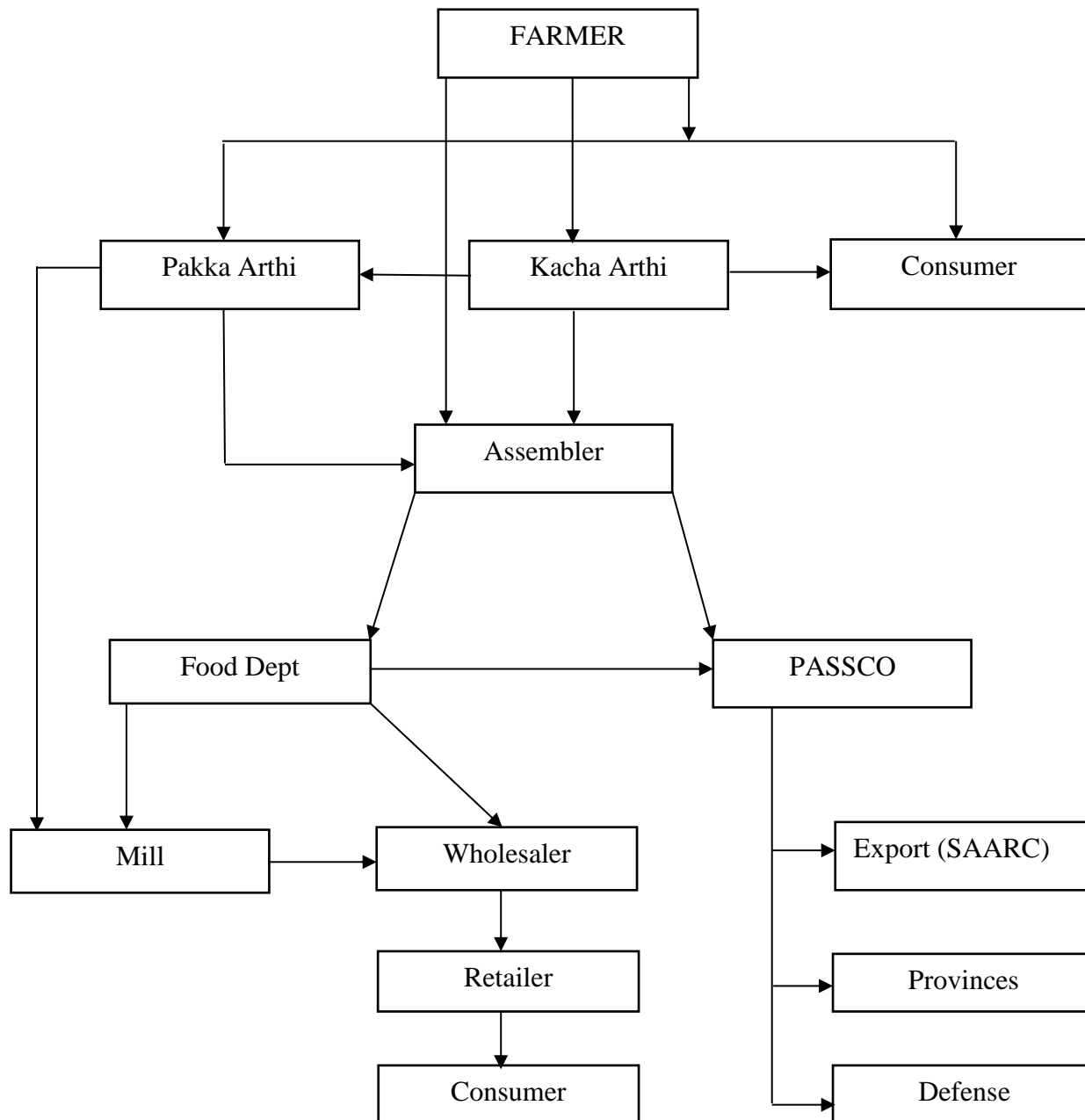
Farmers represent those agents of society which contribute in producing agriculture products as well as supply extra products they produce to various receivers like to consumers directly or to Kacha Arthi, Pakka Arthi or assemblers. The Pakka Arthi further supplies its portion to mills or assemblers.

The Kacha Arthi supplies their portion to assemblers, wholesalers as well as to consumers directly. The assemblers supplies it to food department and Pakistan Agriculture Storage and Services Corporation (PASSCO) where Food Department furthers its stock to consumers through wholesalers and retailers while PASSCO exports its stock or gives it to provinces and defence. Assembler is the center point where the stock of wheat is kept before its further supply to the concerned provincial department's godown i.e Food department or Federal department's warehouse i-e PASSCO depending on which department owns the assembler from where the wheat was supplied. Wholesalers in this channel of supply represent those participants who buy wheat from mills and sell it to retailers. Retailers are second to final consumers who get their supplies from wholesalers to be further distributed among end consumers. The farmers also supply some of portion they produce to consumers. The channels are explained in the conceptual frame work of wheat supply chain (Figure 1).

### 3.3. Conceptual Framework

The conceptual framework includes the supply of wheat from farmers to the consumer:

Fig: 1. Wheat Supply Chain



Source: Author's own Framework.

### 3.4. Econometric Model

The theoretical framework confirms us the way how the different channels of wheat producers in market for wheat supply chain meet. The econometric model which we will follow in our study depends on our dependent variable which elaborate that what method is best suitable. As our focus is on determinants of wheat supply chain which according to definition is a ratio variable. In case of dependent variable as ratio variable, Ordinary Least Square (OLS) is used for analysis. OLS is one of the simplest (if you can call it so) methods of linear regression. The goal of OLS is to closely "fit" a function with the data. It does so by minimizing the sum of squared errors from the data Ordinary least-squares (OLS) regression is one of the most popular statistical techniques used in the social sciences. It is used to predict values of a continuous response variable using one or more explanatory variables and can also identify the strength of the relationships.

Linear regression models are extremely useful and have a wide range of applications. The assumptions of OLS are extremely important, and one cannot just neglect them. Having said that, many times OLS assumptions will be violated. However, that should not stop a researcher from conducting his/her econometric test. Rather, when the assumption is violated, applying the correct fixes and then running the linear regression model should be the way out for a reliable econometric test. We will apply the OLS econometric technique for equation mentioned above for the sole purpose that our dependent variable is ratio variable therefore we will run regression by OLS.

To examine the determinants of Wheat Supply the following econometric model will be used;

$$QWP = \alpha_0 + \alpha_1 SFL + \alpha_2 MI + \alpha_3 FE + \alpha_4 LP + \alpha_5 EL + \alpha_6 LO + \alpha_7 AC + \alpha_8 DM + \alpha_9 IPI + \alpha_{10} AA + \epsilon$$

QWP = Quantity of Wheat Produced

SFL = Size of farm Land

MI = Access to Market Information

FE = Farmer Experience

LP = Lagged Price of farmer

EL = Education Level

LO = Land Ownership

AC = Access to Credit

DM = Distance to market

IPI = Improve Production Input

AA = Access to Arthi

€ = Error Term

### **3.5. Definition of Variables and References**

The variables defined in model needs some explanation which is given below'

#### **3.5.1. Dependent Variable**

**Quantity of wheat produced:** In the model stated above the dependent variable is Quantity of wheat produced which represents the amount of wheat actually supplied to the market by household in the year 2018 which is measured in maunds. In his study on the determinants of Quantity wheat supply Usman (2016) used quantity of wheat as dependent variable.

#### **3.5.2. Independent Variables**

The variables which are considered to affect wheat production in the study area are discussed as under

**Size of Farm (landholding):** The size of farm is a continuous variable which is measured in terms of hectares assigned to wheat and was anticipated to affect the wheat production by household positively (Ashenafi, 2010). Because, farmers who have more land have more tendency to produce, more than the farmers with less land and that's why they supply more to the market. Usman (2016), had found



out from his work that one unit when increased in terms of land allocated for production will increase 11.1qt supplied to the market, which makes it clear that there exist positive relationship between supply to the market and size of land.

**Access to Market Information:** The access to market information is a dummy variable which is measured with value 1 if market information is available to farmer and 0 otherwise. Muhammad (2011) clearly stated that the supply and availability of market information has a positive and significant relationship. Tadesse (2011) and Abraham (2013) in their separate studies about ginger and potatoes concluded that the supply increased positively when the farmer has market information. The positive relationship was explained by the fact that market decisions are made based on information about market, where markets not fully developed convey ambiguous price information, affecting the decision of farmers negatively and leading to inefficient product movement.

**Farmer Experience:** This variable is continuous and measured in number of years a person had involved in farming activities. The farmers with more experience produce more potato for marketing as compared to those who have less experience in farming Abraham (2013). Hence, study hypothesized that the farmers with more experience in farming activities influences the wheat production positively.

**Lagged Price:** This variable is also continuous and measured average annual price getting the former in previous year. This price is measured in Rs. per maund. Usman (2016) resulted in having positive relationship between supply to market and product price making the relationship positive between the two in such a way that the price in lag price will affect the production of wheat and thus marketable supply for current period. So it's considered that there is positive relationship between lagged price and wheat supply.

**Education Level:** This variable measured the number of years of schooling a farmer has. This study hypothesized that education may affect positively the wheat production. Ayelech, T. (2011) is examined that literacy has positive relationship with supply of mango marketed in Ethiopia. So it was

concluded that the education affects the decision making and hence better decisions leads to more production and more supply to market.

**Land Ownership:** This is a tricotomous dummy variable with 1 for owner, 2 for rented and 3 for rented+owner. It has been seen in studies that more the land one owns, the more will be production hence making it the positive and significant relationship between land ownership and wheat production. The cost of land owned will be less than land rented.

**Access to Credit:** It is a dummy variable and depending on loan consuming the farmers who took it will be given 1 and the farmers who don't take will be given 0. The increase in amount of loans are thought to initiate the production process and hence considerable increase supply, so it is considered to have positive and significant relationship with production of wheat. The work of Tadesse (2011) and Muhammed (2011) revealed that the production and supply of pepper and teff were increased with increase in amount of loans taken by farmers hence making it positive and significant relationship between the two variables.

**Distance to Market:** This variable is taken as continuous variable measured in km. it is thought to have negative and significant relationship between distance to market and production as the work of Berhanu and Moti (2010) defines it and the reasons provided were that the farmers residing near to markets will have more market information, less carriage costs and less spoilage costs. However different studies shows different results.

**Improve Production Input:** This a dummy variable. The farmers who used improved grains are given value of 1 and 0 otherwise. The usage of improved production inputs are thought to have positive and significant relationship with the production. The reason behind it is that the use of improved seeds and fertilizers produces more output on less area of land and hence increases the production.

**Access to Arthi:** This is a dummy variable with value 1 to the farmers who has access to Arthi and 0 to farmers who don't have access to Arthi. It has been hypnotized that the access to Arthi has positive

relationship with production because Arthi facilitates farmers with monetary units as well as counselling to the farmers who has access to it.

Independent variables which are present in model are discussed in Usman (2016). The variables such as size of farm, access to market information, farmer experience and lagged price positively and significantly affect the dependent variable Martey (2014). The independent variables such as education level, improved production inputs, land ownership, distance to market, access to credit has significant effect on dependent variable.

### **3.6. Data and Data Source**

The given section will highlight the proposed research methods that will be used for analyzing the obtained data. The nature of ongoing Research study is exploratory as well as descriptive in nature and it aims at discovering the role of middle man in wheat supply chain in the Arifwala, Pakpattan district of Punjab, Pakistan.

#### **3.6.1. Data**

In Social Science research the basic instruments used for collecting data are used documents, interviews, Observations and questioners. Three basic elements of underlying the techniques of qualitative research are asking, observing and reading. So this research uses interviewing method to collect reliable data based on designed question in the form of questioners. Data collection is based on filling up these prepared research questioners, which were designed to meet the requirements of research objectives. The study is based on primary information secured through informal interviews from target population and secondary data from food department Pakpattan and PASCO Lahore. The following procedure is used to build up a solid methodology.

### **3.7. Sources of Data**

The source from where the data is collected and the way to collect it is as follows:

### 3.7.1. Sample size and Sampling Tools/Techniques

Two stage stratified simple random sampling technique will be used for the study area of Dist. Pakpattan Punjab Pakistan due to author's residence and easy access to data from local communities related to study. District Pakpattan is chosen purposely to investigate the role of middle-man and determinants of wheat supply chain, because this area is highly productive in wheat production and remain in surplus. In this regard we use Two Stage Stratified Simple Random Sampling Technique. The first stage is Punjab and 2<sup>nd</sup> stage take into account district Pakpattan future more there are two tehsils of this district namely Arifwala and Pakpattan. In next step we will randomly chose villages as starts from these two tehsil, in addition to this we will randomly select samples from these chosen villages. There will be three main sources from whom we can collect the information related to our study i.e. Farmers, Arthi and Assembler. Due to high number of channels the study will follow a sampling technique approach by considering all the prescribed members as respondent. The sample size and sampling approach used are as follows.

#### 3.7.1.1. Farmer Sampling

The total number of farmers in Dist. Pakpattan is 1,823,687 (Government of Pakistan). Population of tehsil Pakpattan and tehsil Arifwala is 969,225 and 854,462 respectively. We have taken 12 villages form both tehsils as our strata and father we have taken 8 samples from each village. Over all we have taken a sample of 96 farmers to represent the total population of 12 villages which is 87,021 with a confidence interval of 10 and confidence level of 95 % (CRS, 2018).The formula used for sample calculation will be

$$SS = \frac{Z^2 * (P) * (1 - p)}{C^2}$$

Where

SS= Sample size

Z= Z value (e.g 1.96 for 95% confidence level)

P= Percentage picking a choice, expressed as decimal

C=confidence interval, expressed as decimal

**Table.3.3.Farmer Sample Size**

No	Name of Tehsil	Name of Villages	Total Population	Sample Size
1	Pakpattan	CHAK NO 29/S-P	4568	8
2		CHAK NO 20/S-P	6964	8
3		CHAK NO 17/S-P	6461	8
4		CHAK NO 37/S-P	19171	8
5		CHAK NO 32/S-P	5790	8
6		CHAK NO 19/S-P	8511	8
7	Arifwala	CHAK NO 151/E-B	5322	8
8		CHAK NO 167/E-B	5536	8
9		CHAK NO 143/E-B	6312	8
10		CHAK NO 71/E-B	6952	8
11		CHAK NO 147/E-B	7259	8
12		CHAK NO 161/E-B	4197	8
Total			87,021	96

Source: Population Census, 2017

### 3.7.1.2. Arthi Sampling

#### a) Kacha Arthi Sampling

The total number of Kacha Arthi present in the said area is 340. The sample calculated by the formula comes out to be 75 at a confidence level of 95% with a confidence interval of 10.

#### b) Pakka Arthi Sampling

The number of Pakka Arthi in Arifwala are 7 in total while in tehsil Pakpattan are 5 which makes it a total of 12 Pakka Arthi present in the region of our research.

### **3.7.1.2. Assembler Sampling**

The data of assembler will be secondary in nature and can be obtained from food department and PASSCO

- a) Food department: This data of assembler will be taken from department of food at district Pakpattan
- b) PASCO: This data of assembler will be taken from PASCO office Lahore.

## CHAPTER IV

### Result and Discussion

This section theoretical discuss about the characteristics of market actors role; how the wheat reached in market through different phases and also detail describe the market margin of wheat supply through graphically as well as tabulated form. Here it is also mentioned about the famer preferences regarding Arthi and lastly detailed discuss empirically regarding the determinants of wheat supply.

#### 4.1. Characteristics of Wheat in Supply Chain

The following factors contribute in the wheat supply process;

##### **Farmers**

Farmers are the main contributors in wheat production and its marketing as well as the supply of wheat supply stock to another factor in the economy. Farmers produce on the basis of land and resources available to them. In this study the farmers are divided according to the land they hold which includes the land they own as well as the land they take on rent or the land with ownership rented structure. The farmers who have less than 5 acres of land is categorized as small farmers. The farmers who produce on land between 5>10 acres are categorized into medium sized farmers and the farmers who produce on more than 10 acres of land are large sized farmers. In this study the small farmers are 24, medium sized farmers are 45 and large sized farmers are 27, all of which make total sample size of 96 respondents.

##### **Kacha Arthi**

The farmers produce and gets paid in return twice a year due to two cropping cycles every year. The Kacha Arthi acts as funding resource for a farmer at times when he needs money for cultivation process. This helps the farmers to grow wheat for the some future period. Kacha Arthi also facilitates the farmers after the harvesting period by providing the transportation for wheat crop to be sold and also bears the labor cost which will be on farmers if farmers had to sell it to some other entities such as government. By providing labor to load and unload the wheat stock, the farmers has considerable

decrease in cost which increases their profit. The Kacha Arthi gets his commission from sale of crop from which he gets his profit and leaves the remaining for the farmers to fulfill their needs.

### **Pakka Arthi**

The wheat stock after Kacha Arthi reaches to another step in supply process which is called Pakka Arthi. Pakka Arthi buys the wheat stock from Kacha Arthi. It has no direct link with farmers. The stock which Pakka Arthi buys is either stored to be sold at some future date or sold directly to the mills or industries which needs wheat. The wheat stored is sold to traders as well as exported to generate revenues. The amount of Pakka Arthi used in this study are 15 in district Pakpattan the respondents only sell their wheat stock to mills in the observed area.

### **Assembler**

The assembler are the actors in supply chain which is used by government to buy wheat from farmers. There are two types of assemblers in district Pakpattan i-e food department and PASSCO. The farmers have a choice to sell their wheat produced to either Kacha Arthi or food department or PASSCO. The data has been collected from main office of food department at district Pakpattan which works under the provincial government body. The data of PASSCO has been collected from its main office at Lahore which works under the federal government body. The wheat stock from PASSCO is then exported by the amount of 0.4% of total production to the SAARC countries. One million ton of wheat is stored by PAASCO as a reserve. The remaining stock is then supplied further on the notification of ministry of food security to different sectors like defense and provinces.

### **Millers**

The mills buy wheat stock from two sources. Mills will either buy from Pakka Arthi based on the mutual dealings while mills also buy from food department of provincial government in the amount decided by the criteria set for them by the government. The criteria requires the mills to buy the amount which their machines can convert from wheat to flour in a single day.



## **Wholesaler**

The wholesaler gets their input product from two sources which includes mills and provincial food department. The mills when get wheat stock from food department and Pakka Arthi converts it into flour and provides it to the wholesaler. The food department supplies their wheat stock directly to the wholesalers to be processed further on.

## **Retailers**

The retailers acts at the last stage of supply process where they buy the wheat from wholesalers and sell it to final consumers for consumption needs. The retailers due to their lower financial status works on a minor scale and helps in buying, transportation, storing and selling of wheat to the final consumers.

## **Consumers**

The consumers are the end users of the final product of wheat. The consumers either get their wheat in the form of flour from the retailers which has already passed through all the channels of supply of wheat or the consumers can directly buy their wheat from the farmers on small scale.

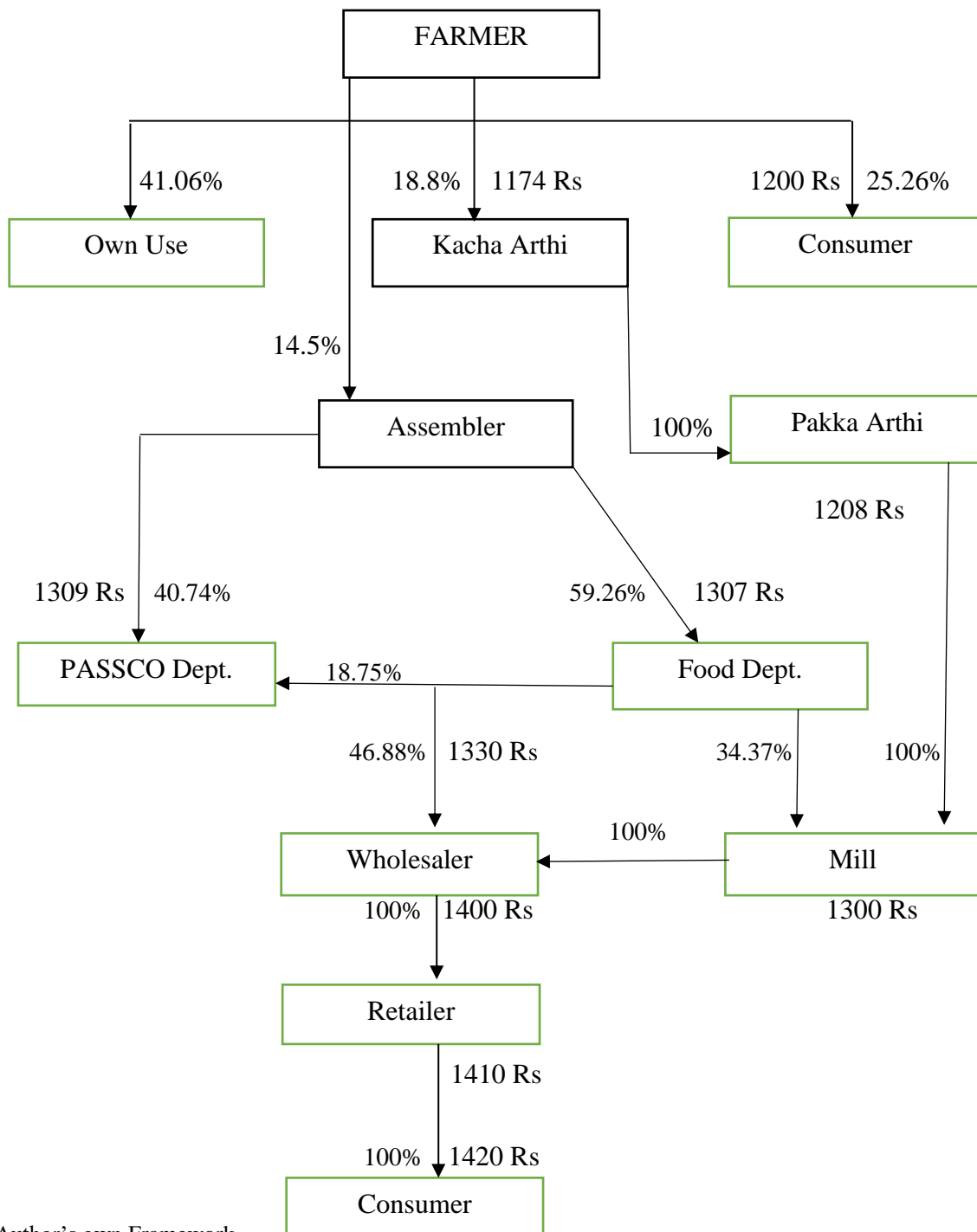
### **4.1.1. Marketing Channels**

The farmers produce their wheat store it for personal consumption. The surplus amount of wheat the farmers produced are sold further in the markets to the consumers or to the Kacha Arthi. If the farmers are selling their wheat stock to the government then the farmers in tehsil Arifwala will sell their wheat to local food department and the farmers from tehsil Pakpattan will sell it to the PAASCO department.

In this study the farmer's uses 41.06% of wheat for personal needs, 18.8% of the wheat stock is sold in the markets to Kacha Arthi while 25.26% amount of wheat has been sold directly to the final consumers. The wheat in amount 14.5% has been supplied to the assembler in our study area. The Kacha Arthi which further provides 100% of its stock to the Pakka Arthi and Pakka Arthi provided 100% of its wheat stock to mills where mills provided 100% of wheat stock to wholesaler. The wheat stock at assembler points has been further distributed in the way that 59.26% has been provided to

food department and 40.74% has been provided to PASSCO. Food department furthers the supply of wheat by amount of 34.37% to mills association and 46.88% of wheat stock to the wholesaler and 18.75% has been provided to the PASSCO. The wholesaler after getting its stock from mills and food department supplies its 100% stock to the retailers whereas retailers provides its 100% stock to the final consumers.

**Fig: 2 Market Margin and Channel**



Source: Author's own Framework

#### **4.1.2 Market Margin**

The term marketing margin can be defined as the two market levels price difference. The difference between equivalent quantity, quality and producer prices is called market margin. Further the difference of price between producer and wholesaler can also be termed as marketing margin. Spencer (1971) explained that the difference in price between wholesaler and retailer are also called marketing margin. The margin mainly covers the total amount of costs that occur in transferring the product from one step to another step in the marketing channel. The cost involved in providing the marketing services can be said to be marketing margin.

The marketing margin in this study can be analyzed based on average sale price per maunds of marketing agents such as consumer, Kacha Arthi, Pakka Arthi, assembler, mills, wholesaler and retailer.

In above figure 2 discuss about market margin and channel of wheat supply chain from farmer to consumer.

The farmer when sells directly to consumer at the price of 1200 Rs. per maunds with cost of production estimated to be 500 Rs. In cost of production includes cost of labor, fertilizer and thresher. The farmers when sells it to Kacha Arthi at the price of 1174 Rs. per maunds with cost of 550 Rs. This extra 50 Rs. defines the transportation cost in this case. Further if Kacha Arthi sells this product to Pakka Arthi at price of 1208 Rs. The difference between 1174 and 1208 is the commission charged by the Kacha Arthi. The commission charged by Kacha Arthi approximately 34 Rs. in which includes its(Labour cost, Loading & unloading cost, Transportation cost) cost of 12 Rs. per maund which makes Kacha Arthi's profit to be 22 Rs. per maund. Pakka Arthi purchased product on 1208 Rs and sell product to mills on a price of 1300 Rs. per maund which includes its estimated cost to be 40 Rs. and 52 Rs. profit. The farmers when sells wheat to assembler, he sells it to either food department or PASSCO. If he sells it to PASSCO then the price per maund he charges is 1309 Rs. per maund with cost calculated to be 560 Rs. The difference between 1309 Rs. and 560 Rs. is farmer's profit. If farmer sells it to food

department then he sells it at the price of 1307 Rs. per maund with cost of 560 Rs. the difference between which makes the profit of farmer. The food department then sells their product to mills at the price of 1300 Rs. per maund where the extra cost of 7 Rs. is bear by the government by giving subsidy in this case.

When mills receive the product from either food department or Pakka Arthi converts the wheat into flour and sells it to wholesaler at a price of 1400 Rs. per maund with the transportation cost of 20 Rs. at the time of buying from food department. Other costs including cost of converting wheat into flour, the cost of electricity and labor are estimated to be 60 Rs. on average per maund making the cost of 1380 Rs. of flour to the mill. Another cost which is beard by mills are the transportation cost of flour to the wholesaler which is approximately 10 Rs. per maund. The wholesaler sells flour at the price of 1410 Rs. per maund with the cost of 1400 Rs. per maund making its profit to be 10 Rs. per maund on average. The retailer sells the flour to the final consumer at the price of 1420 Rs. which retailer bought at the price of 1410 Rs. per maund making 10 Rs. per maund as retailer's profit.

Furthermore, below table specifically discuss about the market margin per maund from Kacha Arthi to retailer in wheat supply chain.

**Table.4.1: Market Margin**

<b>Trader</b>	<b>Kacha Arthi</b>	<b>Pakka Arthi</b>	<b>Mill</b>	<b>Wholesalers</b>	<b>Retailers</b>
<b>Purchasing Price</b>	1174	1208	1300	1400	1410
<b>Labor Cost</b>	5	5	7		
<b>Loading &amp; Unloading</b>	5	5	10		
<b>Transportation Cost</b>		20	20		
<b>Other Cost</b>	2	5	15	2	2
<b>Selling Price</b>	1208	1300	1400	1410	1420
<b>Market Margin</b>	34	92	100	10	10
<b>Net Profit</b>	22	52	48	8	8

Source: Own survey

## **4.2. Investigating Farmer's Preference Regarding Arthi**

In our study we observed that the trend in our study area is that farmers prefer only Arthi. The reason for it was observed that the loan which Arthi provides also can be divided into three parts i-e loan on cash, loan in form of fertilizers or loan in cash and fertilizers. Our study results showed that the Arthis in our study area doesn't provide loan in form of cash. They provided either loan in the form of fertilizers or fertilizers and cash both but never did dealings in cash alone. The reason behind farmers preferring Arthi's was that there were no preconditions when the loan was required as compared to banks where the banks demanded collateral in the form of land or gold or property of some sort.

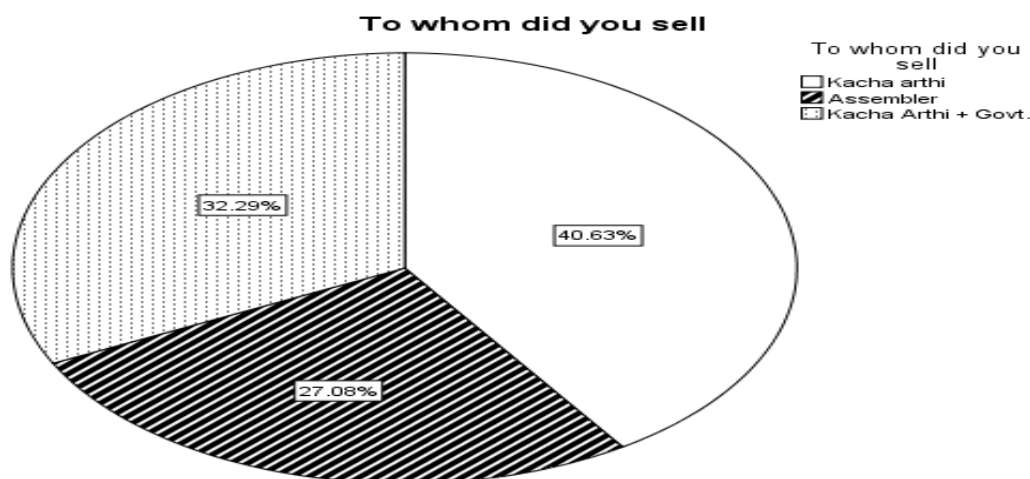
Second reason which made farmers choose Arthi's was that the procedure for taking loans was time consuming as banks needed to check the credentials of the farmers before they issue them the required funding as the policy of banks to stay on safe side. Arthi's provided loans without checking any credentials of farmers which made them popular source of funding for reaching out by farmers and the findings of the study suggest that 64% of our respondent who have access to credit get their credit from Arthi while 36% of respondents denied to have access or need of credit facility.

One question which arise was how the Arthi's recovered their loans in case of default on part of farmers. The study area when investigated revealed that if the farmers has some natural catastrophe due to which they were unable to give back their loans then Arthi's would give them extra time in which the farmers had to pay back their loans. There were no confiscation of land or police FIR's in order to recover the loan which was seen as a positive point which made Arthi's a reliable source of loan for farmers.

The loans were then adjusted in the next cultivation process. The loans provided by Arthi's were free of interest as compared to banks which charge high rates of interest. The Arthi's get their benefits from the commission they charge when the same farmers want to sell their wheat in the market which happens in almost every case because it is costly and less beneficial to sell their products to

government. Arthi's provide loans to farmers whom they personally know or to farmers who have a guarantor of some sort or to farmers with comparably good history of paying back loans or on personal references after carefully doing their crop assessment. The amount of credit needs is investigated by previous history, area on which crops will be cultivated, by income level and by crop assessment. The loans provided are only for farming purposes and no personal consumption, development purposes like land purchasing etc. extra loan is provided on limited amount only in case of emergency of some sort on special requests by farmers.

**Fig 3: Farmers preference to sell Wheat in Market**



From the above diagram it can be seen that the farmers were found to sell 40% to the Kacha Arthi, 27% to the assembler i-e government and 31% government and Kacha Arthi both. The only reason for farmers to choose government for selling their products is the rate which government agrees to buy, whereas the farmers have plenty of other reasons for not selling their wheat to government. The government doesn't buy wheat from every farmer. Their criteria of buying is that government buys only from those farmers whom they provide bardanas. Bardana is the packing of wheat. If it is in form of bori then the amount will be 8 boris per acre will be provided which it can be in form of thelas which will be provide in amount of 16 thelas per acre. One bori will have 100 kgs of wheat while one thela will contain 50 kgs of wheat. The maximum amount of wheat which government will

buy from a single farmer will be 200 boris or 400 thelas depending on the amount of measuring wheat.

The selling procedure of selling wheat to government has some complications like farmers willing to sell less than 500 boris to government will have the personal reference of guzzetted officer or lambardar of the region where he can take the money directly from bank while those farmers who are willing to sell their wheat to government with more than 50 boris must go through call deposit process and cannot take their money directly from bank. The government institutes like food department provide 7rs and PASCO provide 9rs per bori for costs like transportation cost, loading and unloading cost and labor cost which is very low and less beneficial to local farmers. Another difficulty which farmers go through is that the governments wants farmers to have kanta of their own which costs them from 12000rs to 17000rs and the patta which costs from 12000rs to 15000rs which is another drawback of selling to government.

Sahiwal division is considered surplus in producing the wheat where the average wheat produced on one acre land is 40 maund while the government purchases only 20 maund per acre so farmers are forced to sell it in market. The government policies make it hard for farmers to sell it to the government and those who do sell their wheat to government are involved in some sort of corruption for the sake of their benefit which would not be possible if sold on fair basis as per rules defined by government. The amount of wheat sold to government more than 20 maund gives a clear picture of the dark side of our society which includes corruption on larger scale making the country's economy go down and making farmers continue their trend of taking help from Arthi for their various needs.

### **4.3. Determinants of Wheat Supply**

Results of descriptive statistic Table 4.2 demonstrate that people with holding land which start from minimum 2 acres to maximum 24 acres. The mean land occupied by farmer was calculated 9.229 acre. Another important factor that highlights the determinants of wheat supply is the experience of farmers



because this make the farmers able to predict and forecast nature of weather and crops. The findings of study shows that the respondent farmers have average experience of 16.6256 years .The minimum production per acre in this study is 30 maund and the maximum production per acre has been recorded 50 maund. The minimum education of farmers recoded in the study is 5 years and maximum education is 14 years. The distance of field from market plays an important role because it leads to higher cost if the field is situated away from market. The average distance of farms from market has been recorded 8.28 km. Total 96 respondents have been interviewed out of which 65 respondents showed that they have sold out their output to private business sector while 31 respondents have dealt with government by selling their output 1250 Rs.

The below table gives a quick look of the frequency distribution of land holding size, farming experience, yield per acre, education level

**Table.4.2: Descriptive Statistics of Variable**

<b>Name of Variables</b>	<b>Minimum</b>	<b>Maximum</b>	<b>Mean</b>	<b>Std. Deviation</b>
<b>Size of Holding</b>	2.00	24.00	9.2292	4.76275
<b>Farming Experiences</b>	10.00	35.00	18.6250	5.00789
<b>Yield Per Acre</b>	30.00	50.00	43.7500	4.70162
<b>Education Level of Farmer</b>	5.00	14.00	10.1562	2.30481
<b>Distance to Mkt. in Km</b>	4	15.00	8.2813	3.19112
<b>Past Price of Other then Govt.</b>	1100.00	1200.00	1105	13.12706

As explained in Table 4.3 there were 3 types of cultivated land holder i.e. owner, renter and owner + renter. There were total 96 respondents out of which the owners contribute to 56 in numbers while there were 25 respondents who had land taken on rent while 15 respondents were of owner + renter type. The percentage of owner was 58.3%, rented is 26% and owner + renter is 15.6%. The cumulative Frequency of owner is 58.3%, rented was 84.4% and owner + renter is 100%.

**Table.4.3: Type of Cultivated Land**

	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>Owner</b>	56	58.3	58.3
	<b>Renter</b>	25	26.0	84.4
	<b>Owner + Renter</b>	15	15.6	100.0
	<b>Total</b>	96	100.0	100.0

Thirty four respondents in total of 96 sample size as mentioned in Table 4.4 did not opt for credit making it 35.4 % of total. The reason is that they had access of own funding to be used for cultivation process while 62 respondents took credit for production process making it 64.6 % of total. The cumulative percentage of farmers who do not take credit is 35.4 % while those who take credit is 100%. The farmers who took loans were purely from Arthi and no other source.

**Table.4.4: Access to Credit**

	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>No</b>	34	35.4	35.4
	<b>Yes</b>	62	64.6	100.0
	<b>Total</b>	96	100.0	100.0

The Table 4.5 explains that there were 14 respondents of total 96 sample size had no access to market information about prices making it 14.6% of total population. While 82 respondents had access to market information making it 85.4% of total. The cumulative frequency of farmers with access to market information is 14.6 % while the farmers who had no access to market information was calculated to have a cumulative frequency of 100%.

**Table.4.5: Market Information**

	Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>No</b>	14	14.6	14.6
	<b>Yes</b>	82	85.4	100.0
	<b>Total</b>	96	100.0	100.0

The total sample of farmers in table 4.6 used different variety of seeds. 79 respondents of the total 96 sample size used improved seeds that's why the production of our Study area is higher than normal. Another reason for high production is fertility of land of the said area. Only 17 respondents used local seeds. 82.3 % used improved seeds while 17.7 % used local seeds. The minimum production of this fertile land was calculated to be 30 maunds despite the fact that the farmers used local seeds.

**Table.4.6: Type of Seed**

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>Improved Seed</b>	79	82.3	82.3	82.3
	<b>Local seed</b>	17	17.7	17.7	100.0
	<b>Total</b>	96	100.0	100.0	

Thirty four respondents in total of 96 sample size as mentioned in Table 4.7 did not opt for access to arthi it 35.4 % of total. The reason is that they had access of own funding to be used for cultivation process while 62 respondents took credit by arthi for production process making it 64.6 % of total. The cumulative percentage of farmers who do not access to arthi is 35.4 % while those who take credit is 100%. The farmers who took loans were purely from Arthi and no other source.

**Table.4.7: Access to Arthi**

		Frequency	Percent	Valid Percent	Cumulative Percent
<b>Valid</b>	<b>No</b>	34	35.4	35.4	35.4
	<b>Yes</b>	62	64.6	64.6	100.0
	<b>Total</b>	96	100.0	100.0	

#### **4.3.1. Reliability Analysis of the Data**

Before processing analysis of the econometric model, it is important to highlight the reliability and validity of collected data because many of the authors are of the view that Econometric estimations of Primary data collected from different respondents have heterogeneous outcomes, and without knowing the nature of data and associated problem the estimation could cause bias or insignificant results. Therefore to see the reliability of collected data we will rely on Cronbach's Alpha value, which is suggested (Ryan and Khan 1993) to check the reliability of collected data and conclude that any

primary data whose Cronbach's alpha is always greater than 0.50 to be depended on reliable and valid data, any value lower than 0.50, in primary data may cause invalid or biased result. The findings of Cronbach's Alpha for the ongoing study is given in table 4.7. The result indicates that the current data is reliable about 72.9%. Therefore we can conclude and proceed to the econometric estimations by arguing that the ongoing data analysis is reliable and valid for econometric estimation.

**Table.4.7: Reliability Statistics**

Cronbach's Alpha	N of Items
.729	9

#### 4.3.2. Estimation of Econometric Model

Table 4.7 is the table which clarifies the result we got through linear regression model. It explains the variable and their behavior. The size of holding which is independent variable when increased 1 unit will increase the yield per acre to .412 units which is our dependent variable making it significant and positive relationship as expected in studies of Usman, S (2016) and Ashenafi Amare, (2010) the reason behind it was explained as the more land one holds, the more that person has resources and the more one manages. It was found to be significant at level 1%.

The farming experience positively and significantly affect the yield per acre because the more farmer has experience the more yield per acre will have production. The farmer experience was found to have significant at level 10%. It can also be seen from previous research work of Abraham (2013). As the experience decreases the yield per acre also decreases.

The access to credit in our study area was found to have positive and significant relationship with our dependent variable yield per acre. The production needs credit needs. The farmers who have more access to credit will have more production as can be seen from literature such as Alemnewu (2010) and Muhammed (2011). The independent variable is found to be significant at level 10 %.

The education level of cultivators positively and significantly affect the yield per acre of production. The independent variable education level was found to be at 1 % significant. It is highly significant due to the fact that with more education comes the knowledge to understand farming more and thus have more capability of producing than farmers with less or no education as can be seen from previous literature discussed by Ayelech (2011).

The past price of other than government significantly and positively affect the dependent variable yield per acre of production. The significance level was at 5%. It was significant due to the fact that the past prices act as signal to current market conditions and enable the farmers to work well on production for higher profit as can be seen from the study of Usman (2016).

The improved seed quality affects positively and significantly the yield per acre of production. It is highly significant at level 1%. The reason for it is that 75% of people in Pakpattan Punjab uses improved quality seeds and have more production as compared to farmers who used low quality seeds. The literature also defends our result as can be seen from work of Ashenafi (2010).

The access to arthi affect positively and significantly the yield per acre of production. It is highly significant at level 1%. The study statistics show that the farmer who are benefiting easy access to arthi facility 1.096 unit higher production as compare to those who are not getting the arthi facility.

The R square of the study was .650 and the adjusted R square which shows how much an independent variable explains the dependent variable has a value of 0.541 which makes it clear in case of primary data that the model applied was appropriate in this case.

**Table.4.8: Result of OLS Model**

Model	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	29.899	33.663	.888	.378
Size of Holding	.412	.118	3.504	.001
Type of cultivated land	-.032	.612	-.052	.959
Farming Experience	.159	.085	1.871	.064
Access to credit	.972	.524	1.855	.069
Education level of farmer	1.061	.225	4.708	.000
Distance to market in Km	-.244	.148	-1.646	.105
Market information	.171	1.106	.155	.878
Past Price of Other then Govt	.071	.030	2.367	.020
Improved input seed	5.438	1.409	3.860	.000
Access to Arthi	1.096	.221	4.962	.000

a. Dependent Variable: Yield per Acre

*Model Summary<sup>b</sup>*

Model	R	Change Statistics								
		R Square	Adjusted R Square	Std.Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change	Durbin-Watson
1	.778a	.605	.541	3.04729	.605	1.635	9	55	.000	1.635

a. Predictors: (Constant), which type of Seed you use, Farming Experiences, Size of Holding, Past Price Other than Govt., Type of Cultivated Land, Market Information, Distance to Market in Km, Access to Credit, Education level of Farmer.

b. Dependent Variable: Yield per Acre

## CHAPTER V

### Summary, Conclusion and Recommendation

This section describes the whole findings of this study into a brief summary followed by concluding remarks and finally the policy recommendation which aims at providing the results of this study to be used for improvement of the economy.

#### 5.1. Summary

The role of middleman was found more positively and very much less negatively in supply of wheat. The negative role was relatively less as compared to positive role. By negative role, we mean that the government procurement prices i-e support prices are higher than the prices prevailing in market by Arthi. Yet another reason is that the Pakka Arthi only sell to mills and no government entities. Overall it was found that the positive relationship exist and prevail as compared to negative role. Farmers also prefer to sell their products to middleman as compared to government, the reason for which can be explained by the fact that when farmers need credit for cultivation, the middleman provides it and when the time of sale comes the middleman facilitates farmers as compared to government who sell it to farmers to whom it provides bardana.

Middleman also compensate the farmers in case of natural disaster's loss as compared to banks who do not do it. Also middleman takes no collateral as compared to banks and those only deals on the basis of personal knowing and credit worthiness of farmers by knowing his past record of paying. in case of natural disaster and resulting destruction of crop, the farmer is not able to deliver the product and deliver the product to Arthi who have an advance. This results in Arthi faces the loss equal to the commission he was expecting to earn from selling that product. The conclusion becomes non recoverable in the year of disaster and its adjustment is usually covered to the next year. Because of all these reasons and by watching facts such as a farmer sells 58.8 % of its production as seen by our study and 44.07 % production among that 58.8% production was sold to other than government

entities. So farmers with mean experience of 15 years and with a mean education of 10 years still prefer middleman makes it clear that there are flaws existing in current government department procedures regarding buying of wheat from farmers as can be seen from general trend of farmers preference towards middleman over government which fulfills our first objective of finding the preference of farmer relating middleman.

The second objective relating the market channels can be seen from this study shows that there is positive role of middleman in wheat supply chain. The market margin results show that the highest market margin in this study is of mills which is Rs 100 per maund. Next in the row comes the market margin of Pakka Arthi which is Rs 92 per maund. Then comes the market margin of Kacha Arthi which is calculated to be Rs 34 per maund. The lowest market margins have been recorded of variables wholesaler and retailer which is Rs 10 per maund each. The highest net profit is shown by Pakka Arthi followed by mills, Kacha Arthi, wholesaler and retailer.

The conclusion of this can be explained as size of land holding, farming experience, access to credit, education level, past price of other than government, improved Input seeds which were having significant results with the dependent variable. All of the above mentioned variables had positive relationship with the dependent variable yield per acre of production. So we can say that the relationship of our independent variable with the dependent variable yield per acre of production when seen in our study area i-e Pakpattan Punjab Pakistan, have same type of positive relationship as was explained in research works done before. This shades a light on the third objective of our study.

## **5.2. Conclusion**

The study is concluded by finding the results of the middleman relationship with farmer which is positive and strongly significant. This can be explained by the fact that middleman fetches the farmer by providing different services like providing fertilizers, loans, labor and transportation etc.,.The negative impact is almost negligible which is explained through lower prices which middleman charge



over their services. These findings concludes that the more investor has invested the more profit he gains i-e there is strong causality between the investment and profit. Quantity of wheats produced has shown to have positive and significant relationship with size of holding, farming experience, access to credit, education level of farmer, past price other than government, improved input seeds. and access to arthi.

### **5.3. Recommendations**

- The middleman plays positive role as can be seen from the study conducted in Pakpattan Punjab. The low government preference by farmers can be minimized by such policies oriented around farmers which helps farmers at time of cultivation and later on when farmers want to sell their stock unlike current conditions put by the government to buy wheat only from selected farmers.
- The government should increase the amount of giving bardanas to the region with more production than what current amount of bardanas couldn't absorb. For the problem of higher price paid by the government to farmers and the higher gap between price paid by Arthis and price paid by government can be reduced only if government makes such a policy that there exist open bardana system where everyone can sell their production portion to the government. Such act will increase competition and there will be less gap left between prices of government and Arthis. PASSCO pays 9rs and food department pays 7rs for helping the farmers to cover the labor cost, loading and unloading cost etc which is very low. The government should make their own transport system at the time of buying wheat from small sized farmers.

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**Appendix**  
**Questionnaire for Arthi**

**Part I: Demographic Information**

Name: \_\_\_\_\_ Village (Tehsil): \_\_\_\_\_  
Education: \_\_\_\_\_ Cell Number: \_\_\_\_\_

Characteristics of Arthi (For Interviewer's Reference Only)

Main Crop: Wheat                      Type: Kacha – Pakka                      Size: Small - Medium - Large

**Section I: Business Profile and Environment**

**1. How long have you worked as an Arthi?**

- (a) Less than 5 years
- (b) 5 -10 years
- (c) 10 -15 years
- (d) 15 -20 years
- (e) More than 20 years

**2. What is the form of your business?**

- (a) Sole proprietor
- (b) Partnership
- (c) Private company

**3. Business Type**

- (a) Commission Agent
- (b) Stockiest
- (c) Both

**4. How did you enter this business?**

- (a) New establishment
- (b) Inheritance / Family Business

**5. Who are your target group clientele?**

- (a) Small farmer
- (b) Medium Size farmer
- (c) Large farmer

**6. How many farmers are you dealing with?**

- (a) Less than 40 farmers
- (b) 40 -60 farmers
- (c) 60- 80 farmers
- (d) More than 80 farmers

**7. What other businesses do you have?**

- (a) Farming
- (b) Fertilizer and pesticide dealership
- (c) Seed company
- (d) Machinery renting (tractor, harvester, thresher, laser land leveler)
- (e) Stockiest
- (f) Other \_\_\_\_\_

**8. What are your sources of financing?**

- (a) Self Capital
- (b) Friends and family
- (c) Farmers savings
- (d) MFIs / banks (at what interest rate?)
- (e) Private money lenders (at what interest rate?)
- (f) Individual investors

**9. Was it easy to get finance from the bank?**

- (a) Yes (b) No

**10. Do you deal with more than one bank at a time?**

**11. If you have borrowed from banks, how much and at what margin?**

**12. If you borrow from banks/private money lenders, please state form of collateral you Provided**

- (a) House
- (b) Agriculture land
- (c) Shop
- (d) Plot
- (e) Other \_\_\_\_\_

**13. What problems have you encountered in accessing finance?**

- (a) Lengthy and cumbersome process
- (b) Lack of information
- (c) Lack of appropriate capital
- (d) Other

**14. Do you think it would be a good idea for Arthis to join hands with banks to fulfill the Credit needs of farmers? (Explain them NIBAF model)**

**15. Describe how government policies affect your business.**

- (a) Taxes
- (b) Market committee regulations
- (c) Market fee
- (d) Commission

**16. What is the role of the Anjuman-e-Arthiyan?**

- (a) Commission fixation
- (b) Dispute settlement between Arthis
- (c) Helping in recovery of default loans



(d) Other \_\_\_\_\_

**17. Describe relations and interactions with other Arthis.**

- (a) Friendly
- (b) Competitive

**18. Business Potential:**

(a) Have you ever attended any training on farm activities to improve your own knowledge?  
Y/N

(b) Do you look for ways to expand your business (by offering other services, or entering a new market, or partnering with another service provider) or are you content with what you have? Y/N

(c) Do you look out for new technology and new agricultural practices to share with your clients? Y/N

(d) Have you ever experimented with any different technique of farming? Y/N

**Section II: Financial Services**

**1. When providing credit, how do you select the farmer?**

- (a) Know him from before
- (b) Background check (how?)
- (c) Guarantor
- (d) Personal reference

**2. How do you assess the farmer's credit needs?**

- (a) Previous history
- (b) Area under crop
- (c) Income level
- (d) Crop assessment

**3. What purpose do you lend for?**

- (a) Farming activities
- (b) Personal consumption
- (c) Development purposes (purchase of land asset, tractor, tubewells installation etc.)
- (d) Other \_\_\_\_\_

**4. Do you provide credit in cash or in kind?**

- (a) In kind
- (b) Cash

**5. Factors affecting the Size of the loan.**

- (a) Land holding
- (b) Crop under harvest

- (c) Personal relationship
- (d) Repaying capacity
- (e) Collateral

**6. Loan amount**

- (a) Rs.10000 - 30000
- (b) Rs.30000-60000
- (c) Rs.60000-100000
- (d) Rs.100000-150000
- (e) Other\_\_\_\_\_

**7. Does interest vary across different borrowers? If yes, on what basis do you decide?**

**8. Do you need any collateral when you lend? If yes, what type?**

- (a) Land (Passbook)
- (b) Livestock
- (c) Postdated Cheque
- (d) Crop output
- (e) Guarantor

**9. How much time you take to disburse the loan?**

- (a) At the spot
- (b) 7-10 days
- (c) 10-15 days

**10. What is the term of your credit?**

- (a) One crop cycle
- (b) Two crop cycles
- (c) Three months
- (d) Six month
- (e) One year

**12. Credit repayment schedule**

- (a) Lump sum
- (b) Installments
- (c) Output sold at harvest

**13. Do you monitor the farmer once you have given him a loan?**

- (a) Yes
- (b) No
- (c) Sometimes

**14. How do you monitor the farmer once he takes the loan**

- (a) Personal visits,
- (b) Through the Beopari
- (c) Through the extension agent
- (d) ICT technology
- (e) Through the representatives of pesticide and seed companies

**15. If farmer default then how does you manage loan recovery?**

- (a) Sale of Produce

- (b) Take livestock in possession
- (c) From collateral
- (d) From guarantor
- (e) Roll over loan to next crop cycle
- (f) Police action
- (g) Pressure from Arjuman-e-Arthiyan

**16. Have you interlocked credit with sale of crop output at your shop?**

- (a) Yes
- (b) No

**17. If yes, then what is the sale price of the output?**

- (c) Market Price
- (d) Below market price (how much lower)?

**18. What is the mechanism of output price setting?**

- (a) Open Auction
- (b) Simple negotiation between seller and Arthi
- (c) Price set by Arthi.

**19. In case of open auction how the base price is set?**

- (a) Set by the Arthi
- (b) Set by the market committee
- (c) Set by the big buyers
- (d) Set in accordance of international prices

**20. Are there incidents where a farmer breaks this binding?**

- (a) Frequently
- (b) Sometimes
- (c) Rarely
- (d) Never

**21. If farmer sells his crop output to some other Arthies, then how you recover your loan amount?**

- (a) From that Arthi
- (b) Through Anjuman-e-Arthian
- (c) Any other way
- (d) It is not possible to recover the loan

**22. What percentage of loans do you NOT recover?**

- (a) 1-5 %
- (b) 5-10%
- (c) 10-15%
- (d) Other\_\_\_\_\_

**Section III: Non-Financial Services**

**1. Are your operations restricted as commission agent and money lending or do you provide some additional social services to the farmer?**

- (a) Helping with children's school fees,
- (b) Medical expenses
- (c) Settling disputes
- (d) Emergencies
- (e) Any other social service

**2. Do you provide any of the following advisory services to farmers?**

- (a) Land leveling, soil testing, planting time etc
- (b) Varieties to be planted
- (c) Better management practices
- (d) Integrated pest management
- (e) Crop related particular trainings
- (f) Extension material (booklets, brochures, instruction material)
- (g) Other \_\_\_\_\_

**3. Do you provide any of the following facilities to farmers?**

- (a) Supplying seeds, pesticides, fertilizers etc. (self/dealer)
- (b) Procuring at farmers' door steps (self/through beopari)
- (c) Storage
- (d) Transportation

**Section IV: Income of the Arthi**

1. How much you have invested in this business at present? \_\_\_\_\_ (RS.)

2. How much you have advanced in cash to farmers at present?

(a) Crop \_\_\_\_\_ (b) amount \_\_\_\_\_ (RS.)

No	Loan Size	Interest	Term	Notes
1	(e.g. 1 lac)	(e.g.4%)		
2	(e.g. 3 lac)	(e.g.6%)		
3				
<b>Total</b>				

3. How much you have advanced in kind (value) to farmers at present?

a) Crop \_\_\_\_\_ b) amount \_\_\_\_\_ (RS.)

No.	Item	Actual Cost	Price (Rate at which	Premium	Term

		(Price at which Arthi buys)	Arthi sells to the farmer)		
1.	Seeds				
2.	Fertilizer				
3.	Pesticides				
4.	Other				

**4. Indicate your average cost incurred per 40kg for wheat in trading process?**

No.	Marketing Cost	Amount (RS.)
1.	Purchased Price of Grain	
2.	Labour employed to fill the sack and stitch	
3.	Loading	
4.	Unloading	
5.	Transportation Cost	
6.	Storage Cost	
7.	Wage for permanent employee	
8.	Electricity	
9.	Telephone expense	
10.	Personal travel & other expense	
11.	Bardana per bag	
12.	Other Expenses	
	Total Cost	

**5. To whom did you sell?**

- (a) Direct to consumers
- (b) Kacha Arthi
- (c) Paka Arthi
- (d) Assemblers
- (f) Mill
- (e) Other\_\_\_\_\_

**6. What is the selling Price of wheat per 40 Kg.?**

## Questionnaire for Farmer

### Part I: Personal Information

Name:		Gender	1) Male	2) Female
Village:		Tehsil:		

### Section II: Farming Practices

Q.1: What is the size of your holding? (Acres)

Q.2: Which type is the cultivated Land? (Acre)

(a) Owner (b) Rented (c) Owner + Rented

Q.3: If rented, from whom you rent it?

Q.4: How many years have you been farming?

Q.5: What was your wheat yield per acre in 2018?

Q.6: What is your education level?

Q.7: What is the highest education level in your household?

Q.8: Do you have access to Credit?

(a) Yes (b) No

Q.9: If “Yes”, from where did you get the credit service?

(a) Arthi (b) Bank/ Name (c) Relative (d) Other Specific

Q.10: If “Yes”, what was the form of credit?

(a) Cash (b) Fertilizer (c) Other Specific

Q.11: If answer 8 is “No”, than what was the reason for not choosing credit?

(a) No Need (b) Interest (c) High Interest (d) Lack of Collateral

(e) Fear of inability to repay (f) No Service (g) other

Q.12: What was the precondition to get credit?

(a) Social Collateral (b) Land Holding (c) Gold (d) Property (e) Other

Q.13: Do you have any problem getting credit? (a) Yes (b) No

Q.14: If “Yes”, what is the nature of your problem?

(a) Few Supply (b) Inadequacy of credit (c) No Diversification (d) Collateral

(e) Absence of Informal Institution (f) Other Specific

Market Information:

Q.15: Do you get any market information before supplying your product to market?

(a) Yes (b) No

Q.16: If “Yes”, than how from the following, choose “Yes” or “No”

Source category	Source list	1) Yes 2) No
Personal/professional Networks	Arthi	
	Friends/neighbors	
	Government Agents	
	Others (specify)	
Public information System	Television	
	Radio	
	Internet	
	From market bulletin	
	Other (specify	

Q.18: What is the distance between your field to market in Km?

Q.19: Do you take Bardana for grain parking? Yes=1, No=2.

Q. If no then move to next section.

Q. If yes than from which source?

(a) Private market (b) government (c) Arthi (d) Another (Specify)

Q. If yes than who many bardana you take? \_\_\_\_\_

Q.20. does any cost is associated with Bardana? (a) Yes (b) No

Q. if yes than what is the price of one Bardana? \_\_\_\_\_

Q. Do you sale your whole production? (a) Yes (b) No

Q. If No, then for what purpose you keep reaming production?

Q. What is the quantity do you sell per year?

Q. What is the quality of your Grain with respect to humidity?

Q. is there any difference regarding Price based on humidity?

Q. At what time did you sell your grain in 2018?

- (a) April – May 2018      (b) June – July 2018  
(c) August – September 2018      (d) October – November 2018

Q. What is the reason behind you chosen time?

Q. To whom did you sell?

- (a) Direct to consumers    (b) Kacha Arthi    (c) Paka Arthi    (d) Assemblers  
(e) Wholesaler    (f) To Retailers    (g) Others (Specify)

If sell to Arthi than,

Q. Did you take lone from that Arthi to whom you sell?

Q. What is the reason to sell other than govt.?

Q. Why you do not sell Govt.?

Q. What is the reason to sell govt.?

Q. Why you do not sell Other than Govt.?

Q. What is the price per 40 kg you received?

Q.17: What is the trend in price of wheat in Past and Present?

- (a) Increases    (b) Decreasing    (c) Stable

Year	Average Price per 40kg you received	Remark
2017		
2018		

Q. What is the term of sale?

- (a) Cash    (b) Credit    (c) Other\_\_\_\_\_

Q. If you chose credit then what is the duration to credit pay back?





Q.22: How was the yield of crops as compared to the previous year(s)?

(a) Very high (b) High (c) Low (d) Very low (e) Medium

**Frequency Table of Results**

**Table:1 Size of Your Holding**

	Frequency	Percent	Valid Percent	Cumulative Percent
	2.00	2	2.1	2.1
	3.00	5	5.2	7.3
	4.00	9	9.4	16.7
	5.00	8	8.3	25.0
	6.00	3	3.1	28.1
	7.00	9	9.4	37.5
	8.00	11	11.5	49.0
	9.00	11	11.5	60.4
	10.00	11	11.5	71.9
Valid	11.00	3	3.1	75.0
	12.00	4	4.2	79.2
	13.00	2	2.1	81.3
	14.00	4	4.2	85.4
	15.00	4	4.2	89.6
	16.00	4	4.2	93.8
	17.00	2	2.1	95.8
	20.00	1	1.0	96.9
	24.00	3	3.1	100.0
Total	96	100.0	100.0	

**Table:2 Farming Experiences**

	Frequency	Percent	Valid Percent	Cumulative Percent
	10.00	10	10.4	10.4
	12.00	3	3.1	13.5
	14.00	2	2.1	15.6
	15.00	20	20.8	36.5
	16.00	1	1.0	37.5
	17.00	3	3.1	40.6
	18.00	2	2.1	42.7
Valid	20.00	23	24.0	66.7
	21.00	4	4.2	70.8
	22.00	13	13.5	84.4
	23.00	2	2.1	86.5
	25.00	10	10.4	96.9
	30.00	2	2.1	99.0
	35.00	1	1.0	100.0
	Total	96	100.0	100.0

**Table: 3 Yield Per Acre**

	Frequency	Percent	Valid Percent	Cumulative Percent
	30.00	1	1.0	1.0
	35.00	10	10.4	11.5
Valid	40.00	21	21.9	33.3
	45.00	44	45.8	79.2
	50.00	20	20.8	100.0
	Total	96	100.0	100.0

**Table: 4 Education level of Farmer**

	Frequency	Percent	Valid Percent	Cumulative Percent
	5.00	7	7.3	7.3
	8.00	18	18.8	26.0
Valid	10.00	39	40.6	66.7
	12.00	21	21.9	88.5
	14.00	11	11.5	100.0
	Total	96	100.0	100.0

**Table: 5 Distance to Market in Km**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4.00	16	16.7	16.7
	5.00	2	2.1	18.8
	6.00	7	7.3	26.0
	7.00	16	16.7	42.7
	8.00	21	21.9	64.6
	9.00	11	11.5	76.0
	10.00	4	4.2	80.2
	12.00	3	3.1	83.3
	13.00	3	3.1	86.5
	14.00	10	10.4	96.9
	15.00	3	3.1	100.0
Total	96	100.0	100.0	

**Table: 6 Past Price Other than Government**

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1100.00	37	38.5	56.9
	1105.00	5	5.2	64.6
	1110.00	16	16.7	89.2
	1115.00	5	5.2	96.9
	1120.00	1	1.0	98.5
	1200.00	1	1.0	100.0
	Total	65	67.7	100.0
Missing	System	31	32.3	
Total	96	100.0		