

*University of Applied Sciences*



**VAN HALL  
LARENSTEIN**  
PART OF WAGENINGEN UR

## **Cross Border Onions Trade between Afghanistan and Pakistan**

Rodat District, Nangarhar Afghanistan

A Value Chain Approach

Zabihullah

September, 2010

Research Project Submitted to Van Hall Larenstein University of Applied Sciences in Partial Fulfillment of the Requirements for the Degree of Master in Agricultural Production Chain Management, Specialization Horticulture Chain Management.

Wageningen,  
The Netherlands.  
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Director of Research  
Larenstein University of Applied sciences  
Part of Wageningen UR  
Forum-Gebouw 102  
Droevendaalsesteeg 2  
6708 PB, Wageningen  
Post box 411  
Tel: +31 31 7486230  
Fax: +31 31 7484884

## **ACKNOWLEDGEMENT**

There are no words that can be found to praise and thank Allah who provided me with the opportunity and strength to accomplish this work.

I express my appreciation and gratefulness to Mr. Houwers Geert, Coordinator of the Chain Management Department of Horticulture for his supervision, and guidance throughout the preparation of this thesis.

I wish to acknowledge Mr. Baars Robert for his valuable and relevant guidance in the concept of data collection and thesis writing.

I also take the opportunity of thanking Mr. Verschuur Marco and other lecturers for their support and guidance during the study period and Special gratitude to my fellow classmates for bringing valuable ideas and corrections in this report.

Finally I sincerely thank my parents and family for supporting me throughout the entire masters' study.

Zabihullah,  
September, 2010

**Dedication**

This thesis is dedicated to millions of innocent Afghans martyred, the Widows and the Orphans during the war in Afghanistan.

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## ABREVIATIONS

1\$= 45.50	Afghanis
1\$= 85.50	Pakistani Rupees
AFG	Afghanistan
APO	Asian Productivity Organization
ASAP	Accelerating Sustainable Agriculture Program
AVRDC	Asian Vegetable Research and Development Center
CNFA	Centre for the Neuroscience of Fear and Anxiety
DAI	Development alternative incorporation
DAP	Di Ammonium Phosphate
DFID	Department for International Aids
FAO	Food and Agriculture Organization
FBC	Full Bright Consultancy
FFTC	Food and Fertilizer Technology Centre
ICARDA	International Centre for Agricultural Research in the Dry Areas
IDEA-NEW	Incentives Driving Economic Alternatives - North, East, West
PHDEB	Pakistan Horticulture Development and Export Board
RS	Rupees
UK	United Kingdom
UNSD	United Nations Statistic Division
USA	United State of America
USAID	United State Aid for International Development



## **Abstract**

The purpose of this study was to assess the possibility for avoiding extreme price fluctuation and increase growers' margin in Rodat District of Nangarhar Province, Afghanistan. Two approaches were used: the current growing and producing condition and the reasons of price instability as well as assessment of current and new proposed conditions. The Onions, wheat, Cotton, Rice, and Corn are the major crops of Rodat but onion is largely produced and introduced as a cash crop. Rodat produces 32% onions of total Nangarhar province and 87% are going to Pakistan with very low prices. The growers have less margin and feeble bargaining power at farm gate. (63%) of the growers are small scale and have not as much of 1 hectare of land; only 10 % are large scale and have more than 2 hectares of land. 37% are uneducated; almost 58% growers have pre-finance agreements. The growers don't have straight get in touch with wholesale market and prices are settled by negotiation of local traders and growers. The lack of equipment and technology in farm practices delayed the process and increased operation cost. The work performs by hand therefore most of the cost price consisted of the labor cost. The irrigation is also one of the great expenditure, the fields are irrigated 4 to 5 times by rented tube well therefore irrigation consists 28% of total input price. The poor farm management reduced the average production. The fields suffer from various diseases. The peak season price is 8 Rupees per kg, the price are affected by production time, oversupply and custom at border. The sharp season of Rodat is escorted with the production of some other places like Khogiani, Hesarak, Logar province onions and some places of Pakistan. The intermediaries have fewer margin in the current chain. 47% of total cost is the transaction cost. The border custom increased from 80,000 to 150,000 Pakistani Rupees per 22 tons by Pakistanis, it has straight affect on farm gate price. The value share of grower is 27% and the revenue is 3.5 Rupees per kg in current chain, contrary the Nangarhar consumers suffering high prices during off season. The prices are augmented from 20 to 50 Rupees per kg during the off season in Nangarhar. The onion exports from Nangarhar with low prices and imports to Nangarhar with high prices are mutual advantage for Pakistan. Nangarhar is a frost free area and able to produce early and late maturing varieties but some Central, Northern and Southern provinces have long off season. These provinces don't have onions in early May to June and price greatly increases. The new planned chain indicates the marketing opportunities for Nangarhar onions in some parts of Afghanistan with three time high profits for growers then current chain. The new plan for Nangarhar onions increases the value share of growers from 27% to 50%. The price fluctuation in Nangarhar is 20 to 50 Rupees per kg at consumer level while the new planned varieties, storage for required volume and plan for sequential marketing stabilize the prices and increase growers' margin at farm gates. Nangarhar requires the storage of 21,000 tons for off season and growing of early maturing varieties for other markets.

# CHAPTER ONE

## INTRODUCTION

This chapter covers the background of the study and describes the problem statement. It further includes the formulated research questions that guided the study as well as describe the limitations and general thoughts of the research conducted in the area

### 1.1. Background Information:

Afghanistan located in South Central Asia that is 652,090sq.km of land locked mountainous country with the range of 1,500 to 7,485m in height. The hot summer, cold winter, freezing at dawn and 30°C after noon can easily separate the seasons. October and April are the most precipitation falling months, 50mm precipitation in desert areas and 1,000mm in the mountainous areas are the average rainfall (FAO. 2007). Most of the farmers are small holders and agriculture is the main source of income. Some major agricultural, food, industrial and crop production has significant roles in the economy of the people. The farm size is less than 2 hectares and maximum could be reached at 60 hectares. Total arable area is about 12%. Fruits, wheat, nuts, wool, mutton sheepskins, lamb skins and opium are the major agricultural products. While corn, rice, barley, wheat, vegetables, fruits and nuts are the main food crops and major industrial crops are cotton, tobacco madder, castor beans and sugar beets (USAID. 2008). The UNSD estimated data in 2008 is as shown in the table below:

That: Pakistan is high export partner of Afghanistan, more than 50% of the production is imported from Pakistan also play major role in export of Afghan production compare to other neighbour and regional countries

Table 1: Production and trading condition of Afghanistan

Gross domestic Products	126.79	Billion \$
Export	5.80	Billion \$
Import	25.00	Billion \$
Major export( To Afghanistan) partners	Pakistan (55%), India (11.8), Iran (2.4%)	
Major import( From Afghanistan) partners	Pakistan (17.2%), China (15.4%), Japan (12%)	

Source: (UNSD. 2008).

A survey FAO conducted in 2003 throughout the country shows that horticulture crops cover 13% of total rain fed and irrigated arable areas while 6.3 percent land is under vegetable cultivation, and orchard are grown in 6.7 percent, perishable products like vegetables have a restricted domestic market because of security, instability, poor roads, high temperature, lack of market and lack of knowledge. The survey shows that the main problems for growers are:

- Lack of water (only 14% available)
  - Pests 18%,
  - Disease 20%
  - Improved fruit varieties 14%,
  - Improved vegetable varieties 15%,
  - Farmer cooperatives 14% percent"
- (FAO.2003).

---

FAO: Food and Agriculture Organization

USAID: United State Aid for International Development

UNSD: United Nations Statistic Division

According to the ICARDA evaluation survey, Afghanistan has a favorable and suitable environmental condition for horticulture crops and vegetables. The melon, water melon, onion, potatoes and tomatoes are the most important vegetables and consist of 87.4 percent of all vegetables grown in the area. Onions are grown at 12 percent of total vegetables but due to lack of a marketing system most of the farmers make pre-financed contracts and estimate the yield before harvest, some farmers who are near to border easily export their products at better prices (ICARDA. 2003).

The tough accessibility to water and/or facilities to draw up water from Kunar and Kabul Rivers compelled the eastern region growers to grow the annual crops.

The growers of the eastern four provinces of Afghanistan (Nangarhar, Kunar, Laghman, and Nuristan) produce more annual crops due to hard accessibility to water. The major vegetables in eastern provinces are,

Table 2: Eastern provinces major vegetable production percentage

<b>Vegetables</b>	<b>%</b>
Okra	23%
Tomato	11%
Onions	11%
Carrots	5%
Potatoes	1%

The total of 70 wholesalers in Jalalabad have 0.02 million MT trading of different horticultural crops with Pakistan. The eastern and central region export 66,000MT onions, tomato, and potato during the on-season to Pakistan and import 74,000 MT back from Pakistan in off-season, therefore Pakistan is a significant trading partner in region (Favre . 2005).

Nangarhar is significant for eastern provinces in term of local production and supply to other provinces of the country and Pakistan.

The eastern province of Nangarhar covers 7641 sq.km of area with a population of 1.5 million people, where 80% of these people directly depend on agriculture for their livelihood because of competent agro ecological background and access to backward and forward markets. The growers mostly grow horticulture crops, field crops, apices within others; mostly use springs canals and shallow wells for irrigation. The growers are faced with problems and challenges in their growing and marketing of products, inadequate supply of quality inputs, lack of farming knowledge, lack of farm machinery and tools, lack of market information at farm gate, poor extension working and poor infrastructure for agriculture products are significant to mention (Rahman and Hossain. 2005).

Lack of storage and lack of marketing information at farm gate in Nangarhar is the best opportunity for Pakistani traders to increase their profit in traditionally horticultural crops importing to Pakistan. The lack of storage facility is the reason that onions exported from Jalalabad to Pakistan are of low prices (Maani. 2003).

## **1.2. Research problem:**

Rodat is one of the well known districts of Nangarhar in onions production. The district produces 32% of total Nangarhar onions but 87% of these onions are exported to Pakistan during harvesting season at very low prices. After harvesting season due to high demand and lack of onions in Nangarhar markets the onions are imported back with two time high prices.

## **1.3. Research objectives:**

To avoid great price fluctuation in Nangarhar and optimize prices at farm gate.

## **1.4. Research Questions:**

**1.4.1. Main question1:** what is the current trading situation of onions in Nangarhar?

### **1.4.1.1. Sub questions:**

- How is the current growing and producing condition of onions?
- How are onions marketed at the moment?
- What is the value addition of the chain?

**1.4.2. Main question2:** How is onions production managed in Nangarhar to help with sequential marketing and avoid price fluctuations?

### **1.4.2.1. Sub questions:**

- How the fresh onions can be kept for long time?
- What arrangement can avoid oversupply in the market?
- Where is the marketing opportunity for Rodat onions inside Afghanistan?

## **1.5. Expected output:**

This research focuses on the value chain of onions in Rodat district which are exported to Pakistan at low prices during harvesting season. It is expected that the research would find out the challenges in current chain and the way of solution to optimize prices at farm gate and feasibilities of keeping onions in Nangarhar furthermore would plan sequential marketing strategy to avoid price fluctuation and less availability of onions in Nangarhar markets.

## **1.6. Research Conceptual Framework:**

The concept of value chain relationship with broader market is important to realize the direct and indirect influence of actors on the chain.

The research framework focuses on whole chain of onions from producer to consumer. This framework shows the price fluctuations associated with onions availability and none availability in market because of the lack of onions maintenance facilities in Nangarhar province.

The lack of storage facilities to elongate the shelf life is the reason of growers compulsion to sell their production with low prices in climax season and this is a good opportunity for Pakistani markets to import Rodat onions with low prices while during the off season of Nangarhar it is again a better opportunity for Pakistan to send back the onion with high prices. It is obvious that transaction cost and many intermediaries in the chain can influence the prices therefore these costs can negatively affect the prices at farm gate. In the result, the price should be optimized at farm gate; the season should be elongate in Nangarhar and should find out possible solution for onions keeping in the area to help with availability in the markets and stabilize the prices.

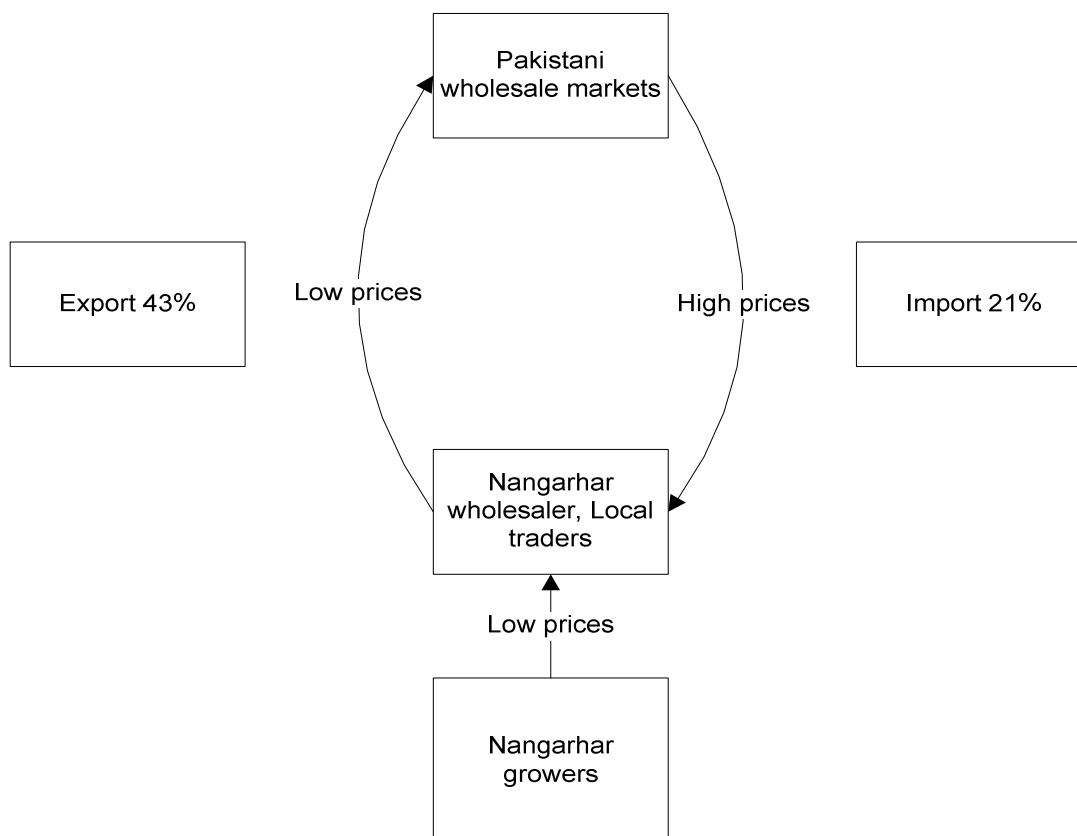


Figure1: conceptual framework of the research

This will be the base of feasible recommendations and strategy in order to address the problems and find out the possible solutions.

### 1.7. Limitation of the study:

Three decades of war and destruction have destroyed the agriculture infrastructure and production. Lack of technology, illiteracy, extension working, nonexistence of correct documents and data, security condition and limited sources are the main challenges for the researchers and reliable data is hard to obtain in almost all sectors of agriculture. Therefore the current situation forces the study to rely on limited sources.

The provided information of this report is through observation of the production system, marketing, agriculture department information and direct observation of famers, wholesalers, and retailers as well as conclusion made by personal observation during short visits. The full description of current circumstances needs broader investigation. However the primary collected information of this study can be used for future study and planning.

### 1.8. Report structure:

This report is structured into six main chapters. Chapter 1 offers the background of the study and describes the problem statement. Its further includes the formulated research questions that guided the study. Chapter II consists of literature related to the challenges in onions producing, marketing and storing condition. Chapter III includes research methodology: area, research strategy, tools used. Chapter IV presents the empirical findings of the research. Results are discussed under chapter V and the report ends with chapter VI that includes the conclusion and recommendations.

## **CHAPTER TWO**

### **REVIEW OF LITERATURE**

This chapter focuses on the review of different literatures related to the research problems and recommendations. It includes literature about seasonality and causes of price fluctuation, general challenges in chain, storage requirements and importance of sequential marketing.

#### **2.1. Challenges in chain**

Seasonality is an associated force with perishable commodities up to consumption such as southern Hemisphere grapes, avocado and stone fruit shift from Chile to the United State and Europe in winter to meet the demand of consumer because the area has less domestic production. In the same way the United State import grapes in spring from Mexico and export in fall season. Some time buyers take benefits from perishable attributes of commodities and reduce bargaining power of growers because perishable crops should be harvested, and marketed at short time. Most of the time they contract with producers and transporters for high volume of perishable commodities to stabilize the prices, quantity and volume like buyers were able to reduce growers profit to zero in California lettuce industry. Temperatures management as an effective tool can extend the shelf life of horticulture commodities (Kader. 1985).

The fruits and vegetables play significant role in farm income increases, poverty reduction and sustainable agriculture of Asian countries, especially developing countries. Some time 30 to 40% losses have seen after leaving farm gate, poor infrastructure for storage and lack of marketing, lack of processing are the most contributing factors of wastage. But limitation of major infrastructures enforces restrictions on domestic and export markets. Poor quality production and high post harvest losses are due to lack of knowledge, poor producing practices, poor quality inputs, inadequate packing and packaging, poor post harvest handling, inadequate pre-cooling facilities, transportation, storage, lack of processing and marketing, high transportation expenses and weak marketing and poor integration activities throughout the chain. Some poor countries are nowadays innovative and developed low cost storage system and reduced losses during storage like India, and Nepal, the current design and usage of system is largely supported by government and put research for development (APO. 2006).

An Ethiopian journal indicates that 30% losses of vegetables are due to poor post harvest handling in the country. Lack of proper transportation, selling of unprocessed vegetables, lack of storage facilities, poor traditional storage system and lack of cool storage are significant restrictive factors in vegetable sectors (Mariame and Gelmesa, 2006).

## 2.2. Price fluctuation:

A research conducted in Sudan shows that arid and semi arid regions produce significant proportion of agriculture production however the price fluctuation problem is the major problem almost for any agricultural based economy, but third world is particularly faced with this problem. The less development of technological facilities for storage and transportation are the challenges and constraints in third world, but none feasible cropping all year round, poor storage and only one crop per year made this problem more sensitive in arid and semi arid regions. The oversupply, harvesting season at once, inadequate transportation, cropping cycle and delaying decreases the capability to match the supply with demand and import or export throughout the country. In addition Sudan faces with huge seasonal price fluctuations in the majority of agriculture commodities. The rice has very high prices before harvesting but extremely goes down during harvesting months and rises again, the same case act upon in onions (Speece. 1989)

A study from 1979 to 2004 was conducted in four major wholesale markets of Pakistan to make clear that high prices fluctuation in markets is due to time, oversupply, perishable attributes of onion and storage cost. The prices depressed down in peak harvesting season because markets had full supply of products but the storage of products elongated their availability and increased prices when there was less availability of products in the market. Some commodities could not be stored because of their perishable attributes and should be carried to market at the time or store for less time which also play role in price fluctuations. The study also shows major difference in prices of different markets which were depending on transportation and transaction cost. Transportation is shafting of commodities but transaction cost is institutional cost put on commodities like commission, transportation etc. These costs affect prices in the market (Heman and Fateh. 2006).

Nepal produces less onion from its demand therefore they import 90% from India. Their onions come to market late April to June but still import 10 to 15 % during onions peak season. They completely depend on India during the rest of the year, but seasonality of the production and import from India fluctuate the prices considerably. The following figure shows the data of prices in different markets.

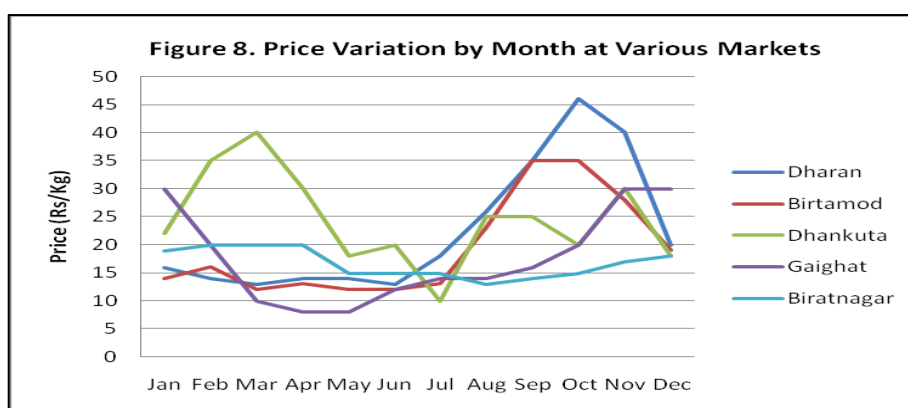


Figure 2: Onions price fluctuation in different markets of Nepal

Source : ( FBC. 2008).

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FBC: Full Bright Consultancy.

Several challenges create restrictions for onions growers to maximize their returns. Short harvesting season of onions create high fluctuation in market prices; the transportation cost of onion bulbs to far market place is expensive. Onions have severe losses from diseases and weight decreases due to ambient storage (AVRDC. 2003).

### **2.3. Storage significance:**

The lack of proper storage is one of the significant factors in prices fluctuation of onions, The storage of agriculture commodities play major role in competition of market, consistency of prices and helpful in schedule marketing. It elongates the supply and availability after harvesting and value is added normally. The commodities will be competitive when there is continuous supply to the market and storage is possible to supply gradual and sequential rate of commodities and stabilize prices due to long availability in market. It increases the income and bargaining power of producer and on-farm storage decreases the costs in developing countries (Rabirou and Olukayode. 2007).

The prices instability and marketing risk of perishable commodities is controlled when there is sequential marketing of commodities because the commodities are introduced to market gradually and avoid extreme fluctuation of prices while oversupply of commodity depresses the prices. Sequential marketing is possible when there are facilities of effective and economic storage to supply the products to market according to the demand (Alimi and Ayanwale. 2005).

India is the world largest producer of onions and second world largest fruit and vegetable producer but 30% vegetable and fruits get spoiled and wasted at sharp harvesting season due to lack of proper transportation and storage facilities. Later than harvesting season India imports the same vegetables with high prices because of insufficiency in the market and most of the people can't purchase (Krishna. 2004).

The lack of storage is a problem for perishable vegetable producers in Sub Saharan Africa. Producers are compelled to sell their products by buyer prices at farm gate. They have poor bargaining power and obligated to sell their products at farm gate on low prices because perishable commodities are wasted if it is not stored on proper time.

The storage increases the products availability in market for long time but the store can also much more increase prices because of building cost, operation cost and product purchase cost while the price could not be affected more if storage used according to their maximum capacity throughout the year (Lyakurwa. 2007).

The early harvest, the late harvest and harvest more often during best maturity stages are three options for small scale growers to obtain high prices in the market. If the growers wish to keep their onions for long term in storage, the spray of Maleic hydrazide few weeks before from harvesting can elongate the storage life and avoid the sprouting during storage but the better solution if there is no facilities for cool storage or no market for fresh commodities is processing of products with simple technique like drying of onions. Processing is an easier way and less costly during post harvest handling and transportation of the processed products is simpler than fresh products (Kitinoja. and Kader. 1985).



A six month storage test of summer large and medium sized onions (*Allium Cepa*) of three growers in 1, 4, 21°C indicates that medium yellow onions has best result in 1 °C while large size onion had lowest losses at 4 and 21 °C but white onions faced with highest losses. After three months 1°C did not have losses but decay, sprouting was major losses factors at 4°C although sugar reduced and pungency increased at 4 °C and 21°C but onion remained dormant at 1°C. The examine shows that size can change the quality and can affect decay and sprouting rate in storage. In conclusion 1 °C is the best storage temperature for Granex Grano type onions. Because it appeared low percentage of decay and kept onion dormant in six month storage. Furthermore the 1 °C is the best storage temperature for onions keeping and medium quality is more stable during storage

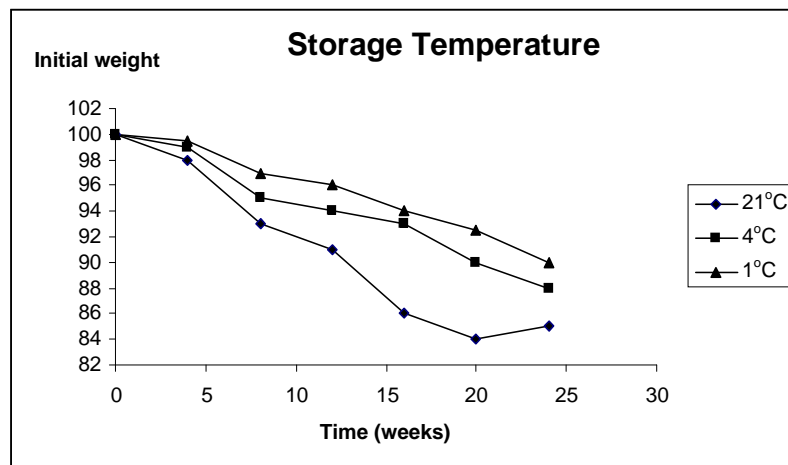


Figure 3: Losses in different storage conditions

Source: (Hurst. Shewfelt and Schuler. 1985).

The storage should be well designed, proper equipments, adequate doors for loading and unloading and adequate distribution of cool air and proper capacity for predictable requirements. Commodities should have air space and store should not be filled more than their capacity to limit the proper cooling. Shelf life of onions is 10 to 14 days and possibly being stored for 3 to 10 months (Kader.1985).

Mostly the growers of vegetables and fruits suffer the challenges of overproduction and weak marketing demand from poor planning or imprecise production and market information. The inadequate storage and transportation facilities are major causes of this situation. Pre-cooling, storage, packing, packaging and transportation are the significant post harvest technology that influences the level of losses. Furthermore many of the horticulture products have brief harvesting season and need to extend their marketing period therefore they need to store and expand their life. Different storage methods are used, but air cooled storage often used for horticulture commodities. China newly designed under ground storage or cave storage in central and northern areas. This technology is not commonly used in other worlds, but changing it according to the various climate and soil condition might make it successful in many parts of the world (Liu.1999).

## **CHAPTER THREE**

### **METHODOLOGY**

This chapter indicates some significant information about the study area and describes the approach of data collection and tools used for analysis; it also describes the sources used for secondary data.

#### **3.1. Research materials and methodology:**

##### **3.1.1. Study area:**

The study area Nangarhar is situated in 160 km to the east of Kabul. The Kunar and Laghman provinces are located to the North, Kabul, Logar, and Paktia to the West and an international border with Pakistan in the south and east.

Data of Nangarhar social economic and demographic profile shows that total land area of Nangarhar is 7,641 km<sup>2</sup> with 1,342,500 inhabitants which is 5.8% of total population of Afghanistan; Data indicates 177.5 density of people per km<sup>2</sup>. Jalalabad with 205,423 (15.3%) population is the main city of Nangarhar province where wholesale market of vegetables is located. The Wholesale market located in the main city of Nangarhar supply vegetables and fruits to Pakistan, Kabul and Eastern provinces of Kunar and Laghman. The wholesale market has an association of 70 fruits and vegetables Wholesalers and more than 200 local traders.

Nangarhar is a frost free area and mostly produces annual crops but mostly going to Pakistan during the sharp season and Pakistan also supply the fruits and vegetables. Nangarhar has strategic location between Kabul and Peshawar. Therefore the near markets of Kabul and Peshawar are the providential aspect that Nangarhar has access to backward and forward markets.

The research has been conducted in Rodat District 25 km in south east of Jalalabad city where primary data is directly collected from 30 sampled farmers. The total land area of Rodat district is 661 Km<sup>2</sup> and has 120,000 inhabitants, which is 8.9% of total Nangarhar province. Khunzadagan, Batan, Mazina, Zakhil, Piwa, Banda, Tatang, Hisarak, Baroo, Qazi Qala, Kochi Qala and Kam Baroo are famous villages of the District. The District is neighbour of Kot District, Haskamina, Behsood, Chaparhar and Jalalabad city.

Onions, sweet corn, cotton, wheat and rice are the main products of the District. Most of people are small scale but agriculture is the income source in the area.



Map1: The study area of data collection.

### 3.1.2. Surveys:

The survey through prearranged questioner conducted in Rodat district pointed out onion's growing, producing and selling conditions and searched out the input cost of onions, using random sampling techniques. From the entire village: small scale, medium scale and large scale farmers were interviewed randomly. The SPSS shows the composition of the samples as here below.

District	farm size			
	0.2Ha-1Ha	1Ha-2Ha	>2Ha	Total
Rodat	19	8	3	30

0.2Ha-1Ha: Small scale farmers  
 1Ha-2Ha: Medium scale farmers  
 >2 Ha: Large scale farmers

Six wholesalers, six retailers and two experts have also been interviewed, the prearranged questionnaires were asked face-to-face to obtain marketing information (marketing time, business volume, selling type, selling prices and volume going to Pakistan and approximate offseason prices in different major cities of Afghanistan). Interviews also obtained market opportunities, time of over supply, less availability of onions in market, price fluctuation in wholesale market and prices of other markets. The survey of wholesale market and the free discussion with wholesalers about increase the prices at farm gate and marketing opportunity inside Afghanistan pointed out the idea of new proposed channels and proposed value share and value addition.

The conducted semi structured interview with experts helped onions sequential marketing and proper scheduling of production and marketing to avoid oversupply and fluctuation of prices it also helped to obtain information about different varieties and its marketing opportunities inside Afghanistan.

In the result, the study revealed the livelihood, the current growing and producing conditions, structured value chain, value addition, market selling mode, and decided the margins of different intermediaries in the chain. The value share of farmers by taking the farm price and share of market intermediary calculated as a percentage of final products at the consumer level (retail prices). This process shows share of provided services by intermediaries from carrying point to its final target. The study also pointed out the SWOT and PESTEC analysis which explain the existent problems summary and opportunity for the chain. Further more the study pointed out the arrangement and schedule for sequential marketing and solution for price fluctuations.

### **3.1.3. Data collection and SPSS tools:**

Primary and secondary sources were used to collect the relevant data for research study, the primary data collected through prearranged questioner. The questions were guided the research objectives and had provided answers to the sub questions of the main research questions in the proposal. The data analyzed by SPSS tools e.g. descriptive statistics, cross tabulation and paired simple t-test for understandable analyze and comparison of two groups.

The secondary data consisted of documents related to onions sector; these documents included different reports, documents produced by concerned departments at regional and district level, the region and district socio economic profile, journals, books as well as private source.

## CHAPTER FOUR

### RESULT

This Chapter analyzes the collected data of the field and describes the current farm practices, growers education level and farm size, growing and producing conditions, farm gate prices and describes the marketing channels, it also includes the whole year price fluctuation at wholesale and consumer level in Nangarhar province, value addition, value share, selling mode of onions, SWOT and PESTECT analysis.

#### 4.1. Product profile:

Onion is cool season biannual crop. 16-21°C is optimum temperature for bulb growth and 13-24°C is suitable temperature for vegetation growth. The most fertile soil and 6 to 7 pH is optimum for onions high production, organic soil with low pH also fulfills the requirements for suitable production. Onions can adopt in sandy, clay, silt and organic soils. Saline soils aren't suitable for onions production (Ehsanullah.2006). The sandy poor soil of Rodat and growing of onions every year in same farms the major cause of low production. The growers use 8.5-10 kg onion's seed for transplanting of one hectare and cultivate in 8-10x 20-25 cm in many cases.

It needs permanent water supply therefore it is irrigated 16-18 times in Rodat, because "They take very little water from bottom side therefore it should be kept moisture from upper side to stimulate roots and supply proper water for the plant" (Anisuzzaman.et al.2009). The temperature of Rodat is various from 16 °C to 45 °C during the year.

Onions have different varieties differ by timing of growing, size, color, shape, duration of harvesting, production and resistance against diseases. Onion is one of the important crops in eastern provinces of Afghanistan. Almost all onion growers of Rodat mainly grow Red local Mazzina variety. These onions are famous in local and export markets on Mazzina onions.

According to the extension office of the District, this year onions have been cultivated in 800 hectares and total yield is 30,000 tons. The average yield in Mazzina is 37.5 tons in each hectare included 16% losses at farm gate. It is marketed as fresh bulb onions.

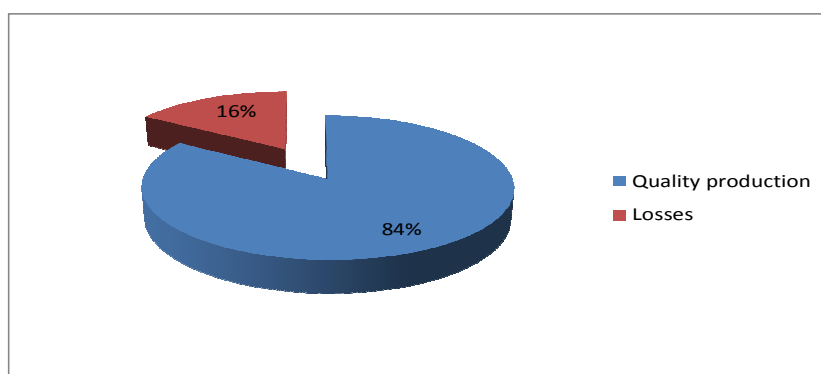


Figure 4: Losses percentage at farm gate

Source: field survey

“The standard production of Red local Mazzina variety is 40.60 tons per hectare” (Ehsanullah.2006). The less average from standard production in Rodat basically caused of poor soil, same field growing by onions every year, poor farm management, pest and diseases.

The onions are sorted and graded by size; the smaller onions are not acceptable therefore grower suffer 16% losses at farm gate. The smaller onions are used at home as fresh bulbs or get spoilage.

Many other varieties are cultivated in different districts of Nangarhar and supply to markets in different times like, red, white, yellow.

Same time growing, harvesting, and marketing of Rodat onions increased the losses and decreased the prices in the market. It is a good opportunity for Pakistan to import the onions with very low prices

#### 4.2. Livelihood and Farm structure:

According to the field survey most of the growers are uneducated and very few percentages are graduated from Universities.

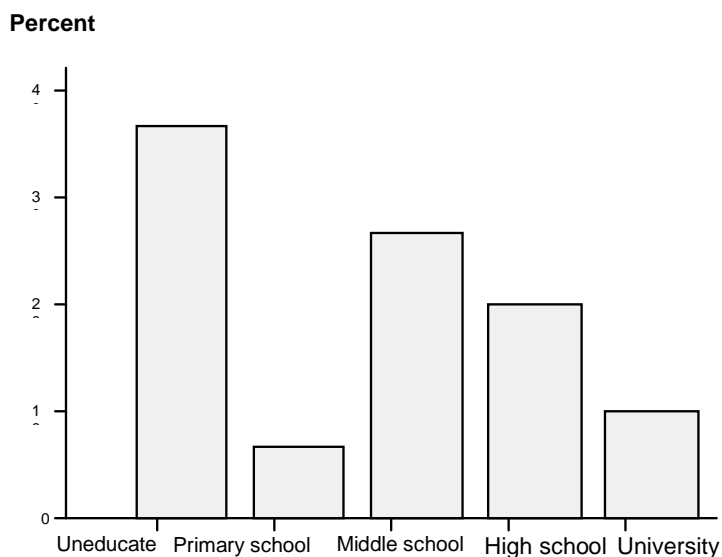


Figure 5: education level of growers

Source: Field survey

The figure shows 10% growers are graduated from universities, 20% growers are graduated from high schools, 27% are educated of middle school and 7% followed primary schools while 37% growers are uneducated,

The minimum age of the grower is 22 years, maximum is reached to 55 years and mean age is 37 years. The average family size is 20-25 people.

Most of the growers are small scale and tenant. Very few growers of the area are owners; the following figure shows the tenure status of growers.

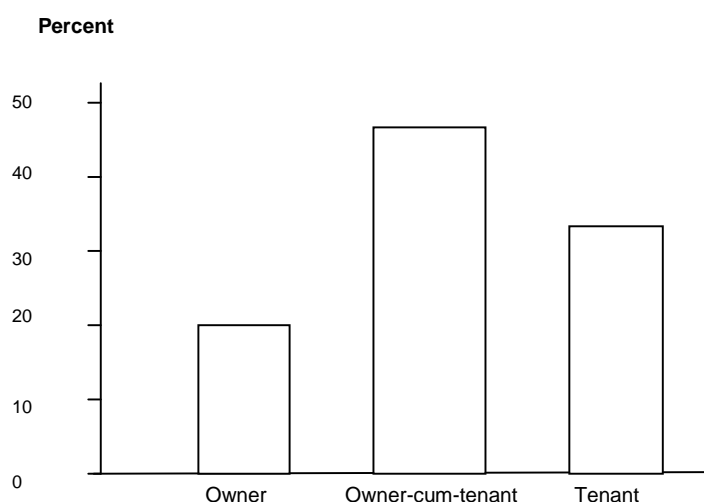


Figure6: Tenure status of growers  
Source: Field survey

Most of the villagers are busy on farming but only 20% people of Rodat are owner and use their own land for growing while other 47% people have their property but rented some other land for growing. The rest don't have land and compelled to use rented land, production of the field and input price of production process are equally distributed on two portions between owner and tenant.

Mostly the growers cultivate onions, corn, wheat, cotton and rarely rice but onions and corn are main production of the area.

Table 3: Major cultivated crops growing percentage in Rodat District

Crops	Grower %
Onions	100 %
Corns	73%
Wheat	33%
Cotton	23%
Rice	13%

Source: Field survey

Onions are traded during peak season and aren't stored because of lack of storage facilities, onion is alternative of poppy and introduced as a cash crop while corn has less marketing prices but produce for cattle, home consumption and market. Wheat, Cotton, Rice are mostly grown for home consumption.

The 63% growers are small scale and have less than 1 hectare of land. 27% percent are medium scale and have 1 to 2 hectares of land. 10% growers are large scale and have more than 2 hectares of land. Mostly the large scale growers are owner of the land.

Table 4: property level in Rodat

Grower type	Frequency	Land area (Hectare)	percentage
Small scale	19	0.2-1 Hectare	63
Medium scale	8	1-2 Hectare	27
Large scale	3	>2 hectare	10
<b>Total</b>	<b>30</b>		<b>100</b>

Source: Field survey

### 4.3. The production process:

The growers of onions in Nangarhar locally produce onions in five steps.

1. Seedling production: 10 kg of seed is used for one hectare as a seedling and cultivated at the end of October. It is produced in one part of the field and transplanted at the end of January.
2. Bed preparation: Bed for planting is prepared two times. The primary tillage is disking, rolling, sub soiling and land preparation then the second preparation is performed. Mechanically it is prepared by tractor. The manure are traditionally produced by growers at home from cattle and broadcasted before primary tillage. The average 4.5 tons of manure is used in one hectare.
3. Transplanting: The plants of onions are transplanted at the end of January to fields when the plants are 12-15cm tall. The growth of better transplant needs approximately 10 to 11 weeks.
4. Irrigation, fertilizer, chemicals and weeding are the growing season practices.
5. Harvesting: The harvesting of onions is started at the end of July and continuous for three months.

The growers generally use traditional equipment for production process. The lack of technology and usage of traditional tools delay the process and increase operation cost. All work performs by hand.



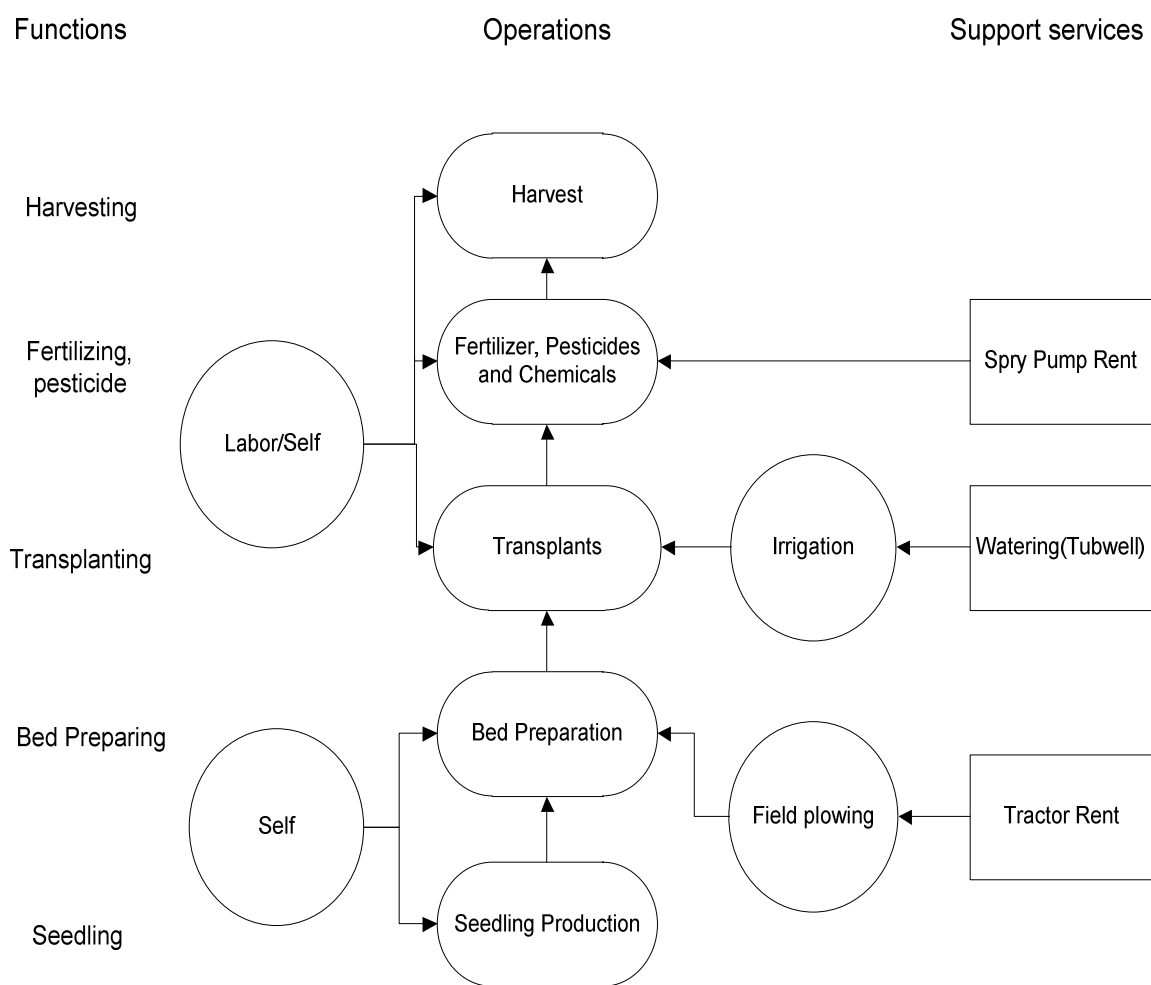


Figure7: Production process of onions  
Source: Field survey

The growing period is one of the critical periods for growers of Rodat because the diseases are one of the important threats for their crops. The onions suffering different diseases like downy mildew, soft rot, dodder, onion anthracnose or smudge. The people are coming from city and spray the fields but most of the growers don't know that what kinds of chemical are used on their onions. They pay 120 Rupees per one (10 liter pump) and four pumps are used at once per hectare, they spray their onions almost 6 times in growing period but most of them complain that chemicals are not affective and can't reduce the diseases.

The shallow root system needs more water therefore growers irrigate the fields 16 to 18 times but hard accessibility to water at the beginning of the growing season obligate the growers to irrigate their fields by tube wells where they pay 400 Rupees per hour and 20 hours are needed for irrigation of one hectare. They irrigate up to 5 times by tube well. In later season the water is coming from Spin Ghar (big and famous mountain located 30 km far from Rodat). These costs enhance cost price and reduce profitability of growers.

#### 4.4. Cost price:

Cost price is specific value represents unit purchased prices. It is a key value determining profitability.

The data collected during field research shows that labor cost 300 is rupee per day; urea fertilizer 1,550 rupee per 50kg, DAP 3,300 Rupees per 50 kg, seed for seedling is 400 per kg and chemicals 120 Rupees per pump (10 liters). Tractor rent estimated 700 Rupees per hour.

Table5: production cost of onions in one Hectare

Production cost per hectare					
S.No	Production cost	cost per unit	Units per Hectare	Requirements	Total
A	Land preparation(Tractor)	700 per hour	5 Hour	2 Time	7,000
B	Seed(seedling)	400 per kg	10kg	once	4,000
C	Fertilizer(Urea)	31 per kg	125 kg	3 Time	11,625
D	Fertilizer(DAP)	66 per kg	125 kg	1 Time	8,250
E	Chemicals+Labor for spry	12 per liter	200 Liter	4 Time	9,600
F	Irrigation	400 per hour	20 Hour	5 Time	40,000
G	Bed preparation( Labor)	300 per day	5 Labors	5 days	7,500
H	Transplanting(labor)	300 per day	15 Labors	6 days	27,000
I	Weeding(Labor)	300 per day	10 Labors	4 days	12,000
J	Harvesting(Labor)	300 per day	15 Labors	3days	13,500
a	<b>Total production cost</b>	_____	_____	_____	<b>140,475</b>
—	Quantity of production	_____	_____	_____	37,500Kg
—	Losses (16%)	_____	_____	_____	6,000kg
c	<b>Marketable production</b>	_____	_____	_____	<b>31,500kg</b>
d	Income	8 per kg	31500kg		252,000
—	<b>Profit per Hectare (d-a)</b>	_____	_____	_____	<b>111,525</b>
—	<b>Profit per Kg</b>	_____	_____	_____	<b>3.50</b>

Source: Field survey

The 37,500 kg is the average production of onions including 16% losses. The land preparation and chemicals use are mechanized while other practices of production are Traditional and organizes by hand. The grower net profit from one hectare is 111,525 Rupees (1,300 \$) per year. The sharp farm gate price is 8 rupee per kg.

The traders check small onions visually but there isn't any special scale for size. The 16% small onions are rejected by local traders.

The labor expenditure, Irrigation and chemicals used against pest and diseases are the critical expenditure of input cost. The growers need labors in different production activities because all operation activities are performed by hand, furthermore the people come from city and use the chemicals on crops, they have simple pump and chemicals of related disease.

The following figure shows different operation costs and most critical costs expended during production activities.

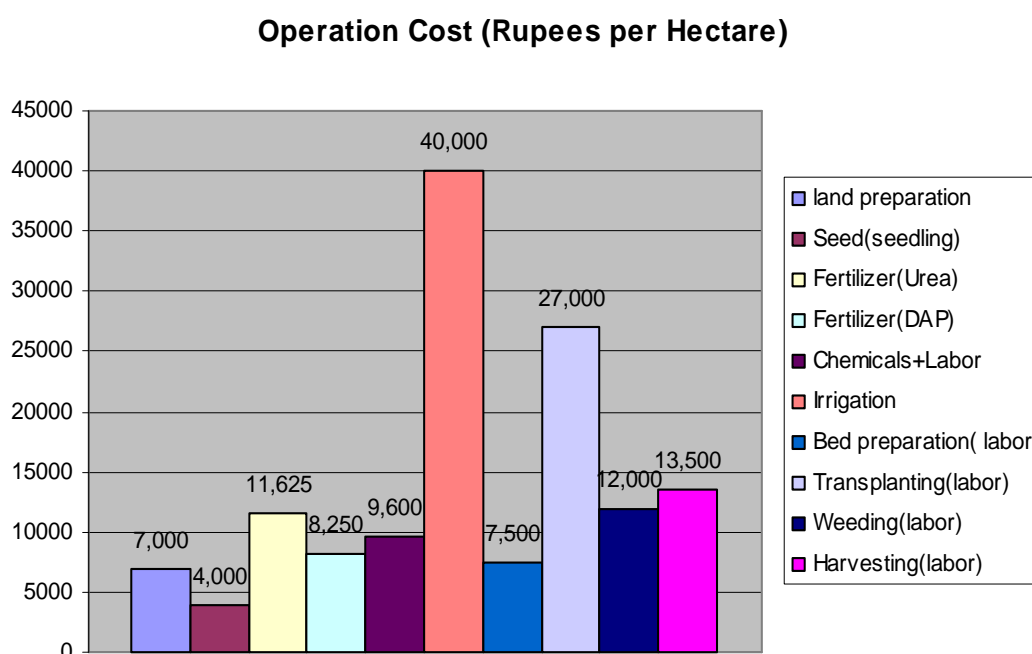


Figure 8: The cost expenditure of production process.

Source: Field survey

The growers faced critical expenditure of irrigation they should irrigate their fields 16 to 18 times. The water is coming from Spin Ghar Mountain located 30km far from Rodat and water depends on season. The growers of Rodat don't have access to this water in winter and just sufficient for Debala growers because Debala is located near to Spin Ghar Mountain Therefore the growers use tube well irrigation for 4 to 5 time at the beginning of growing season, they should pay 400 Rupees for hour and data shows that one hectare can be irrigated in 19 to 20 hours, the total cost for irrigation is 28% which greatly affect total cost of production.

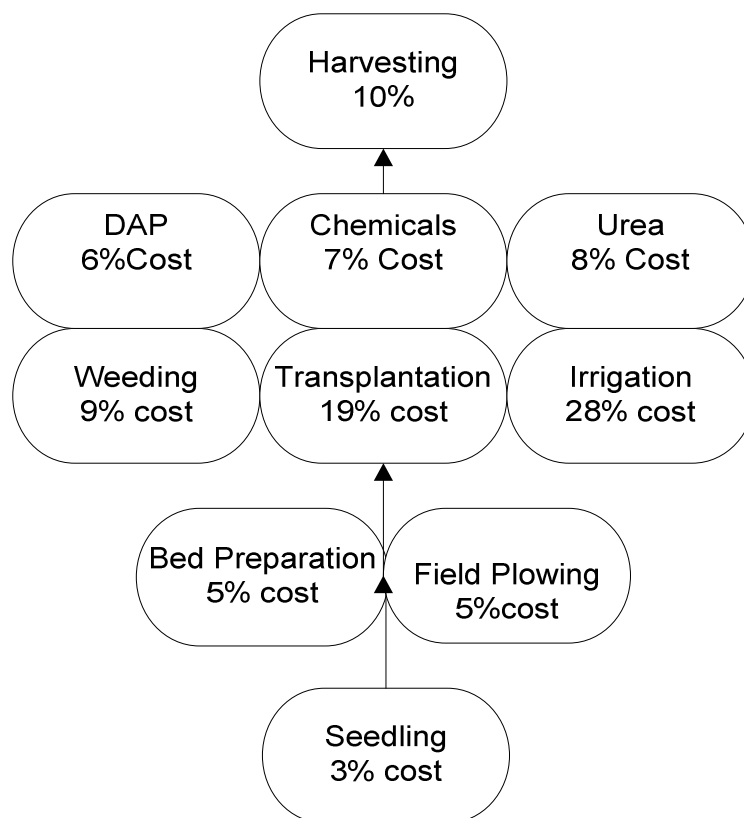


Figure 9: Production cost percentage

Source: Field survey

The lack of water, technology and the work performs by hand delay the production process and greatly increase the production cost. The average rented tube well irrigation is 4 to 5 times during the season. The once irrigation of one hectare requires 19 to 20 hours and growers pay 400 rupees per hour.

#### 4.5. Harvest and yield:

Family and hired labors harvest the onions from July to October by hands; no mechanical technology existed in the area. The growers pay almost 10% of total cost for harvesting. But harvesting depends on negotiation with local traders, some time growers sell their production before harvesting with approximate yield estimation. The data of the area shows that 57% of production is sold by pre finance. The money received by growers before harvesting from local traders under the contract of peak season prices. Most of the local traders are habitant in Nangarhar and few are coming from Pakistan. There are three kind of local traders:

- 1). The Nangarhar wholesaler's representatives
- 2). The Pakistani wholesalers and trader's representatives
- 3). Independent local traders.

These representatives have share trading with their partners or work as agents in the area, they bring the money from their partner and buy the onions before harvesting and give the money to the growers before yield with approximate estimation.

“Onions are cultivated in 12 percent of total vegetables but due to lack of marketing system most of the farmers make pre-finance contracts and estimate the yield before harvest, some farmers who are near to border easily export their products with better prices” (ICARDA 2003).

Some 57% growers of the area have pre-finance contract with local traders then the harvest is performed by traders and 43% of total production is sold by post harvest contract and harvesting is done by growers.

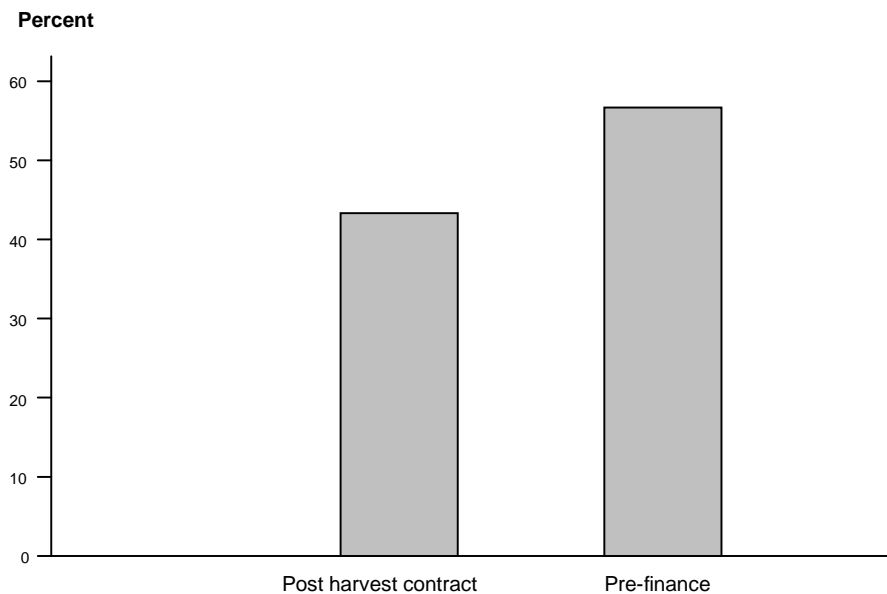


Figure 10: Selling type of onions

Source: Field survey

The difference between pre and post harvest is labor cost estimation in the total price. The labor cost is reduced in pre harvest contract because the harvesting is done by local traders while labor cost and other expenditure are estimated in post harvest contract, but the prices decision depends on peak season prices of the year.

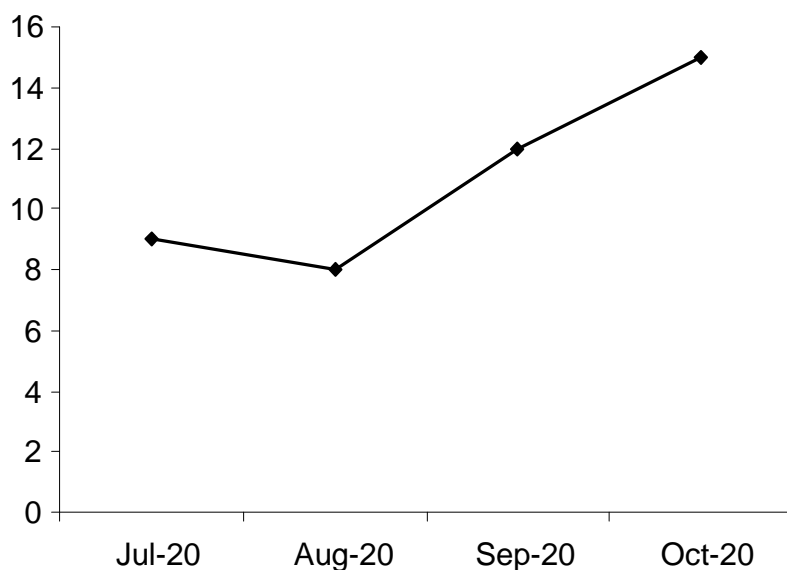


Figure11: Farm gate prices in different harvesting time  
Source: Field survey

The oversupply in the market and sharp season of Rodat reduce the prices. In August, most of the Rodat and some other districts onion are coming to market therefore the farm gate price is 8 Rupees per kg but the end of Rodat season is the end of the season in Nangarhar and wholesale market don't receive onions from other districts therefore price increases to 15 Rupees per kg but less volume is obtained in the area.

The harvesting season of some other districts are going side by side with the beginning season of Rodat onions therefore the prices aren't much higher at the beginning. The sacks, transportation and loads depend on traders. The growers just harvest the onions and bring together in the fields. There are sub roads in the village and onions can easily be transferred and stacked.

#### 4.6. Marketing channels:

##### 4.6.1. Value chain map and analysis:

Value chain map provides the movements of production passing through different stages and process from growers to consumers. The value chain map shows the process of production movement from bottom to the top. The left hand list shows the functions related actors' responsibilities and activities and middle list shows the actors and his place of activities. The right hand block list provides the enablers who perform activities as chain supporters or influencers. The whole chain reflects the whole process from production to consumption.

## Value Chain Map

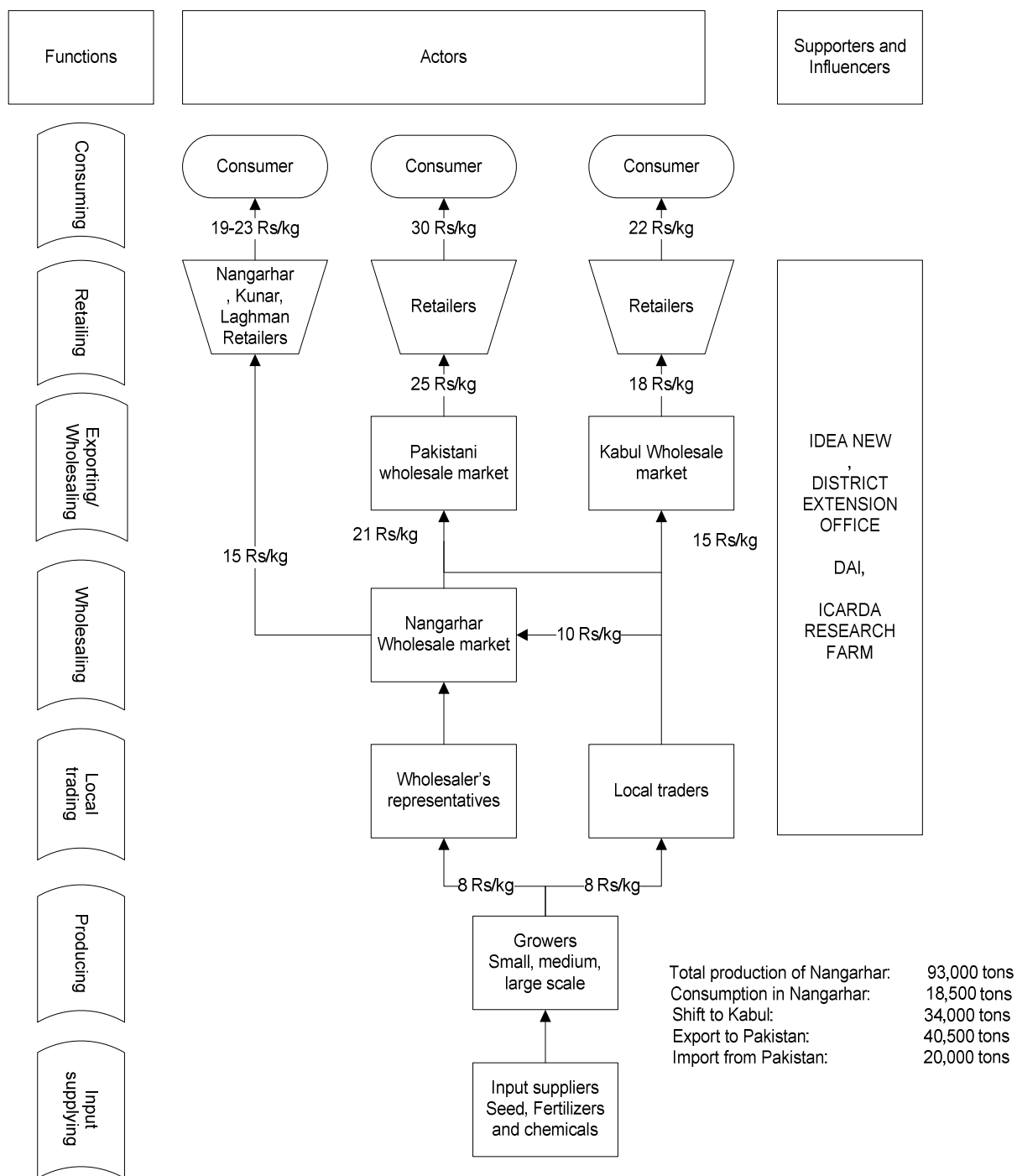


Figure 12: Value chain map of Onions in Nangarhar

#### **4.6.2. The Actors in the Chain:**

##### **4.6.2.1. producers/Farmers:**

According to the extension office of Rodat district there are 800 hectares land been cultivated on onions at 2010 and total approximate production is 30,000 tons.

The growers mostly sell their production on local traders at farm gate. 63% growers are small scale and haven't as much of one hectare. 27% are medium scale, their land area is 1 to 2 hectares and only 10% are large scale and have more than two hectares of land.

The pre harvest contract is the most selling type at farm gate, the growers sell their production before harvesting and traders harvest the onion when there is shifting opportunity. The price variation is from 8 to 15 Rupees per kg. The growers receive seeds, fertilizers and chemicals from city shops.

##### **4.6.2.2. Local traders:**

Local traders transfer the onions to Pakistan, Regional wholesale market and Kabul wholesale market. According to the wholesale market information there are more than 200 local traders in Nangarhar province. Some of the local traders are living in the area and do business of onions, these local traders are producers as well but few of the traders come from Pakistan and some of them are Nangarhar wholesalers' agents, they have specific portion with them. There are sub roads in the village and sacks are transferred and loaded by labors, they pay 10 Rupees per sack (112Kg). The local traders collect the sacks as a group to one place and load in a truck to transfer to Pakistan, Kabul or regional wholesale market. The truck has capacity of 22 tons.

There are three kind of local traders

- Independent local traders
- Nangarhar Wholesalers' representatives
- Pakistani wholesalers' representatives

The independent local traders move their products to Nangarhar, Pakistan or Kabul wholesale markets and sell by commission agents; the commission in Pakistan is 5%, in Nangarhar wholesale market 4% and 3 Afghanis (5 Rupees) in Kabul wholesale markets. Most of the independent local traders don't have enough money for wide trading while wholesalers' agents have enough money and purchase the onions with large volume. Pakistani local traders bring the money from Pakistani wholesalers and buy broad volume.

The data shows that 87% of total Rodat onions are exported to Pakistan and 13% are going to Regional wholesale market or Kabul markets.

##### **4.6.2.3. Wholesalers:**

Nangarhar wholesale market located to the North West part of Nangarhar city is second fruit and vegetable market in Afghanistan and supply the fruits and vegetables to Pakistan and different provinces of Afghanistan; there are three types of traders: the fruits traders, the vegetable traders and mix of fruit and vegetable traders.

The whole sale market has 70 wholesalers and 6 private vegetable trading companies. The wholesalers, private companies and local traders have their association. The wholesalers use free place or rented the place in the market they sell their products on retailers or consumers. They also work as a commission agent when trader or producer brings their products for sale.



The commission agents get 4% in agriculture commodities. This market is newly made by IDEA NEW organization.

The 13% of Rodat onions are distributed in eastern provinces or shifted to Kabul and other 87% are going to Pakistan. The peak season prices of onions in Nangarhar wholesale market is 15 Rupees per kg. The following graph shows the wholesale prices in Nangarhar wholesale market.

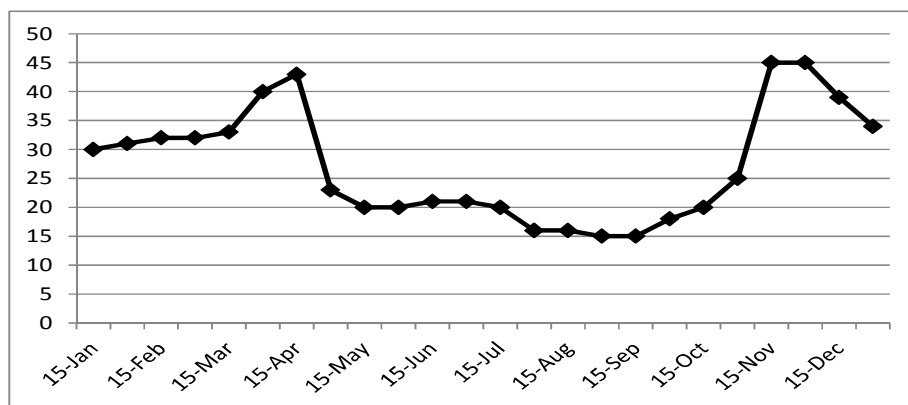


Figure 13: Price fluctuation of whole year at wholesale market

The minimum prices are the peak season prices of Nangarhar from June to September and April to May are harvesting time of white onions marketed at 20 to 23 Rupees per kg while November to April are the off season and prices extremely increased from 30- 45 Rupees per kg. There is significant difference between the prices of Pakistani red onions and Mazina red onions of Nangarhar.

The grower pay 23% of total cost and 77% are other inputs and transaction cost including 15% wholesaler and 16% growers margin. The transaction cost consists 46% of total cost.

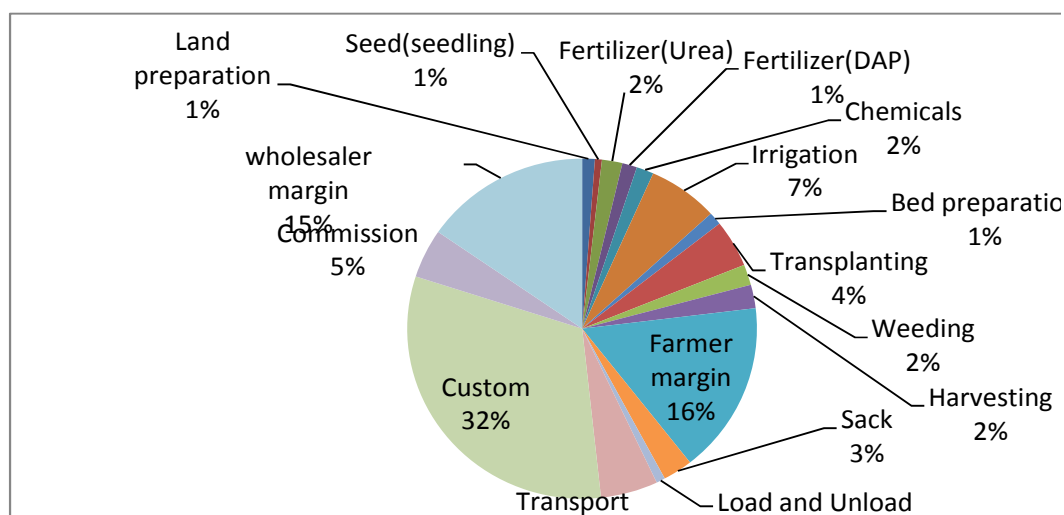


Figure14: The cost structure percentage from production to final destination.

Source: Field survey

The transaction cost to Kabul is not significantly different from Pakistan while it has significantly been differentiated by 32% custom of Pakistan but Afghan traders don't pay custom inside Afghanistan.

#### 4.6.2.4. Retailers:

The retailers buy small quantity of onions in wholesale market and sell in their shops; some of them sell their onions on hand cars at the centre of the city. Some of the retailers are coming from Kunar, Laghman, and districts of Nangarhar. Some of the retailers use vehicles and shift the production to different small cities and districts.

According to the wholesale market information the eastern provinces of Nangarhar, Kunar, and Laghman need 100 tons every day. The peak season retail price in Nangarhar is 15 to 16 Rupees per kg. They pay 10 Rupees per 112 kg sack in market.

The peak season retail price at consumer level is 19-23 Rupees per kg in eastern provinces of Kunar, Laghman, and Jalalabad city. The Jalalabad city, Kunar, and Laghman located near to the wholesale market play major role in retailing of vegetables. The Kunar province is located 90 km and Laghman is located almost 80 km far from Nangarhar wholesale market.

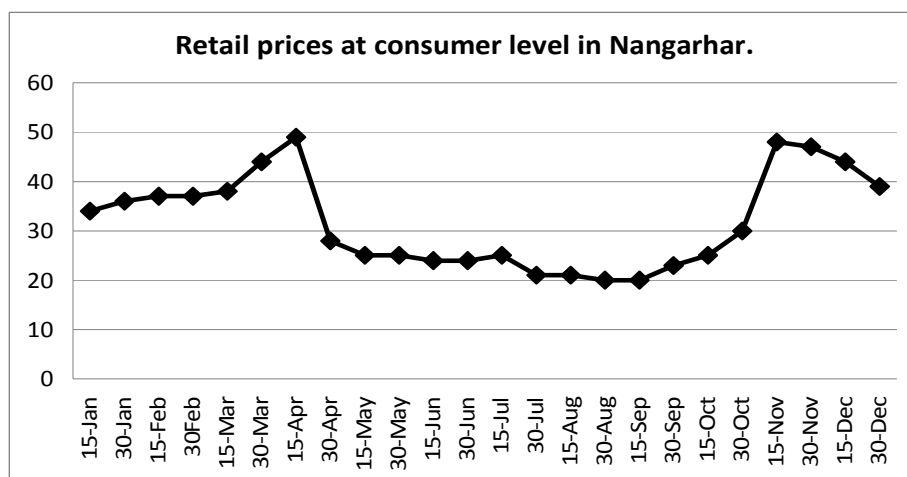


Figure15: The prices fluctuation of whole year at consumer level

Source: Field survey

The off season of Nangarhar greatly increase the prices to 50 Rupees per kg when onions are imported from Pakistan But the prices are reduced to 20 Rupees per kg when there is sharp season in Nangarhar.

#### 4.7. Transaction cost

The onions are shifted by small vehicles, Lorries, and/or large trucks to different districts of Nangarhar, Kunar, Laghman, Kabul and Pakistan. There are two kind of sacks used in the area. The big sacks are packed of 112 kg and small net sacks are packed of 21 kg. The Pakistan wholesale market is located 100 km and Kabul wholesale market is located in 160 km to Nangarhar. The trucks get load of 22 tons of onions therefore mostly the local traders load the onions as a group. The transportation cost and custom are shared among the traders. The transportation cost is 25,000 Rupees and custom is

150,000 Rupees per 22 tons truck to Pakistan. The traders pay 17,000 Rupees for transportation to Kabul and custom isn't paid.

The previous custom was 70,000 to 80,000 per truck while this year the custom has greatly increased to 150,000 Rupees per 22 tons. The border custom affects the prices at farm gate therefore the growers mostly complain from border custom because the high transaction cost decreases the prices at farm gate. The small sack on 5 and big sack is loaded on 10 Rupees in market and market receives 10 Rupees as a market area tax per full-size sack.

Table 6: Transaction cost to Pakistan

Total Inputs	Unite	Price per Unite	Quantity	Total
Sacks	Sack	65 per Sack	200 Sacks	13,000
Load and Unload	Sack	20 per Sack	200 Sacks	4,000
Transport Charge	Kg	1.13 per Kg	22,000 Kg	25,000
Custom	Kg	6.80 per Kg	22,000 Kg	150,000
Commission (5%)	Kg	1 per Kg	22,000 Kg	22,000
Total Transaction cost (22 tons)	_____	_____	_____	214,000
Transaction cost per kg	_____	_____	_____	<b>9.700</b>

Source: Field survey

The transaction cost to Pakistan consists 46% of total cost. The wholesalers and growers greatly complain from high custom.

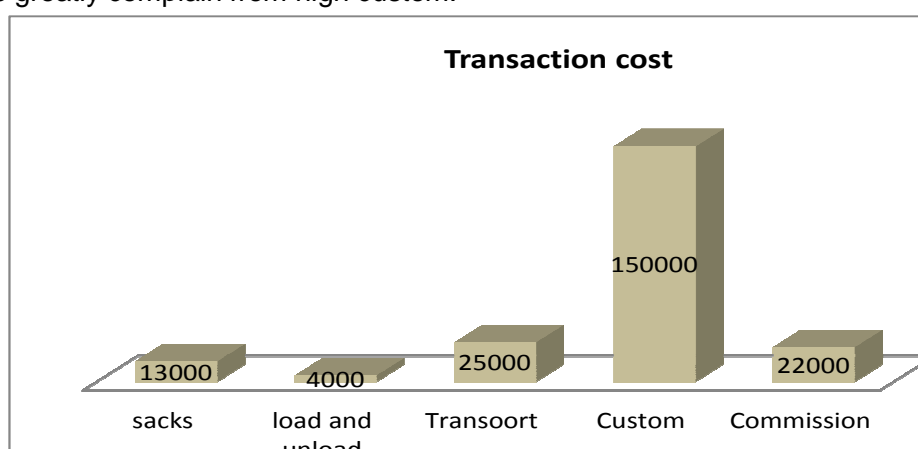


Figure16: Transaction cost to Pakistan

The custom of Pakistan consist 70% of total transaction cost, transportation 12%, sacks 6% and commission in Pakistani wholesale market is 10% of total transaction cost and the peak season wholesale price in Pakistani markets is 21 Rupees per kg. The price is increased to 30 Rupees per kg in Pakistan at the end of Nangarhar season.

#### 4.8. Value share:

"The value shares of the different market participants were estimated by taking the farm price in the case of the farmer and the marketing margin in the case of the market agent (trader) as a percent of the final value of the product at the consumer level (retail price)" (Isabelita. et al.2008).

Value share shows the contribution of actor in whole chain which is obtained from selling and buying difference.

The peak season onion price in Rodat district has been used in following table.

Table 7: The value share of different marketing channels.

Marketing participants	Selling price	Buying price	Marketing margin	Value share %
<b>Channel A ( Pakistan)</b>				
Farmer	8	-	-	27
Nangarhar Wholesaler/Local traders	21	8	13	43
Pakistani wholesaler	25	21	4	13
Pakistani Retailer	30	25	5	17
Pakistani Consumer	-	30	-	100
<b>Channel B (Kabul)</b>				
Farmer	8	-	-	36
Wholesaler/Local trader	15	8	7	32
Kabul Wholesaler	19	15	4	18
Retailer	22	19	3	14
Consumer	-	22	-	100
<b>Channel C(Regional)</b>				
Farmer	8	-	-	40
Wholesaler	15	8	7	35
Retailer	20	15	5	25
consumer	-	20	-	100

Source: Field survey

The channel A shows that grower value share is 27% and net profit is 3.5 per kg and Nangarhar wholesaler and local trader value share is 43% in the chain and receives 3.3 Rupees net profit per kg. The wholesaler and local trader profit estimated to Kabul is 4.2 and cost share is 32% in the chain.

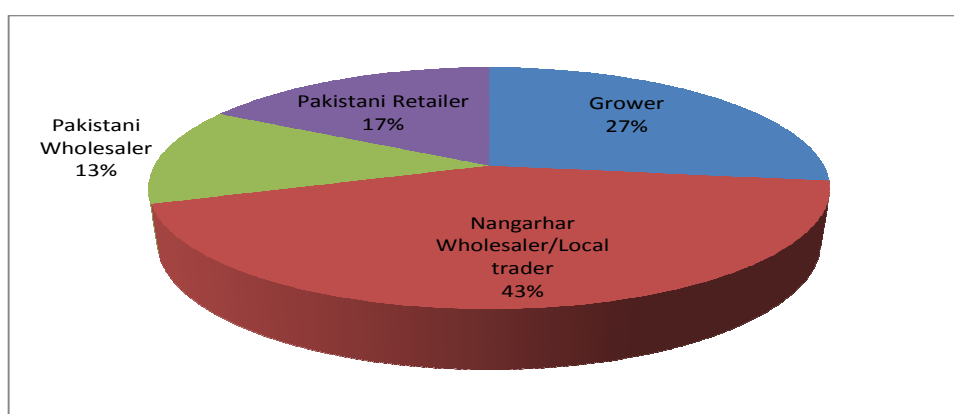


Figure 17: Value share percentage

Source: Field survey

#### 4.9. PESTEC analysis:

A PESTEC analysis was performed to see where the problems and opportunities within the sector located. From this analysis we can see that the problems within the sector concentrated mainly at political, economical and technological aspects. These problems rank from local up to government levels so that in order to solve the change in the whole system need to be done. Bellow is the details of PESTEC analysis of fresh onions sub-sector in Nangarhar

PESTEC ANALYSIS	
Political	<ul style="list-style-type: none"><li>• Ministry of Agriculture doesn't have appropriate consideration to fresh onions value chain of Nangarhar.</li><li>• Lack of information delegation.</li><li>• Lack of certificates and logo.</li><li>• Lack of subsidy policy for producers.</li><li>• Lack of Extension working and training of growers.</li></ul>
Economical	<ul style="list-style-type: none"><li>• Less margins within the sub-sector.</li><li>• Low labor costs.</li><li>• High transportation costs.</li><li>• High custom</li><li>• Low price at farm gate.</li><li>• Price fluctuation</li><li>• Lack of credit.</li><li>• Lack of investment power</li><li>• Lack marketing and business planning skills</li></ul>
social	<ul style="list-style-type: none"><li>• Need marketing education.</li><li>• Need horizontal and vertical cooperation and co-ordination.</li><li>• Need chain integration.</li><li>• The support network is weak.</li></ul>
Technological	<ul style="list-style-type: none"><li>• Lack of technology.</li><li>• Work done by hand.</li><li>• Lack of processing companies and technology.</li><li>• Fluctuating water supply</li></ul>
Environmental	<ul style="list-style-type: none"><li>• Farmer's cooperation if needed.</li><li>• Various diseases out of control</li></ul>

#### 4.10. SWOT ANALYSIS:

From the following SWOT analysis we can see that there are several strengths and weaknesses within this sub-sector. The weaknesses mainly focus on quality, information efficiency, market and transportation. There are many opportunities within the sub-sector to promote exportation and enlarge production. The important threat to the sub-sector is the reduced output.

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"><li>• Excellent climate for onion production</li><li>• Low labor cost</li><li>• Several varieties in the region</li></ul>	<ul style="list-style-type: none"><li>• Poverty and small scale farming</li><li>• Production highly perishable nature</li><li>• Lack of water availability</li><li>• Lack of knowledge</li><li>• Inefficient crop management</li><li>• Lack of appropriate packing facilities available</li><li>• Less growers bargaining power</li><li>• Lack of certificates of (origin, phyto-sanitary, and health)</li><li>• Lack of coordination and cooperation</li><li>• Information dissemination is weak</li><li>• Price fluctuations</li><li>• Lack of Commercial banking and insurance provision is lacking in the area</li></ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"><li>• Proximity to large markets in region( Kabul, Ghazni, Gardez etc)</li><li>• Marketing opportunities in Afghanistan instead of Pakistan</li><li>• Growing early maturing varieties</li><li>• Frost free weather to supply the onions to off season areas of Afghanistan</li></ul>	<ul style="list-style-type: none"><li>• Growers shift to other plants</li><li>• Accompanied peak season of Pakistan and Logar province of Afghanistan.</li><li>• Accompanied peak season of other districts</li><li>• Different onions diseases</li></ul>

## CHAPTER 5 DISCUSSION

This chapter discuss general glance related to the result of the research. it includes the problems existent in farm practices, price comparison of different commodities with onions cultivated in the area, the different marketing times of onions produced in Nangarhar, reasons of price fluctuation, comparison of transaction costs for different markets, proposed chain and proposed value share of growers, it also describes the economical aspects of storage in Nangarhar and sequential marketing plan.



Map2: Main cities of Afghanistan.

Nangarhar Province  
Jalalabad City

### 5.1. Limits in production process:

Rodat is one of the populous districts of Nangarhar and land has distributed on small parts among the people. 63% people are small scale and have less than one hectare of land. Some other commodities are mostly cultivated for home consumption and cattle. The less volume of onions compel the growers to sell their production at farm gate and shouldn't send to market by self therefore the bargaining power of traders are increased and farm gate prices are determined by them.

The lack of technology and lack of water highly increase the operation cost of the products. Hired labors for different process increase the cost price and delay the process. Labors are hired for almost all process.

The irrigation cost consists 28% of total input cost because the water isn't available in some of the places at the beginning of the season therefore the fields are irrigated 4 to 5 by tub well and they pay 400 Rupees per hour. The average 20 hours are needed per hectare.

The crops are suffering different diseases like downy mildew, soft rot, onion anthracnose or smudge and dodder. The uneducated people are coming from city and spray the chemicals on diseases but most of the growers don't know that what kinds of chemicals are used on their onions.

Sadaqat one of the university student said "my farther is an uneducated grower; he went to city shop and brought Thiodan chemical when I checked, it was expired. He went back to shopkeeper and asked, the shopkeeper replied: This is the difference between human and agriculture medicine that human medicine should be used before expire date while agriculture medicine increases their efficiency later than expire date"

Mostly the growers complain that chemicals aren't effective and cannot eliminate the diseases. They use imida, Thiodan, Gloprid, Benomyle, Intracol and Mencozeb for diseases it consist 7% of total cost.

The 37% growers are uneducated therefore they can't manage their farm efficiently. They can't use book let or any information from extension workers, education also affected the farm practices.

### 5.2. Worth of different commodities:

Most of the growers are small scale and agriculture is the main source of their life. Onions, wheat, Corn, Rice and Cotton are the main production of the area.

The corn, wheat, cotton and rice are grown for home consumption and send to market or directly sold on consumer, but the onion are cultivated for selling.

Table 8: Cost comparison of onions with different commodities cultivated in the area

Crops	Production per Hectare	Price per kg	Total price	Comparison
Onions	31,500 kg	8 per kg	252,000	-----
Wheat	3,900 kg	24 per kg	93,600	158,400
Cotton	500 kg	180 per kg	90,000	162,000
Rice	2,450 kg	35.7 per kg	87,465	164,535
Corn	4,000 kg	18.5 per kg	74,000	178,000

Source: Field survey



The comparison of total production cost including input costs shows difference among the crops grown in the area. The input prices of crops are different but here the total production costs have simply been compared. The onions have high production then other crops but the prices are low. The high volume of onion production increased the income of growers; therefore it has been introduced as a cash crop in the area and 30,000 tons have been produced in 800 hectares within this year. The wheat is second high income crop, the cotton is third, Rice is fourth and corn is fifth high income crop while 73% onions growers cultivate corn. The corn is low income crop compare to other crops but most of the onions growers cultivate corn because the growers keep cattle and need the grass therefore the weeds and corn crop are being reaped for cattle before harvesting.

The corn is cultivated when the wheat is harvested therefore the corn and wheat can't be compared while onions can be compared with all cultivated crops in the area because the onions are transplanted at February and harvested at July to October. The wheat is cultivated at the end of October and harvested at the end of April but corn and rice is cultivated at the end of May and harvested at the beginning of October.

### 5.3. Moments and Nature of the Market:

Nangarhar is frost free area and largely produce sub tropical crops. The Kabul River passes from the area and some areas of Nangarhar are sufficiently being irrigated; the market is near to Pakistan and easily imports the agriculture commodities in different seasons and export as well.

"The appropriate factor that added to Nangarhar horticulture production is near markets of Kabul and Peshawar, because Peshawar market is located only 100 and Kabul is located 160 km far from Nangarhar." (Saidy, 2003). The Nangarhar wholesale market is located 30 km far from Rodat District. Different districts produce different varieties of onions and carry to market in various times. Onions are locally classified by skin color as red, white, yellow and brown.

Some varieties were tested in 2005 for adaptation and yield in Nangarhar University Agricultural Research Farm.

Table9: Yield comparison of different onions varieties.

Cultivar	Average plot yield(kg/4.2m <sup>2</sup> )	Yield (t/ha)	Ranks	Yield difference With CAL606(t/h)
CAL 606	24.3	40.6	A	_____
Red Local Mazina	17.7	29.4	B	11.2
Super stone	13.4	22.3	BC	18.3
Super swat	11.3	18.9	CD	21.7
Red Brown F1 Hybrid	9.5	15.8	CD	24.8
Nasik Red	7.3	12.1	D	28.5
N-53 Commercial	6.7	11.2	D	29.4

Source: (Ehsanullah, 2006).

CAL606 variety is faster maturing and earlier growing variety. This variety is transplanted in early spring or late winter. This is high yield variety and early harvested. It is white color variety and marketed before other varieties (Ehsanullah, 2006).

The research shows that Red local Mazina is second high yield variety, this is red color variety cultivated in Rodat and some other districts. It is seedling at the end of October

and transplanted to the fields at February. The high volume of Rodat production (30,000) tons depress the prices in market. Red local Mazina variety has storing capacity but because of lack of storage capacity high volume is exported to Pakistan in sharp season.

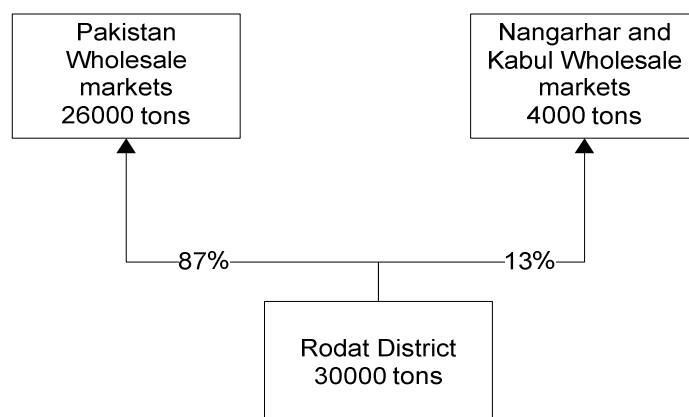


Figure18: marketing channels of Rodat onions.

Source: Field survey

The high volume of production in peak season, lack of storage facilities in the area and losses intimidate reduced the prices in farm gate; the high transaction cost to Pakistan has direct influence on prices. The season of Rodat is some time accompanied with other districts onions therefore it also depresses the prices in the market.

According to the DAI information white onions (white Spanish), Red local Mazina, Red-Bombay, Red-Creol, Super Swat, Swat-1, Cabrit Red and Dr.wakil varieties are grown in different districts of Nangarhar. It should be mentioned that Cal 606 and White Spanish are white and other varieties are red onions. The variety specifications and different temperatures have differentiated the marketing time of onions in Nangarhar.

Table10: Marketing times of Nangarhar onions.

Districts	Onions Marketing Time											
	Jan	Feb	Mar	April	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Sra Rod												
other all districts												
Srobi												
Khogiani,Hesarak												
Rodat												

Source: Field survey

The white Spanish variety is cultivated in Sra Rod district of Nangarhar; it is white color variety and largely cultivated in this area. White onions marketing is started at 25 April and continued for 40 days with optimum prices compare to red onions. It is marketed at 20 to 23 rupee per kg. According to the wholesale market information Sra Rod district produce maximum 30,000 tons of onions. Other different districts produce almost total 14,000 tons onions and marketed for 50

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DAI: Development alternative incorporation

days before Mazina onions, while onions of Red local Mazina are marketed for almost 80 days from July to October. Hesarak, Khogiani and Srobi onions are go along with Rodat onions during its sharp season. The total production of Rodat, Hesarak, Khogiani and Srobi are almost 50,000 tons and the peak season price is 8 rupee per kg, October is the end of Nangarhar onions in market.

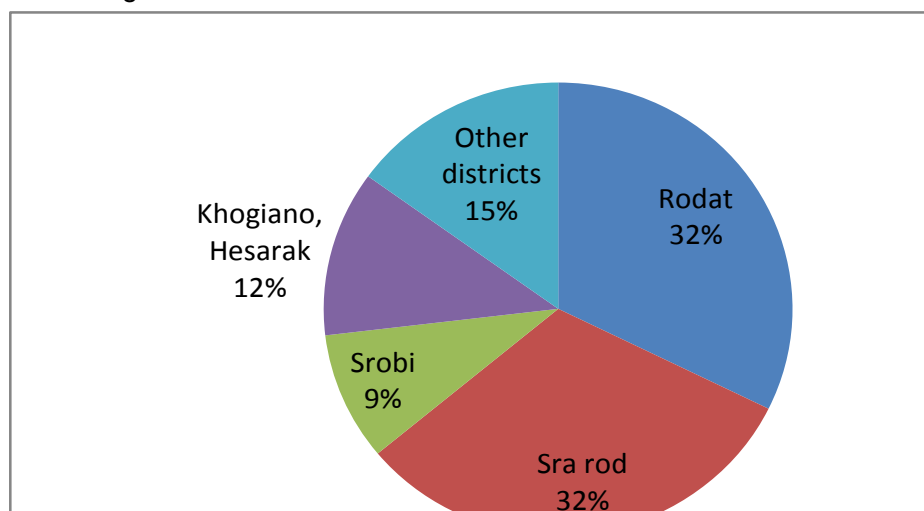


Figure 19: Total onions production percentage in Nangarhar  
Source: Field survey

Sra Rod produces 32% of total onions and marketed early with optimum prices of 20-23 per kg while other 68% are red onions and marketed with low prices of 15-20 rupee per kg at wholesale market.

Mazina onions are famous in markets for its storing and long time keeping capacity but 87% are going to Pakistan and 13% are shifted to regional wholesale market where the onions are managed for Kabul wholesale market or retail sale.

According to the wholesale market information the eastern provinces of Nangarhar, Kunar, Laghman, and Nuristan need 100 tons per day.

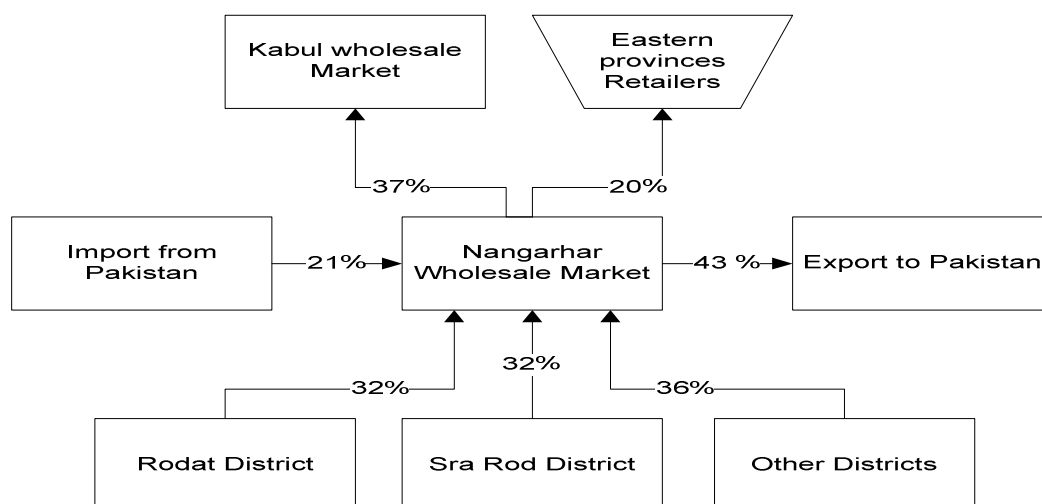


Figure20: Trading channels of onions in Nangarhar  
Source: Field survey

#### **5.4. Cause of price fluctuation:**

Data collected from the area shows that 78% growers get price information by local traders and 23% price information is shared among the growers. Most of the growers complain that the local traders determine the prices of onions in a session at the beginning of the season. There are no keeping facilities and growers compelled to sell their production sharp season. The growers try to sell their production before harvesting. Some of them are waiting and don't harvest before sale. They estimate almost 16% small size onions during the contract but there is no sorting and grading machine. The small onions are separated visually or by hands.

The data shows that 87% of onions are exported to Pakistan by regional local traders, regional wholesalers or Pakistani traders.

The group of traders combines the onions to one truck which has capacity of 200 sacks (22tons) and exports them to Pando Ba Ba market. The vegetable wholesale market in Peshawar is located almost 100 km far from Nangarhar. The Pando Ba Ba wholesale market of Peshawar is a famous vegetable market and the first wholesale market for Rodat onions but after these onions is distributed in other parts of the country like Peshawar wholesale markets, Sindh, Karachi, Punjab wholesale markets.

The Pakistani markets don't have sufficient onions for four months after July. The Punjab onions are being marketed before July and Swat region onions are coming to the markets at the beginning of July only some parts of Khyber pukhtonkhwa province produce the onions Therefore it is a good opportunity for Pakistani traders to import Afghan onions. Some of the onions are stored and some of them are marketed in different markets of Pakistan. The lack of storage facilities and same time harvesting season compel growers to sell their production with low prices. The farm gate prices fluctuate from 8 to 15 Rupees per kg in Rodat district.

The prices of Rodat onions are not significantly high at the beginning of the season compare to the nature of agriculture commodities. The reason is Nangarhar markets already has onions from Sra Rod district, the growers of Sra Rod grow white onions which has been introduced to growers by DAI and ICARDA. These onions come to markets before Rodat onions and sufficient onions in market affect the prices at farm gate further more the beginning season of Mazzina onions is peak season of swat onions in Pakistan and Pakistani markets also have sufficient onions in the markets, therefore the onions are only going to Kabul markets. From one side August is the peak season for Rodat onions, from other side onions are harvested in some parts of Khyber phokhtonkhwa province and Baluchistan province of Pakistan, Therefore the prices are reduced in Nangarhar.

According to the growers information the prices are determined and introduced by local traders and wholesalers. They collect all the local traders and wholesalers' agents in a session at the beginning of the season and select low price for peak season but local traders and wholesalers say that prices in Peshawar markets of Pakistan are reduced during the peak season of Rodat onions because the stored onions of Swat and newly produced onions in Pakistan are sequentially accompanied with Rodat onions in Peshawar markets furthermore high custom, and transportation also increase total input cost to Pakistan. The collected information shows that the reason of wholesalers and local traders is logical and prices are affected by custom, transport, and prices at Pakistani markets.

The prices are increased in September because the season is rarely move to the end and October is the last month therefore the maximum price is 15 Rupees per kg in farm

gate in October and October is the end of the season in Nangarhar if any grower has the onions at the beginning of November the price is increased to 20 Rupees per kg however it is very few while the onions are oversupply has been avoided in the markets and prices have been stabilized. The transaction imported to wholesale market of Nangarhar at 30 to 45 Rupees per kg when there is lack of onions in the markets of Afghanistan.

“Sindh has 44.4% share of total onions production in Pakistan and 51,000 Hectares land was cultivated at 2001. November to May is Sindh onions marketing time” (PHDEB, 2006). The harvesting of Sindh onions is started at November and October is the end of Rodat onions, therefore lack of onions in Nangarhar markets is again better opportunity for Pakistani traders to export the Sindh onions with high prices to Afghanistan. Sindh of Pakistan produce high volume of onions but mostly export to other countries and some are stored for a time. Therefore the transaction cost and optimum prices in Pakistan logically increase prices in Nangarhar markets.

The following graph shows prices comparison of white onions, Nangarhar Red onions and Pakistani red onions.

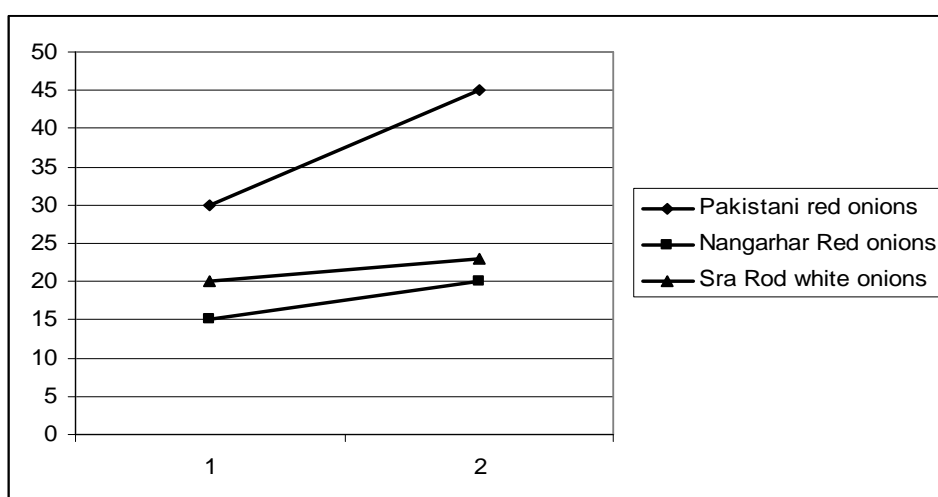


Figure21: Prices differentiation of White onions, Nangarhar red onions and Pakistani red onions

Source: Field survey

The above data for comparison of prices have been collected in Nangarhar wholesale market. The prices of Nangarhar red onions is 8 Rupees per kg in peak season but the end of October and beginning of November is the end of the season in Nangarhar therefore the graph of Rodat onions increases to 20 rupee per kg while Pakistani red onions wholesale price in Nangarhar is 30 to 45 Rupees per kg in off season of Nangarhar. There is significant difference in the prices of Pakistani and Nangarhar red onions.

## 5.5. Transaction costs assessment:

Some parts of transaction cost like sack, commission, load and unload, are almost the same to Pakistan and different cities of Afghanistan while custom is the major distinguishing factor because the custom is paid to Pakistan but afghan traders don't pay

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PHDEB: Pakistan Horticulture Development and Export Board

custom inside Afghanistan. The transaction cost to Pakistan is 9.7 Rupees per kg but it is cheaper to Kabul and total transaction cost to Kabul is 2.8 Rupees per kg. it has very less difference to some other markets of Afghanistan compare to Kabul. The Kabul market located 160 km far and total transportation cost of a truck is 16,000-17,000 Rupees per 22 tons. The commission in Kabul is 3 Afghanis (5 Rupees) per 7 Kg.

Table11: Transaction cost to Kabul

Total Input	Unites	Price per Unit	Quantity	Total cost
Sack	sacks	65 per sack	200 Sacks	13,000
Load and Unload	sacks	10 per sack	200Sacks	4,000
Transport	Kg	0.77 per Kg	22,000 Kg	17,000
Commission	Kg	0.70 per Kg	22,000 Kg	15,715
Losses during transportation 3%	Kg	0.60per kg	22,000 Kg	13,200
Total Transaction cost	_____	_____	_____	62,915
Transaction cost per kg	_____	_____	_____	<b>2.80</b>

Source: Field survey

The onions leaving to Kabul have less transaction cost because the traders don't pay custom and less commission are paid in market. The above transaction cost calculated for 22 tons of onion but mostly the small Lorries of 7 to 8 tons are going to Kabul and large trucks of 22 tons are going to Pakistan because the customs are calculated for truck instead of weight.

The prices at Kabul wholesale market in peak season of Rodat onions are 8 to 9 Afghanis (15 to 16 Rupees) per kg. It should be mention that Nangarhar onions are going to Kabul from April up to 10 August and beginning of August is the first stage of Rodat onions therefore it is a good opportunity for Nangarhar wholesaler to transfer the onions to Kabul.

The wholesale net profit to Pakistan is 3.3 but net profit to Kabul is 4.2 Rupees per kg. The northern, central and western provinces of Afghanistan like Kabul, Mazar-e- Sharif, Balkh, Ghazni, Qondus, Gardez cities are also don't have the onions in the markets at the beginning season of Rodat onions. Therefore July to 15 of August is the best opportunity for traders to send the onions to above cities. The low volume of onions at the beginning has reduced the opportunity.

The following figure compare transaction cost of different cities of Afghanistan with transaction cost of Pakistan.

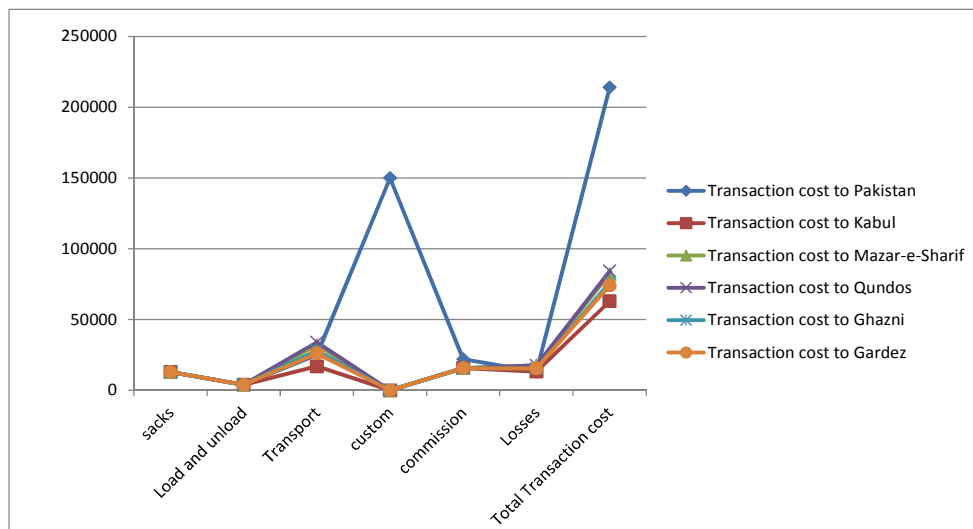


Figure 22: Transaction cost of different markets.

Source: Field survey

The transaction cost to Pakistan is extremely high compare to Afghan markets. Mazar and Qondus are located almost 400 km; Gardez is 230 km and Ghazni is 260 km to Nangarhar. The transportation cost to different cities of Afghanistan is determined according to the destination.

## 5.6. Marketing opportunities in Afghanistan

Nangarhar is frost free area and temperature is various from 16 to 45 °C during the year, therefore Nangarhar has the chance to produce the agriculture commodities in several months of the year while most of the Central, Northern and Western provinces like Mazar, Balkh, Qondus, Ghazni, Gardez have less growing season and broad offseason.

Logar province located near to Kabul produces the large volume of onions which can be sufficient for three months of September to November in central provinces markets, but the markets need onions in the rest months. The Logar onions and some onions produced in Ghazni, Gardez and Mazar mostly distributed among the Central, Northern and South Western markets. There is less need to import the onions at that time but need onions from December to July and prices greatly increase.

The Sra rod onions of Nangarhar is harvested in June to July and shifted to Kabul and other wholesale markets with optimum prices. It is off season of many provinces of Afghanistan. If growers of Rodat and other districts produce CAL606 and white Spanish varieties early in June to July, it will be marketed with optimum prices.

The peak season of Rodat is accompanied with Logar peak season therefore lack of storage capacity and lack of early maturing varieties compelled the growers to sell their products and traders are obligated to send the production to Pakistan with low prices. The white Spanish variety being grown in Sra rod and CAL 606 are early maturing varieties, these varieties are harvested in May and it is the off season of most of the markets in Afghanistan. The wholesale market information about prices and places where early maturing varieties have better prices has clear suggestion to Nangarhar growers to grow early harvesting varieties instead of late varieties.

The following proposed chain indicates the marketing opportunity in different markets inside Afghanistan.

### 5.6.1. Proposed Value Chain Map:

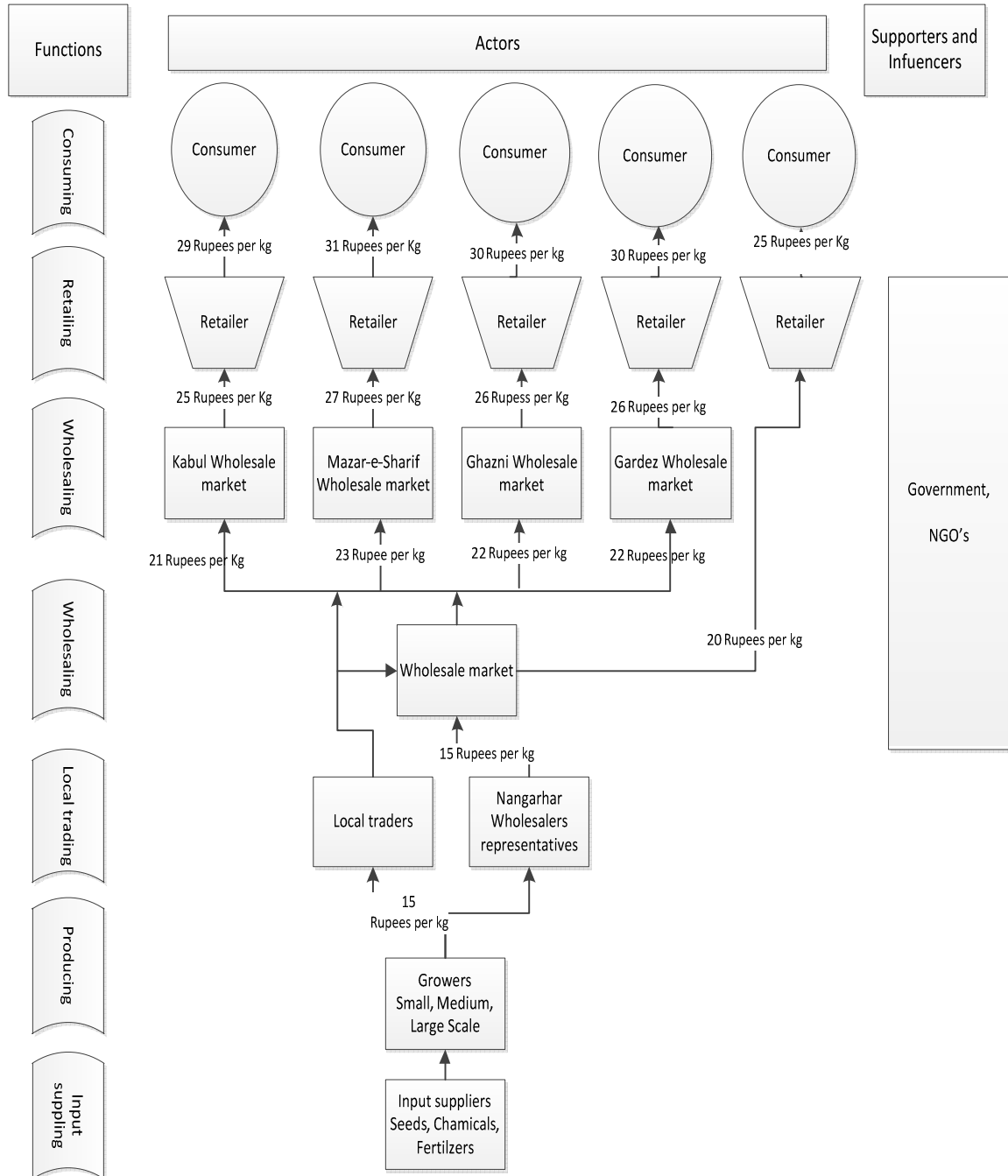


Figure23: Proposed value chain map indicates marketing opportunities in Afghanistan.

Source: Field survey



According to the wholesale market information and wholesalers' opinion the new proposed chain indicates three times high margin for growers. The regional exports also augmented the idea of new white early harvesting varieties. According to the regional experts this idea is also applicable in other districts of Nangarhar because there is less difference in growing and producing conditions of Rodat with other districts. The Central, Northern and South Western provinces have the capacity and requirement to use the Nangarhar onions production.

The storage of onions and sequential marketing in Nangarhar can stabilize the prices and elongate the existence of Nangarhar onions in Markets. The fluctuation of prices shows that stable prices will be 27 Rupees per kg at consumer level in Nangarhar. If the onions stored it is also possible to send the extra production of Nangarhar to other parts of Afghanistan during the off season. The average consumption of eastern provinces is 100 tons per day while average total production of Nangarhar including Srobi district of Kabul is 92,000- 93,000 tons per year. The harvesting is started in May and ended in October. It means that Nangarhar has their own production for six months while need the onions for six months (180 days) of the year. Therefore Nangarhar needs 21,000 tons storage including 3,000 tons extra onions for losses, diseases and other circumstances.

#### 5.6.2. Planned value share:

According to the field survey the proposed chain of onions marketing completely changes the direction of marketing channels, the transaction cost and margin of intermediaries. The value addition of new proposed chain shows that stable price at farm gate is 15 Rupees per kg in peak season.

Table 12: Proposed value share of different marketing channels

Marketing participants	Selling price	Buying price	Marketing margin	Value share %
<b>Channel C ( Ghazni)</b>				
Farmer	15	-	-	50
Nangarhar Wholesaler/Local traders	22	15	7	23
Ghazni wholesaler	26	22	4	13
Retailer	30	26	4	13
Consumer	-	30	-	100
<b>Channel E (Regional)</b>				
Farmer	15	-	-	60
Wholesaler	15	20	5	20
Retailer	25	20	5	20
consumer	-	25	-	100

Source: Field survey

The comparison shows that value share of grower to Pakistan is 27% while it is increased to 50% in new proposed chain. The current value share of grower in regional retail channel is 40% but value share of grower in new proposed chain is 60% and rest value distributed among the other actors.

## 5.7. Economical aspect of storage:

The calculation in appendix D as an example of 100 tons onions storage shows that total need of electricity for 24 hour storage is 20 kW. The total estimated cost is 180,000 Rupees per 24 hours storage. The average stable price of whole year estimated from the prices fluctuation is 27 Rupees per kg. The following calculation shows the approximate profit of storage.

Storage:	100 tons
Time:	24 hours
Electricity:	20 kW
Cost per Watt:	5 Afghanis (9 Pakistani Rupees)

**a. Total cost:** **180,000 (2,105 \$)**

Farm gate price per kg:	15 Rupees
Total: 100,000 kg*15 =	1500,000 Rupees (17,544\$)
Transaction cost: =	<u>100,000 Rupees</u>

**b. Total Cost:** **1600, 000 (18,713 \$)**

**c. Total Input Cost (a+b):** **1780, 000 (20,818 \$)**

d. Income: 2700, 000 (31589\$)

**Net Profit (d-c):** **920,000 (10760 \$)**

Some time the possible extra capacity of storage can also be used for other commodities like tomatoes or potatoes because these commodities are also imported from Pakistan with high prices during the off season of Nangarhar.

The regional experts of Nangarhar suggest underground storage because Nangarhar is one of the hot places and temperature is increased up to 45 °C. Under ground earth can help with temperature reduction.

## CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

This chapter concludes the thesis with significant points pointed out in research project and suggests some possible recommendations for the problem solution.

### 6.1. Conclusion

Rodat is south east district of eastern province of Nangarhar, The onions, wheat, cotton, corn and rice are the major production of the district but onion is the cash crop compare to other crops in the area. Agriculture is the main source of income. This district produced almost 30,000 tons of onions in 2010 but 87% of the production is exported to Pakistan with very low prices.

63% of the growers of this district are small scale and have less than 1 hectare of land thus affected their bargaining power in decision of farm gate price. Only 10% growers are large scale and have more than 2 hectares of land. They aren't direct in touch with wholesale market and sell their onions at farm gate. The price depends on negotiation but local traders have dominance in price selection. The growers should sell their onions and can't keep for long time. 16% of the farm production is estimated small size onions during the selling at farm gate. These 16% are used at home because of lack processing companies or other resources.

Most of the growers are uneducated and can't manage the farm efficiently. The growers use traditional equipment and work perform by hand. Almost 50% growers are tenant thus input price and margin are equally distributed between tenant and owner.

Lack of technology has increased the operation cost. Almost all practices are done by hand and hired labors. The irrigation cost consist 28% of total cost, the fields are 4 to 5 times irrigated by rented tub well at the beginning of the season when there is shortage of water in the area, consequently irrigation and labor cost is the critical expenditure of input price.

57% growers sell their onions by pre finance and get the money before harvesting but price of production is determined in sharp season. They need money during the growing season. Local traders and wholesalers' agents give them money one to two months before harvesting. The farm gate prices fluctuate between 8 to 15 Rupees per kg; the price is affected by harvesting time, oversupply of the market, custom and accompanied seasons of other places like Logar province, Pakistan and some districts of Nangarhar.

Currently three marketing channels are used (Pakistan, Kabul, and retail channel). Pakistan import 43% of total Nangarhar onions with low prices. Kabul wholesale markets receive 37% and 20% is distributed in eastern provinces by retail channel. The value share of growers in channel A (Pakistan) is 27%, in channel B (Kabul) 36% and 40% in retail channel of eastern provinces.

Nangarhar import 21% onions from Pakistan with two time high prices during the off season of Nangarhar. The export price of Rodat onions during the sharp season of Nangarhar is 21 Rupees at wholesale market of Pakistan but the import price during the off season of Nangarhar is 30 to 45 at wholesaler market of Nangarhar. The prices variation at consumer level in Nangarhar is 19 to 50 Rupees per kg, the data shows that the reason is over supply, seasonality, off season, lack of storage facility and lack of sequential marketing plan.

The white onions of Sra Rod district are going to Kabul with optimum price of 20 to 23 Rupees per kg early in the May but the late production of red onions produced in Rodat and other districts are exported to Pakistan with low prices because the prices are affected by peak season of Logar, some areas of Pakistan and high barrier at border.

The transaction cost to Pakistan adds 9.7 Rupees per kg while transaction cost to Kabul is 2.8 Rupees per kg. The custom of Pakistan consist 32% of total cost. The traders don't pay custom to Kabul and other cities of Afghanistan.

The new proposed chain recommends white varieties of white Spanish and CAL606 to growers, these are early harvesting varieties thus it is the best opportunity for Nangarhar growers and wholesalers to send their production to other wholesale markets of Afghanistan because May and April is the harvesting season of these varieties and off season of Central, North and some South Western provinces of Kabul, Ghazni, Gardez, Mazar-e-sharif and Qondus.

The net profit of growers in current chain is 3.5 Rupees per kg but new chain indicates three time high profit at farm gate. The value share of growers in current chain is 27% but their value share is 50% in new proposed chain.

From the total production of Rodat 21,000 tons should be stored for off season of Nangarhar and should be supplied by sequential plan of 100 tons per day to stabilize the prices in eastern provinces. The Local Mazina variety has high storing capacity therefore it should be cultivated for storage and rest of growers should grow white onions of White Spanish and CAL606 varieties for early harvesting and marketing. According to the regional experts this plan is also applicable for other districts of Nangarhar which produce late harvesting onions because other districts of Nangarhar has same problem of prices and Central, Northern and South Western provinces have the usage capacity of Nangarhar production.

## **6.2. Recommendations:**

1. It is recommended that Rodat should produce 21,000 tons Red Local Mazina variety. It should be cultivated in late April and harvested in late September or October. This variety has high storing capacity thus it should be stored for off season and sequentially 100 tons per day should be supplied to Nangarhar markets. The storage is a big investment risk and needs high input cost, it is a permanent investment and should be managed for future time, therefore the government should build the storage and wholesalers should pay rental fee for the space.

The storage should be under ground and should be near to Wholesale market therefore possible empty space will be used for other commodities as well. Many other perishable commodities are coming from Pakistan with very high prices during the off season while Nangarhar and some other provinces of Afghanistan produce the same commodities and send to Pakistan in peak season with very low prices.

2. According to the Nangarhar University research in 2005, the CAL 606 variety is white color, high yield, early maturing and highly adoptive variety in Nangarhar (Ehsanullah E .2006). The Spanish variety is being cultivated in Sra Rod is also early maturing and high adaptive and high yield variety. The harvesting time of these varieties is May to June in Nangarhar and this is the time that Northern, Central, and some of the South Western places of Afghanistan don't have onions in the markets. It is recommended that:

Rest of the Rodat growers should grow white Spanish and CAL 606 varieties, these onions should move to Central, Northern and South Western provinces of Afghanistan.

The extension workers should suggest some large scale growers to grow these varieties. The medium and small scale growers will be stimulated for next year by looking the high yield and prices of white onions during the harvesting time.

It is also possible when extension workers of the district explain the importance of both white and Red onions. The cultivation rate is depended on production volume per year but as an example of 2010 the 30% growers (9,000 tons) should grow white onions and the rest should grow red onions.

3. The extension workers should have three meetings with growers during (seedling or transplanting, growing, harvesting) time and inform them for efficient farm management and better farm practices.
4. The city restaurants and hotels need onions for cooking therefore the cheaper prices compare to optimum prices of 16% small size onions can increase the demand in city restaurants and hotels. It is possible by local traders or growers to make small size onions' contract with restaurants and hotels.
5. The 16% of onions are the high volume and the whole volume can't be supplied to restaurants and hotels therefore the growers should traditionally dry the extra onions for home consumption because the drying increases the usage life of onions.

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## Appendix

### Appendix A: Producer Questionnaire.

Name of interviewer \_\_\_\_\_ Date of interview \_\_\_\_/\_\_\_\_/\_\_\_\_

PH No. \_\_\_\_\_

#### 1. particular of the farmer

- a) name of farmer \_\_\_\_\_ Ph.No \_\_\_\_\_
- b) village name \_\_\_\_\_
- c) District \_\_\_\_\_ province \_\_\_\_\_
- d) Age \_\_\_\_\_ years. Qualification \_\_\_\_\_
- e) Distance of field from Medaled road \_\_\_\_\_ km.
- f) Distance of field from Market \_\_\_\_\_ km.
- g) House hold size \_\_\_\_\_

#### 2. Tenure status

- a) Owner
- b) owner-cum-tenant
- c) Tenant

#### 3. Size of holding (hectares)

- a. Area owned \_\_\_\_\_ b. Area rented in \_\_\_\_\_
- C.Total area operated \_\_\_\_\_

#### 4. Production status

- Rent/estimated rent (if land owned) \_\_\_\_\_
- onions approximate yield \_\_\_\_\_
- losses of produce \_\_\_\_\_
- Home consumption \_\_\_\_\_
- Size of field area \_\_\_\_\_
- Rate of seed in field area \_\_\_\_\_
- Harvesting time \_\_\_\_\_
- Marketing time \_\_\_\_\_
- Names of the onion variety grown?  
I. \_\_\_\_\_ II. \_\_\_\_\_ III \_\_\_\_\_ IV others

#### 5. Inputs:

Inputs	Unit	Quantity(Kg)	price	total
Seed or plants	Hectare			
Fertilizer (Urea)	Hectare			
Fertilizer(DAP)	Hectare			
Chemicals(yes/no)	Hectare			
Labor FL/HL	Hectare			
Machinery Rent	Hectare			

#### 6. Do you have input supplier (yes \ No)?

A). If yes: I). government II). NGOs III) private companies IV). Others

B).If yes what kind of Input supply?

a). seed b). Fertilizer c). Chemicals d). Others



7. How do you get information for proper farm practices?

- a). Extension worker                      b). NGOs                      c). Other

8. Other commodity grown?

Area operated	commodity	production	marketing time	selling price
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

9. Mode of sale:

- a) post-harvest contractor \_\_\_\_\_% b) wholesale market \_\_\_\_\_%  
 b) Pre finance \_\_\_\_\_% others \_\_\_\_\_%  
 c) How do you sell your products?  
 1. Fresh \_\_\_\_\_ 2. dry \_\_\_\_\_ 3. total \_\_\_\_\_

10. How do you get information about market prices?

- I. Farmers II. Middlemen III. Extension worker IV. Media V. others

11. What kind of problems do you face in picking?

- a. labor non/less availability b. labor poor skills c. absence of equipment d. others

12. How do you grade your onions?

- I. by shape II. By color III. By size IV. By variety V. any other

13. What kind of problem do you face in grading?

- a. poor or unskilled labor b. lack or absence of machinery c. any other

14. What kind of packaging you are using?

1. Corrugated box 2. crates 3. sacks 4. carton 5. Any other

15. How the packing of produce is done?

- I. by hand II. By machine.

16. Cost of marketing:

Activities	Unit	Price/unit	Quantity(kg)	total
Picking(FL/HL)	R.D			
Empty crates/sacks	Rs			
Packaging(FL/HL)	R.D			
Grading(FL/HL)	R.D			
Loading(FL/HL)	R.D			
transportation	Rs			
Cold storage(yes/no)				
Unloading	R.D			
Commission	Rs			

FL=family labor, HL=hired labor, RD= Rupees per day, Rs= Rupees

17. Problems regarding fresh onions marketing.

- I. \_\_\_\_\_  
 II. \_\_\_\_\_  
 III. \_\_\_\_\_

18. Suggestions

- a. \_\_\_\_\_  
 b. \_\_\_\_\_  
 c. \_\_\_\_\_

## Appendix B: Wholesaler Questionnaire.

### Particular of the wholesaler:

1. Name of the Respondent \_\_\_\_\_ Ph No \_\_\_\_\_  
address \_\_\_\_\_

2. Educational status: I. Illiterate I. literate:  
If literate then level of education \_\_\_\_\_

### 3. Availability of onions in market and Business volume

#### 1. Beginning of the season

Month	district	verity	quantity	purchase (Rs)	sale (Rs)
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

#### 2. peak season

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

#### 3. End of season

_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### 4. Marketing costs:

S.NO	activity	amount (Rs)
1.	Commission	_____
2.	Loading and unloading	_____
3.	Transportation charges	_____

### 5. Marketing activities:

#### 1). Mode of purchase:

a). Middle man \_\_\_\_\_ % b) producer \_\_\_\_\_ %  
c) Pre finance \_\_\_\_\_ % d). Others \_\_\_\_\_ %

#### 6. Who buy your onions?

1. Pakistani traders \_\_\_\_\_ % 2. Retailers \_\_\_\_\_ %  
3. Kabul wholesalers \_\_\_\_\_ % 4. others \_\_\_\_\_ %

#### 7. When onions come back from Pakistan?

Month	Verity	quantity	purchase (Rs)	sale (Rs)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**8. Business volume of other products?**

Products name	month	quantity	purchase (rupee)	sale (rupee)
---------------	-------	----------	------------------	--------------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**9. Approximate prices in Kabul?**

Variety	month	quantity	purchase (rupee)	sale (rupee)
---------	-------	----------	------------------	--------------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**10. Approximate prices in Ghazni?**

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**11. Approximate prices in Mazar-e- Sharif?**

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

**12. Approximate prices in Gardez?**

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

Problems regarding fresh onions marketing.

- I. \_\_\_\_\_  
II. \_\_\_\_\_  
III. \_\_\_\_\_

**9. Suggestions**

- a. \_\_\_\_\_  
b. \_\_\_\_\_  
c. \_\_\_\_\_  
d. \_\_\_\_\_

## Appendix C: Retailer Questionnaire.

### Respondent identification

Name \_\_\_\_\_ Ph No \_\_\_\_\_

address \_\_\_\_\_

Education \_\_\_\_\_ location \_\_\_\_\_

### 1. Business volume and prices

#### 1. Beginning of the season

Month	variety	quantity	purchase (Afs)	sale (Afs)
-------	---------	----------	----------------	------------

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

#### 2. Peak season

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

#### 3. End of the season

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

#### 4. off season

_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

### 2. Marketing costs

S, NO	activities	amount
-------	------------	--------

1.	Loading and unloading	_____
----	-----------------------	-------

2.	Transportation charge	_____
----	-----------------------	-------

### 3. Problems regarding fresh onions retailing

I \_\_\_\_\_

II \_\_\_\_\_

III \_\_\_\_\_

IV \_\_\_\_\_

### 4. Suggestions

a \_\_\_\_\_

b \_\_\_\_\_

c \_\_\_\_\_

d \_\_\_\_\_

## Appendix D: Storage calculation:

Storage calculation for 100 tons onions

**a. Dimension** for the cold store:

Crate: 60 kg contains 300 kg onions

Dimension: length\* width\*height = 1 \* 1.2 \* 0.75 m

Number of crates: 100,000 kg/300kg/crate =333 Crates

Space between crates 5 cm and space from the walls 10 cm

Length	8* 1.00 m	= 8.00 m
	7* 0.05 m	= 0.35 m
	2* 0.10 m	= <u>0.20 m</u>
		8.55 m

Width:	6* 1.20 m	= 7.20 m
	5* 0.05 m	= 0.25 m
	2* 0.10 m	= <u>0.20 m</u>
		7.65 m

Height	7 * 0.75 m	= 5.25 m
	10% extra	= <u>0.55 m</u>
		5.80 m

Dimension of cold storage: Length \* Width \* Height = 8.55 \* 7.65 \* 5.80 m

Mass crate:	60 kg
Content:	300 kg onions
Specific heat of wood =	2.5 kJ/kg.K

Temperature:	Outside during bringing in onions	20 °C
	Out side during storage	8 °C
	Onions by intake	18 °C
	Storage temperature	3 °C

Respiration heat:	0.014 W/kg at 20°C
	0.030 W/ kg at 10.50°C

Once 1/10 of the total is brought in.

Cooling time	24
Ventilation	4 times
K-Value	0.45 w/m <sup>2</sup> K
Evaporator	30 W/m <sup>2</sup> K

Ventilators:	2 kW
Lights:	400 W
Defrost of evaporator	15 kW
Electrical forklift:	10 kW
1 person	300 W

**b. Calculation:**

The last day most heat is produced

Radiating heat of cold

store:

$$2 \times 8.55 \times 5.80 = 99.2$$

$$2 \times 7.65 \times 5.80 = 88.75$$

$$2 \times 8.55 \times 7.65 = 130.8$$

---


$$\mathbf{318.75}$$


---

$$\Delta T: +20^\circ\text{C} - +3^\circ\text{C} = 17\text{K}$$

$$\phi = 0.45 \times 318.75 \times 17\text{K} =$$

$$\mathbf{2.40\text{Kw}}$$

Heat onions Kg:

$$\text{Mass onions intake day10} = 1/10 \times 100 \text{ tons} = 10,000 \text{ Kg}$$

$$\text{Specific heat} = 3.75 \text{ kJ/Kg K}$$

$$\Delta T = 18^\circ\text{C} - 3^\circ\text{C} = 15\text{K}$$

$$\Delta T = 24 \text{ hours} = 24 \text{ hours} \times 3600 \text{ s}$$

$$\phi 10,000 \times 3.75 \times 15 / 24 \times 3600 = \mathbf{6.5 \text{ Kw}}$$

Heat crates:

$$\text{Mass crates} = 1/10 \times 333 \times 60\text{Kg} = 9998 \text{ kg}$$

$$\text{Specific heat of wood} = 2.5\text{kJ/kg.K}$$

$$\Delta T = 18^\circ\text{C} - 3^\circ\text{C} = 15\text{K}$$

$$\Delta T = 24\text{hours} = 24 \times 3600\text{s}$$

$$\phi = 9998 \times 2.5 \times 15 / 24 \times 3600 = \mathbf{0.86\text{Kw}}$$

Respiration heat

$$\text{Average temperature} = 10.5^\circ\text{C}$$

$$1/10 \times 100,000\text{Kg} \times 0.03\text{W/kg} = 300\text{W} = 0.30\text{Kw}$$

$$9/10 \times 100,000\text{kg} \times 0.014\text{W/kg} = 1260\text{W} = 1.26\text{Kw}$$

---


$$\text{Total} \quad \mathbf{1.56\text{kW}}$$


---

Ventilation

$$\text{Cooling of air from } 20^\circ\text{C} \text{ to } 3^\circ\text{C}$$

$$\text{Specific heat of air} = 1.005\text{kJ/kgK}$$

$$\text{Specific mass of air} = 1.2 \text{ kg/m}^3$$

$$\text{Heat: } 1.2 \times 1.005 \times 17 = 20.4\text{kJ/m}^3$$

$$\text{Volume store: } 8.55 \times 7.65 \times 5.80 = 379.36\text{m}^3$$

$$4 \text{ time per 24 hours}$$

$$4 \times 20.4\text{kJ/kg} \times 379.36\text{m}^3 / 24 \times 3600\text{s} = \mathbf{0.35 \text{ Kw}}$$

Ventilators:

$$\mathbf{2 \text{ kW}}$$

$$\text{Defrost of evaporator: } 15\text{Kw during 1 hour} = 15\text{Kw} \times 1/24 = 0.625 \text{ kW}$$

$$\text{Lights used 4 hours. } 0.4\text{kW} \times 4/24 = 0.066 = 0.07\text{kW}$$

$$\text{Forklift: 2 hours work } 10\text{kW} \times 2/24 = 0.833\text{kW} = 0.83\text{kW}$$

$$\text{One person: Works for two hours } 0.3\text{kW} \times 2/24 = 0.025\text{kW} = 0.03\text{kW}$$

**In total**

$$\mathbf{15\text{kW}}$$

$$\text{For safety 10\% extra } 15.20 \times 10/100 = 16.70$$

The cooler is off during intake and during defrosting.

The evaporator has to transport the heat in 20 hours

$$\mathbf{\text{Needed cooling Power: } 16.70 \times 24/20 = 20\text{kW}}$$