



Impact Study of HLP Extension Package on Grape Production In Terms of Farm Income in Kabul Province, Afghanistan

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Abstract

Mirbachakot District of Kabul Afghanistan is one of the grape production areas in Afghanistan. The farmers are suffering from different grape production and marketing problems which made their life difficult.

After the 3 decades of war HLP [Horticulture and Livestock Project] a World Bank funded project under the over all guidance of MAIL [Ministry of Agriculture, Irrigation and Livestock] has established the farmer organizations as a unit of intervention and introduced the package of extension services. The extension package includes the application of lime sulfur in late winter in order to prevent fungal diseases in grape vineyards and improve the quality and quantity of grapes.

The objective of this research was to assess the effect of HLP extension package on quality and quantity improvement of grapes in terms of farm income and its impact on farmer's livelihood as well as to what extent the grapes has joined the export market.

I was surprised when HLP Team Leader introduced me to their responsible staff of Mirbachakot and when I had meeting with the District Extension Officer of Mirbachakot to help me in data collection; they were my classmates in university.

The result shows that the grape production has been increased by 61% after HLP intervention but the price has become lower from 17.3 Afs/Kg by average 2.5 Afs/Kg. The reasons for lower price are indicated as: 1, the export traders are facing more problems in Pakistan border. 2, the exchange value of Pakistani rupees versus Afghani has been reduced in 2009. 3, more supply than demand in domestic market and 4, no existence of proper raisin making factories.

In order to improve the farmers income, the following solutions has been strongly recommended: 1, the government of Afghanistan particularly the chamber of commerce should make contract with other countries like India instead of Pakistan from which the traders and farmers don't get higher income, encourage the private sector for exporting fresh and dried grapes; and 2, the private sector should make the grape collection centers in different places; grade, pack and dry the grapes and then export it to the foreign market where they can get more money.

The above recommended solutions can help the farmer get higher price from their grape production so they can have enough food and good live.

Acknowledgement

First of all I express my sincere gratitude to my parents, brothers and all my family members who encouraged and financed me not only when I am far away from home but through out my life especially to study for this master's degree. It is the prayers of my parents that I am successful in all of my endeavors.

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Above all I would like to thank the ALMIGHTY Allah for his help and grace in all my endeavors. Thank you all.

List of Abbreviation and Terminology:

MAIL	Ministry of Agriculture, Irrigation and Livestock
HLP	Horticulture and Livestock Project
MRRD	Ministry of Rural Rehabilitation and Development
IPM	Integrated Pest Management
NAEC	National Agriculture Education Center
GDP	Gross Domestic Production
DEO	District Extension Officer
M&E	Monitoring and Evaluation
DAP	Di Ammonium Phosphate
Afs	Currency of Afghanistan (Afghani) (€1=60 Afs)
Jerib	A unit of measuring land (1Jerib=0.2ha)
Kareze	Underground streams bringing out the water for irrigation
Ashar	Helping the farmer each other during the hard work

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Chapter I

Introduction

This research aimed to study the impact of HLP [Horticulture and Livestock Project] extension package on grape production in terms of farm income in Mirbachakot District of Kabul Province, Afghanistan. As stated in detail in background information 1.1, HLP is a World Bank Project working since 2006 in Afghanistan to rehabilitate the destroyed orchards during the 3 decades of war and increase the production and productivity of Almond, Apricot, Pomegranate, and Grape fruits in Afghanistan. For this purpose they introduce an extension package to increase the grape production. As Mirbachkot District is one of the grape production areas in Afghanistan, and HLP has introduced its extension package for rehabilitation of the destroyed orchards and increase the production and productivity of grape fruits, therefore this research attempted to study the impact of HLP extension package on grape production in terms of farm income.

1.1 Background Information on Research Topic:

Afghanistan is a landlocked country, located in the central Asia with the total area of (652230 sq Km), population 28.396 million, and dry climate with cold winter and hot summer (Department of State, 2010). Agriculture is the main source of income, provide 80% of employment and account 31% of GDP (USDA, 2010). In 1960s and early 1970s Afghanistan produced enough cereals, fruits, vegetables, and meat for domestic consumption and export. Grapes decorated the table of Saudi Arabia and the Gulf States, and afghan raisons were contributing 20% of the world's raisons (Bruno, 2009).

Three decades of war in Afghanistan caused damage all kind of infrastructures. All people in general and farmers in particular are suffering from different problems, which made their life difficult. In 2002 the international community and the people of Afghanistan agreed and joined hands to make free Afghanistan from the last 3 decades of conflict and start an effort of rebuilding an Afghan nation from the past war, violence and destruction (ANDS, 2008).

World Bank and MAIL through HLP launched to increase the horticultural production as farm income. For this purpose they tried to find the solution for the problems that farmers are facing. In Mirbachakot one of the main problems that farmers are suffering from is the low price of grapes during the harvesting season because of low quality of grapes, which affected by the fungal diseases. This problem made farmers' livelihood difficult throughout the year. From the other hand the grapes harvesting starts from September and ends in November, in this period there is more supply than demand. The traders are buying those grapes which quality is relatively better among the existing grapes. Some of the farmers dry their grapes and make raisin. But as they dry the grapes traditionally on soil surface, not in improved mechanized method, the quality of the raisin is also not good.

HLP has established farmer organizations and introduced the package of extension services. HLP is World Bank funded project, working under the over all guidance of MAIL. The HLP extension package consists, introduction of fungicide (making and application of lime sulfur) for quality and quantity improvement of grapes, pruning technique, and weeding. HLP introduced the extension package in 10 provinces including Mirbachakot.

1.2 Horticulture and Livestock Project (HLP):

The Horticulture and Livestock Project (HLP) is the World Bank funded comprehensive agricultural development project in Ministry of Agriculture, Irrigation and Livestock (MAIL). The project aims at sustainable increase in production and productivity of perennial horticulture and livestock and producers' incomes for food security in focus areas. To achieve the project development objective, HLP has organized its planned interventions into three separate but mutually reinforcing components – (1) horticulture development, (2) livestock development, and (3) institutional capacity development. The former two components have been organized around a specific set of overall expected project outcomes with a scope for developing national horticulture and livestock development modalities. The third component has been organized to support the two technical components with development of necessary human and institutional capacities for their effective implementation and institutionalization of the resultant development modalities. (HLP, 2009)

1.2.1 HLP Objective:

The overall objective of HLP is *“to assist the producer households in adopting improved practices so as to increase horticulture and livestock productivity and production in focus areas”*.

HLP main objectives for horticulture development is the rehabilitation of 12000 ha existing damaged orchards (0.2 ha/hh), establishment of 5000 ha new orchards (0.2 ha/hh), and applying integrated pest management (IPM) for pest control in 11 provinces of Afghanistan.

HLP main objectives for livestock development is the establishment of small poultry farms for 10000 female poultry farmers, improving capacity of existing 3 small private dairy plants and the privatization of 120 Governmental animal health clinics.

1.2.2 HLP Extension Approach:

HLP followed the target group extension approach for obtaining the both horticulture and livestock objectives. But here only horticulture approach for rehabilitation of the destroyed orchards has been discussed in detail; therefore HLP implemented as follow:

HLP focused on rehabilitation of 4 crops (Grape, Apricot, Almond and Pomegranate which is potential commercial crops of Afghanistan) which have been destroyed during the 3 decades of war.

HLP introduced different type of extension packages for rehabilitation of the grape, apricot, pomegranate and almond orchards in 11 districts of 11 provinces; one district has been selected in each province for pilot implementation.

This research focus on impact of HLP extension package on grape production in Mirbachakot, therefore it will also focus on extension package in Mirbachakot district.

1.2.3 HLP Extension Package:

Mirbachakot district of Kabul province which is one of the grape production areas and destroyed a lot during the war is also one of the focus districts for rehabilitation. Mirbachakot has 37 villages out of which only 25 villages has been covered by the HLP. HLP has established 25 farmer organizations in 25 villages, each farmer organization consist of 25 farmers (one group leader and 24 group members). HLP has assigned 6 extension workers (one extension worker for 3-4 farmer organizations/ 75-100 farmers)

and the extension workers introduced the package of extension services to their selected farmers. The HLP extension package consists, introduction of fungicide (making and application of lime sulfur) for quality and quantity improvement of grapes, pruning technique, weeding and 50 Kg of Urea, 50 Kg of DAP, pruning scissor, sprayer, and protection cloths for spraying. These inputs are given to the lead farmer to be used only in 0.2 ha as demonstration for the member farmers. The extension worker visited 2 or 3 times of the lead farmer per month to show the different techniques in their orchard in presence of some member farmers. The extension worker given the monthly activity plan by the extension coordinator based on the seasonal calendar.

Although these amounts of the inputs are not enough for the 0.2 ha, because the farmers are using more fertilizer based on their affordability to buy from the market. Except the lime sulfur, other inputs were used by the farmers in the future as well but only the new application method has been taught by the HLP extension workers.

HLP evaluated the adoption of the extension package. After the evaluation it was found out that the farmers adopted only the lime sulfur, not the other techniques. For example, the HLP recommended the pruning technique in which the branches should be cut severely and they should leave the short branches in the grape plant, but the farmers were doing the long pruning, because they say the short branches can be damaged by the spring frost, but if the branches are long only the peak of the branches will be affected by the frost not the entire branch. Secondly the farmers are not weeding, because there is water shortage the grass prevent evaporation and from the other hand this grass is used for the animal feeding. Therefore only lime sulfur is adopted for quality and quantity improvement of the grapes. The HLP extension staff used the vineyard of group leader as demonstration plot for practically showing farmers making and application of lime sulfur which is sprayed at the end of winter, before grape sprout. Therefore, the quality and quantity improvement is because of lime sulfur application. To find out that to what extent HLP extension package has contributed to quality and quantity improvement in terms of farm income and joining the export chain, therefore, this research attempts to assess the effect of HLP technical intervention and functions of farmer organization on quality and quantity improvement of grape production in terms of farm income and its export chain from Afghanistan to Pakistan and then its impact on farmer's livelihood.

1.3 Research Problem Statement:

Mirbachakot District of Kabul Province is the main grape production area. The farmers are having difficult livelihood from the low prices they are getting during the grape harvesting season. The low price is because of the low quality of the grapes and low quality is because of the existing fungal diseases in the area. HLP established farmer organizations and introduced an extension package. The farmer organization is established, from one side to cover a lot of farmers and from the other side this should be a unit for intervention, not only for HLP but for any development project. The HLP extension staff trained the farmers by applying the farmer group approach; on making and application of lime sulfur, so this prevents the fungal diseases during the growth season. When the fungal diseases are controlled, the quality and quantity of the grapes are increased so, this would have effect on export market and ultimately it would have impact on farmers' livelihood. So, we are lacking information whether the intervention of HLP has contributed to increase the grape production and farm income of the farmers in Mirbachakot District or not?

1.4 Research Objective:

To assess the effect of HLP extension package on quality and quantity improvement of grapes in terms of farm income and export chain, and its impact on farmers livelihood, in Mirbachakot District of Kabul Province.

1.5 Research Questions:

Considering the HLP extension package for rehabilitation of the grape vineyards and increase the grape production, I tried to focus on grape production, cost price and the revenue to find out increase in farm income, as well as I focused on how much of the grape joined the export chain. From the other hand as HLP established the farmer organizations, I tried to focus on the role of farmer organizations/groups on grape production in terms of helping the farmers to each other, making relationship with the export traders and also involvement of the farmer organization in grape enterprise. Keeping the above issue in mind the following 2 main research questions and 6 sub research questions have been developed.

1. What is the effect of HLP extension package on quality and quantity of grape production in terms of farm income, farmers' livelihood and on export chain?
 - a. To what percentage the Net Farm Income of HLP target farmers have been increased due to the application of extension package?
 - b. To what percentage the grapes of HLP target farmers have joined the export market?
 - c. To what extent the livelihood of the HLP target farmers, in terms of food security have been increased?
2. What is the role of farmer organizations in value addition activities in the grape chain?
 - a. What kinds of cooperation between the farmers have been established?
 - b. To what extent the relations between farmer organization and traders have been improved?
 - c. To what percentage collection of the grapes for marketing and drying by the farmer organizations have been increased?

1.6 Theoretical Frame Work

HLP Extension Package: After getting the general information on total cultivated area, vineyard area, cow holling and education status, the farmers interviewed on whether they know how to make and apply the lime sulfur as well as the effect of lime sulfur on grape production, open questions asked. The data collected analyzed in tables how much farmers know how make and apply the lime sulfur and its effect on grape production.

Functions of Farmer Organization: The HLP target farmers asked open questions on helping each others, their relation with the traders and the role of farmer organization on collection and drying of the grapes. No data on role of the farmer organization has been received except that the group members are trained by the HLP extension staff on making, application and the ideal time of the lime sulfur application.

Improvement in quality and quantity of grape production: The target farmers asked open questions on improvement on quality and quantity of grapes. The improvement in quality stated that the percentage of 1st grade grapes has been increased and the quantity has been measured by increase in grape production. The data presented in chart 2.

Export opportunity of grapes is increased: The farmers asked open questions on to what extent the export opportunity has been increased. The export opportunity measured by the quantity has been sold to export traders. The data presented in chart 2.

Farm income: The farm income measured by getting the quantitative data on production cost and selling price. The Farm Income Measurement technique (Verschuur, 2007) used as a tool for farm income and family net income calculation. The data analyzed in Excel and presented in tables 1 and 2 for 2008 and 2009.

Improvement livelihood in terms of food security: The farmers asked that how much of the extra revenue they spend on food and how much on other things (open questions asked). The data analyzed in Excel and presented as percentage used of extra revenue on food stuff.

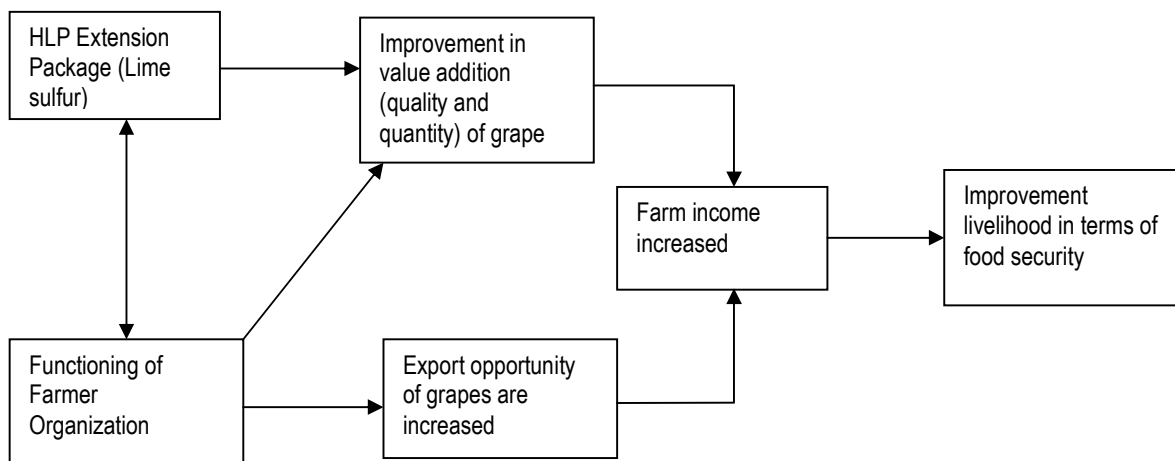


Figure 1: *Theoretical Frame Work*

Chapter II

Literature Review

2.1 Extension Package:

The HLP extension package consists, introduction of fungicide (making and application of lime sulfur) for quality and quantity improvement of grapes, pruning technique, weeding and 50 Kg of Urea, 50 Kg of DAP, pruning scissor, sprayer, and protection cloths for spraying. These inputs are given to the lead farmer to be used only in 0.2 ha as demonstration for the member farmers, although these amounts of the inputs are not enough for the 0.2 ha, farmer are using more based on their affordability to buy from the market. Except the lime sulfur, other inputs were used by the farmers in the future as well but only the new application method has been taught by the HLP extension workers. This research attempted to evaluate the impact of the extension package on grape production, as farm income or family income and the functioning of the farmer organization/ group on grape production and joining the export chain.

Fungal diseases are common grape vine diseases in Mirbachakot District and damage the quality and quantity of the grape fruit. HLP introduced lime sulfur for preventing fungal diseases in grape vineyards. Kenneth in 2004 recommended lime sulfur application in early spring before bud breaks as an effective fungicide for grape vineyards in Afghanistan. There are some other similar cases in other countries.

In Missouri, about 1000 acres of grapes are grown. In order to produce quality grapes for wine production and increase yield per acre, different vineyard management practices has been applied. One of the vineyard management practices is prevention of pests and diseases. According to the experts in the area, in previous years, powdery mildew was difficult to control in vineyards, but now the dormant spray (while the plant is in dormant stage) of liquid lime sulfur on the trunks and canes of the grapevine bushes has been effective to reduce the amount of overwintering inoculums of this fungus (NSF, 2000).

The grape producers in Ohio had problem regarding the use of dormant application of fungicide for control of disease in grapes. Ellis (from Ohio Agricultural Research and Development Center) in 2003-2005 has conducted several evaluations of lime sulfur for control of *Phomopsis* cane and leaf spot on grapes. The result indicated that both lime sulfur and copper applied in the spring showed significant reduction of *Phomopsis* leaf and other inter-node infection during the growing season. They indicate that lime sulfur has effectively controlled the Anthracnose in Ohio vineyards as well (Ellis, 2009).

The overwintering inoculums of anthracnose, *phomopsis* and powdery mildew exist in the bark crevices, canes and buds of the grape plant. Applying liquid lime sulfur during first 10 days of April just prior to bud break, in Iowa provide excellent control of anthracnose, good control of early season *phomopsis* and some control of powdery mildew in grape plant. For most of the fungi, liquid lime sulfur is a toxic. Reduction in amount of overwintering inoculums can dramatically reduce and delay infection of these diseases during the grape plant start sprouting. For organic grapes, many forms of liquid lime sulfur are approved (White, 2008).

The fungus *Uncinula necator* causes powdery mildew and most common and widespread disease of grapevines in the Okanagan, Similkameen area in Canada. This fungus has a narrow host range and attacking only grape plants and a few related species. The powdery mildew fungus over winter in bark, canes, over left fruits and on leaves on the ground, as tiny, round, black fruiting bodies. Spores from the bark, canes and leaves released after the rainfall in the spring. Once primary infection occur it shift to secondary phase and spread to the plant from 7 to 10 days. This disease cause reduction in quality and quantity of grapes by reduced berry (grape fruit) size and reduced sugar content in grape fruit. Dormant spry of lime sulfur in early spring before bud breaks, is effective for the control of overwintering population of powdery mildew (British, 2010).

Sulfur was and still widely used in agriculture as dust or sprayed for suspension and primary control of powdery mildews but also for some other diseases (Dekker, 1999)

Introduction of the HLP extension package has resulted to 10% increase in grape production in north provinces of Afghanistan (HLP, 2008).

2.2 Functions of Farmer Organization:

HLP has established former organizations in target villages as a unit for intervention and introduction of HLP extension package. The farmer organization is defined as:

“Farmer organizations specialized in a single commodity and operate for value-added products which have expanded markets (Swanson, 1998)”.

The functions of farmer organization in Kyrgyzstan also outlined as: providing high quality of potato seeds, farming inputs, mechanization services, loans, quality control system and improving marketing channel (Holtland, 2007).

The main functions of HLP farmer organizations in Mirbachkot District is to exchange knowledge regarding best orchard management practices, inputs, control of pest and disease for quality grape production, as well as improve market access to get higher price. The functions of farmer organization in Mirbachakot District will have effect on quality and quantity as well as effect on joining export chain. To measure the effect of farmer organizations functions on quality, quantity and joining export chain, open questions will be asked from the HLP target farmers during the survey on helping each others, their relation with the traders and the role of farmer organization on collection and drying of the grapes.

2.3 Farm Income Measurement:

Farmers and other family members work the whole year on the farm but can not produce or can not have enough cash from their production to feed their family throughout the year. Many farmers in Afghanistan do not produce enough food and have no enough farm income from the cash crop production, to provide food for the entire year (ICARDA, 2002).

To assess the farm income, literature recommends different methods. Farm business analysis is calculated as follow (Martyn, 1998):

	€	€	
Net Profit		XXX	
Less son's labor	XX		
Less sundry receipts	XX		
Plus interest paid	XX		
Plus land expenses	XX		
Less rents received	XX		
Less national rent for land owned	XX	XX	
Net Farm Income		XXX	
Less value of farmer's physical labor		-XX	
Management and Investment Income			XX

Table 1: Calculation of NFI (Net Farm Income) and MII (Management Investment Income)

The Farm Income Measurement (Verschuur, 2007) used as a tool for farm income and farm family income calculation.

Farm Family Income	
+Total Fixed Costs	+Total Revenue
+Total Variable Costs	-Total Cost
	= Net Result
= Total Cost	+Net Result
	+Family Labor cost
	= Farm Family Income

Table 2: Farm Family Income calculation

From the above farm income measurement techniques, Table 2 is used as tool for farm income and family income measurement. This is the simple and relevant method for farm income and family income calculation for Afghan farmers.

2.4 Livelihood:

Livelihood is defined as: "livelihood comprises the capabilities, assets, and activities required for a means of living (DFID, 1999)".

Agriculture is the main source of livelihood for the rural population in Afghanistan. The farmer can not have enough production to be sufficient for the whole year. In fruit production most of the farmers sell their produce to a trader or a cell merchant before harvesting on fixed price, because they do not have money to buy food or other necessary things for the livelihood. The MAIL food security strategy tries to empower the farmers on improved quality and quantity production of food crops and cash crops; so they can have enough food stuff or cash income for family consumption. More over the

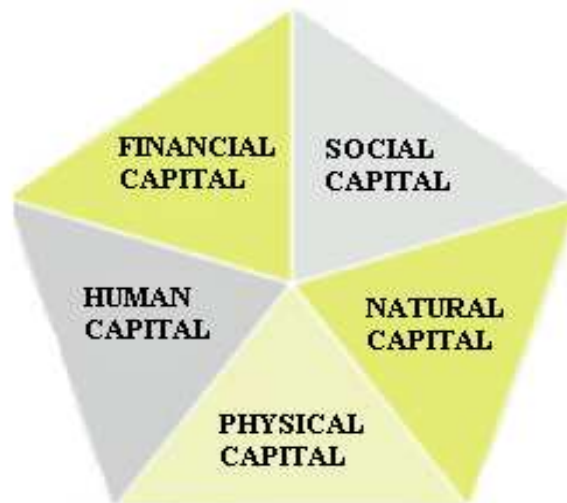
government encourage the farmers to produce not only for family consumption but also for domestic and export market (ICARDA, 2002).

Livelihood assets (also called livelihood capitals) often exist as a pathogen in sustainable livelihood framework. The livelihood capitals are of 5 categories, these categories covers the following types of issues and details (FAO, 2009):

Table 3: Shows the livelihood capitals and their examples

Livelihood Capitals	Examples
Human capital	Labor power, health and nutritional status, skills and knowledge
Natural capital	Access to land, water, wildlife, flora, forest
Social capital	Refers to those stocks of social trust, norms and networks that people can draw upon to solve common problems. It is mediated through kin networks and group membership
Physical capital	Houses, vehicles, equipment, livestock
Financial capital	Savings, gold/jewelry, access to regular income, net access to credit, insurance.

From the above livelihood assets, this research tried to focus on human capital and natural capital (HLP extension package as new knowledge for increase of grape production) which have been changed by HLP intervention. The natural capital (grape production) increased by the application of new knowledge introduced by the HLP. Grape is produced as cash crop, as grape production increased, the farm income increased (from selling of grape); as farm income (money) increased food security of the farm household increased because they depend on market for their staple food.



5 categories of the livelihood capitals shown in the pentagram

Chapter III

Research Methodology

3.1 Type of Research:

This research was an evaluative research. Evaluative research is a research which tries to assess the outcome or impact of an intervention by a program or organization. Thus it attempted to study the impact of HLP extension package on grape production in terms of farm income before HLP intervention (2008) and after HLP intervention (2009).

The farm income as cost price and selling price of grape production, functions of farmer organization and its impact on farmers livelihood and food security has been studied in 10 villages of Mirbachkot District of Kabul Province, Afghanistan. 30 farmers have been interviewed individually in their homes and on farm. The data from the 30 surveyed farmers has been analyzed and presented in tables, charts and figures as summation, percentage and averages.

3.2 Description of the Study Area:

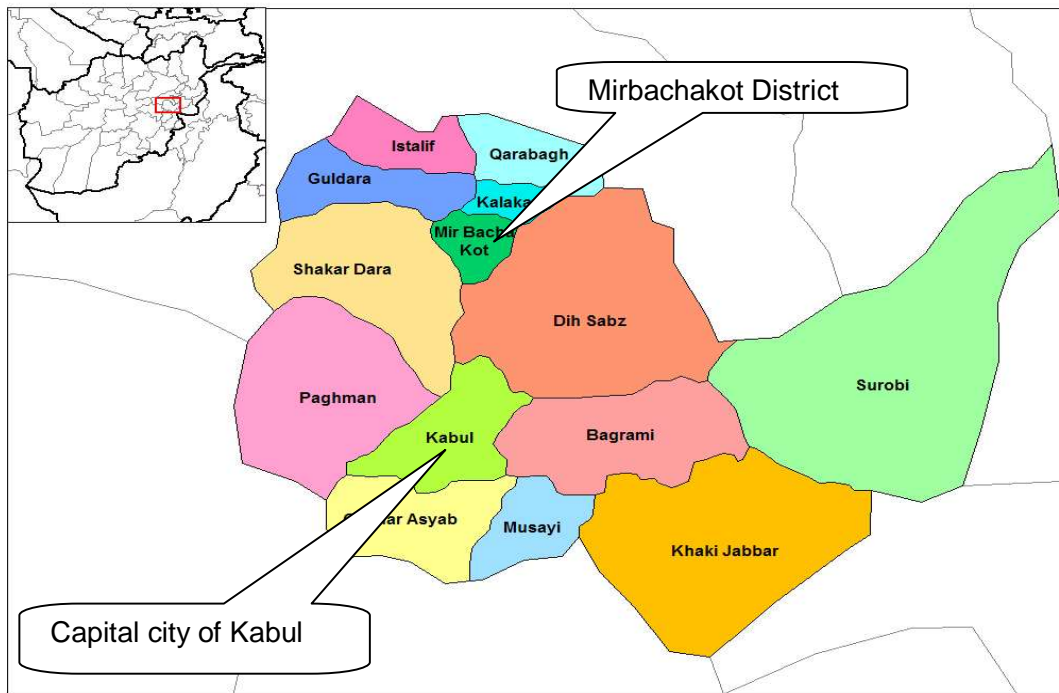
Kabul province is the capital of Afghanistan and located in the central region with 4585 sq km of area and divided into 14 districts, including the provincial capital, Kabul City (MRRD, 2006).

Kabul has cold winter and hot summer, clear daily weather and hardly clouds. The temperature varies from 20C° to 30C° and beyond in summer; however in winter it reaches to -15C° (Maps of world, 2008). There for, Kabul is the single crop zone. Irrigation systems are fed by diverted rivers and the traditional (underground water) Karez system (MRRD, 2006). The above climate condition applies to all Districts of Kabul including Mirbachakot.

As Mirbachakot is one of HLP focus Districts, near to Kabul (25 Km far away from the Kabul city), have experience from my previous job, possibility of every day going and coming back to my home, cheaper transportation cost, security situation in other parts of Afghanistan is not good, thus this District is selected for this research.

Mirbachakot District is located 25Km to the north of Kabul city, having 37 villages and 5000 population; being dominant area of grapevine and grape production is the main sources of income. The sources of water are streams (canals from the river), wells and Karezes (under ground water coming out through under ground streams for irrigation and used for drinking as well) (UNHCR, 2002).

Figure 1: Map of Kabul Province and its districts



Source: (Wikimedia, 2007)

3.3 Methodology:

The research methodology consisted of desk study and field study. The desk study carried out in library and visited some websites. The desk study was important for defining the theoretical concepts, literature review and also giving background information in the research topic. The field study carried out by the survey. In the survey 30 individual HLP target farmers were interviewed. The interview with the individual HLP target farmers was important for collection of quantitative and qualitative data.

First my idea was to survey some HLP target farmers and HLP non target farmers as control farmers and then study the impact of the HLP intervention. During discussion this issues my supervisor told me that there will be difference in vineyards' characteristics of HLP target and non target farmers such as soil structure, tree age, low land and high land, farmer practices and other production systems. Therefore my supervisor suggested me to study survey only HLP target farmers and get the data of before and after HLP intervention data and then compare the impact.

For this reason, first a meeting organized with the HLP Team Leader and M&E Specialist on research topic in order to get the list of HLP target farmer organization in Mirchabakot District. The HLP colleagues appreciated my topic and strongly supported me for the data collection; they introduced me to their responsible person in Mirbachakot District to help me in finding the selected villages, farmers and data collection, when I saw him, he was my classmate in university, he helped me a lot finding the villages, farmers and in data collection. Secondly another coordination meeting organized with DEO of Mirbachakot about my research topic and the selected target farmers to be

interviewed. While visited the District Extension Office the DEO was also my classmate. After discussion about my research topic and the questionnaire, I realized that the questionnaire needs to be translated into Dari language, as the DEO didn't know English very well. So, I translated the questionnaire into Dari language, so the questionnaire was in two language English and Dari everybody could easily understand. I together with DEO of Mirbachkot made our plan for the data collection; he also helped me a lot finding the selected villages, farmers and data collection.

3.3.1 Sample Selection:

Considering the time range for data collection (from July 20 to August 15), difficult availability of farmers while wanting to meet him, and the security situation; I decided that better to have 30 farmers out of the all HLP target farmers in sample size. The 30 farmers randomly selected from the list of HLP target farmer groups/ organizations list. From the HLP target farmer organizations, 10 farmer organizations randomly (from the 1st each 2nd and 3rd farmer organization) selected in 10 different villages out of 25 villages where HLP had the farmer organizations. The villages and the farmer organizations selected randomly to get the sample of different villages (big, small, far away from the road and near to the road). Then 3 farmers (one group leader and 2 members each 11th farmer after the group leader) randomly selected from each farmer organization to have farmers with different farm size (big, small and medium), so totally 30 farmers selected for individual interview.

3.3.2 Data Collection:

Data was collected from 20 July to 15 August by me with the help of 2 persons (finding the villages and farmers) the HLP responsible person in Mirbachakot and the DEO. I interviewed 25 farmers, the HLP responsible person interviewed 3 farmers and the DEO interviewed 2 farmers.

For data collection from the target farmers, a survey form was designed. The survey form contained a combination of structured and open questions. The structure question used for getting the quantitative data on farm cost price and selling price; and the open question used for getting qualitative data on farmer group functioning.

The quantitative data was useful (to answer the 1st research question) for calculating the effect of lime sulfur in terms of farm income and its export chain as well as its impact on farmers' livelihood.

The qualitative data was helpful (to answer the 2nd research question) for defining the role of farmer organizations on quality and quantity improvement of the grapes and its export chain. The farmers were interviewed in their home and on farm.



Picture1: farmer interviewed on farm



Picture 2: farmer interview at home

More over, while realizing that I could not finish interviewing all the 30 farmers by myself (after interviewing 20 farmers), I requested the HLP responsible person in the area and the DEO to help me in data collection. I trained both of them while I was interviewing the farmers on how to interview the farmer and get the data; I translate the questionnaire into Dari language so, they can better understand what they are asking for. The data collected by these two persons are reliable as I checked the forms. The form were checked based on comparison of the yield/ha and cost/ha with the data collected by myself.

3.3.3 Method for Data Processing:

After finishing data collection I designed the tables in MS Excel for entering the data as I don't know how to use the SPSS, however I have requested many times my course coordinator and the Master Program coordinator to arrange training of SPSS for us during my study at Van Hall Larenstein. I entered the data at home; my brothers helped me entering the data in MS Excel. MS Excel used as a tool for processing and analyzing of the quantitative data, the results presented in tables and in charts.

3.3.4 Method for Data Analysis:

The summation, average, and percentage functions of MS Excel and the *Farm Income Measurement Technique* (Verschuur, 2007) used as tools for analysis and calculation of the farm income and family net income. The results presented as figures in tables and in charts.

Chapter IV

Results

4.1 General Profile of the HLP Target Farmers:

According to the sampling frame, 30 farmers in 10 villages are interviewed out of which 10 are group leaders and 20 are group members. First of all to know about the general profile of the farmers, the following question has been asked.

- Village
- Name of the farmer
- Member of the HLP group or not
- Education
- Total farm area
- Grape vineyard area and
- No of cow raising

The above questions (village, name of farmer and membership) have been asked to insure whether this is the village and farmer which is selected for the survey. Similarly question about the education has been asked to see the reaction of educated and uneducated farmers to the questions. Moreover questions about the total farm area, grape vineyard area have asked to find out that what percentage of the land is used for grape production. finally the cow raising question has been asked to see whether only grape production is the source of livelihood or some livestock as well.

Table 4: General Profile of the HLP led farmers/ group leaders, N=10: (Based on Table B1)

SN	Province	District	Village	Group Member		Educated		Total Cultivated Area	Grape Vineyard Area	No of Cow
				Lead	Member	Yes	Grade			
TOTAL				10	0	3		64.5	47.5	9
PERCENT									73.6	
AVERAGE				1	0			6.45	4.8	
RANGE	MAXIMUM			1	0	1	12	18	12	3
	MINIMUM			1	0	1	8	1	1	1

Note: The percentage for grape vineyard area is calculated based on the total grape vineyard area divided by the total cultivated area multiply by 100.

Table 5: General Profile of HLP radial farmers/group members, N=20: (Based on Table B2)

SN	Province	District	Village	Group Member		Educated		Total Cultivated Area	Grape Vineyard Area	No of Cow
				Lead	Radial	Yes	Grade			
TOTAL				0	20	2		57	42	9
PERCENT									73.7	
Average				0				2.85	2.1	
RANGE	MAXIMUM			0	1	1	6	10	6	2
	MINIMUM			0	1	1	6	0.5	0.5	1

Results from table 4 show that only 2 out of 10 group leaders are educated and results from table 5 show that out the 20 only 3 of the group members are educated. It means

more educated farmers are selected as group leader. Result shows table 4 shows that the farm area holding by the household ranges from 1 to 18 Jeribs (average 6.45 Jeribs) and results from table 5 that the farm area holding by the household ranges from 0.5 to 10 Jeribs (average 2.85 Jeribs). It means that the group leader having more land/bigger farmers than the member farmers. 73.6% (of group leaders) and 73.7% (of member farmers) is grape vineyard area out of the total area.

6 out of 10 lead farmers (60%) are raising cows and cow ranges 1 to 3 cows per household. But 7 out of 20 member farmers (35%) are raising cows and cow ranges 1 to 2 cows per household. It means that grape production is not the only farming system, but also some field crops (from 26% of the total land) and having dairy production for their livelihood. Based on having experience in the area some major field crops are: wheat, tomato, potato, onion, cucumber, okra, egg plan, beans, and other vegetables. The above crops are produced only in summer season, this not produced for the whole year. So, the farmers still depend on market for the vegetables in fall, winter and spring season. Furthermore, however the farmer have 26% of the area for field crops, they are not using all the 26% of the area for field crops, because of the water shortage in the area especially in the summer season when the field crop need more water. Based on the experience only 6% out 26% area is used for field crop production, most of the field crop area remains fallowed.

4.2 Grape Production:

Results from the 30 farmers interviewed shows that grape production has been increased by 61% (48% of lead farmers and 74% of member farmers) in 2009 due to HLP intervention. It is worth to mention that there is possibility that increase in production is not only caused by the HLP intervention but also the good climatic condition of the year 2009.

Table 6: The grape production and its using patterns of the 10 group leaders in 2008 and 2009 (Based on Tables B5 and B6)

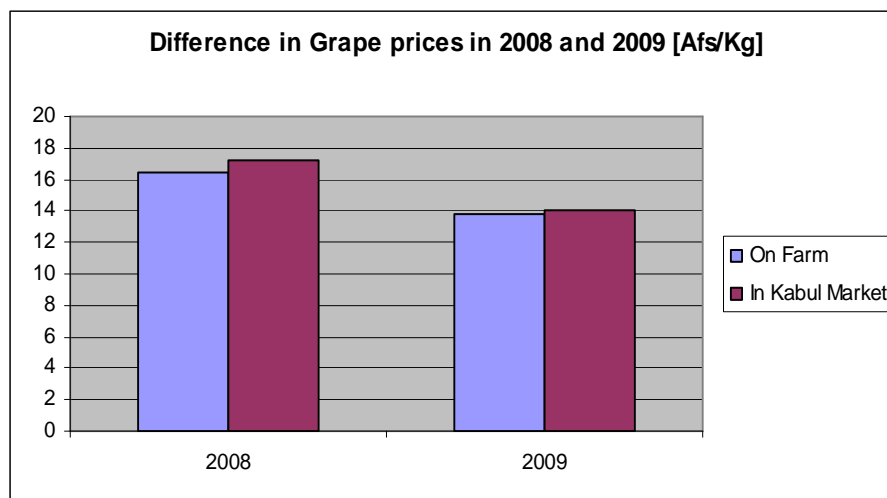
Grape Use Patterns	Unit	2008					2009				
		Total	Percent	Average	Maximum	Minimum	Total	Percent	Average	Maximum	Minimum
Total Yield	Kg	65500			16200	1400	96950			17450	2030
Vineyard Area	Ha	9.5		0.95	2.4	0.2	9.5		0.95	2.4	0.2
Yield/ha	Kg	6895		6895			10205		10205		
Family Used	Kg	4130	6.3	413	1200	150	5410	5.6	541	800	210
Kept for Drying	Kg	1150	1.8	575	650	500	32160	33.2	6432	15000	560
Sold On farm	Kg	19250	29.4	2750	5900	1050	18410	19.0	3068	6620	1120
	Afs/Kg			16.4	28	8			13.5	22	7
Sold in Kabul Market	Kg	40970	62.5	8194	16000	2450	40970	42.3	8194	16000	2450
	Afs/Kg			19.6	33	10			15.2	23	8

Table 7: The grape production and its using patterns of the 20 group members in 2008 and 2009 (Based on Tables B7 and B8)

Grape Use Patterns	Unit	2008					2009				
		Total	Percent	Average	Maximum	Minimum	Total	Percent	Average	Maximum	Minimum
Total Yield	Kg	75290			22150	600	131310			31950	670
Vineyard Area	Ha	8.4		0.42	1.2	0.1	8.4		0.42	1.2	0.1
Yield/ha	Kg	8963		8963			15632		15632		
Family Used	Kg	5810	7.7	290.5	700	30	10670	8.1	533.5	1050	100
Kept for Drying	Kg	2700	3.6	900	1050	600	38510	29.3	4814	10500	1050
Sold On farm	Kg	44690	59.4	3438	22000	550	20020	15.2	2224	5600	570
	Afs/Kg			16.4	30	9			14.1	24	9
Sold in Kabul Market	Kg	22090	29.3	3682	12300	560	62110	47.3	7763.75	31600	560
	Afs/Kg			16.4	30	9			13.4	18	7

The results particularly yield/ha of lead farmers showed in table 6 are lower than the yield/ha of member farmers showed in table 7 for both years 2008 and 2009. The reason is that as the lead farmers are having more area for grape production, but as they are poor and have no access to credit, they can not afford to buy enough inputs (fertilizer, pesticide and etc) and hire enough labor for digging, pruning and weeding which has direct effect on grape production. But as the member farmers are having less grape production area, they can afford to buy enough inputs and hire enough labor even most of the work has been done by their selves for the grape. Moreover the high productions by the member farmers are also because of the grape varieties. Similarly the prices differ according to the early harvest and late harvest, variety to variety, selling on farm (to exporter), and selling in Kabul market for both years 2008 and 2009.

Chart 1: On farm and Kabul market prices Afs/Kg in 2008 and 2009 (Based on Tables B3 and B4)



Results in Chart 1 show that opposite to the yield increase, the price of the grape has been decreased in the other way around. Discussing the causes of decline in price with the farmers, they stated that the prices decline has been caused by 4 factors.

1. The export traders are facing more problems in Pakistan border. Checking of the trucks by the Pakistan police take a lot of time to get permit to pass the border as well as the trader has to pay more money per truck.
2. The exchange value of Pakistani rupees versus Afghani has been reduced in 2009, so it's not profitable for the traders to export more grapes.
3. When the production is high and there is less export so in Kabul market there is more supply than demand caused reduction in price.
4. Poor and traditional (on soil surface) raisin making practices by the farmers which cause low quality.

Chart 2: Grape yield and its using patterns by (Kg) in 2008 and 2009 (N=30) (Based on Tables B3 and B4)

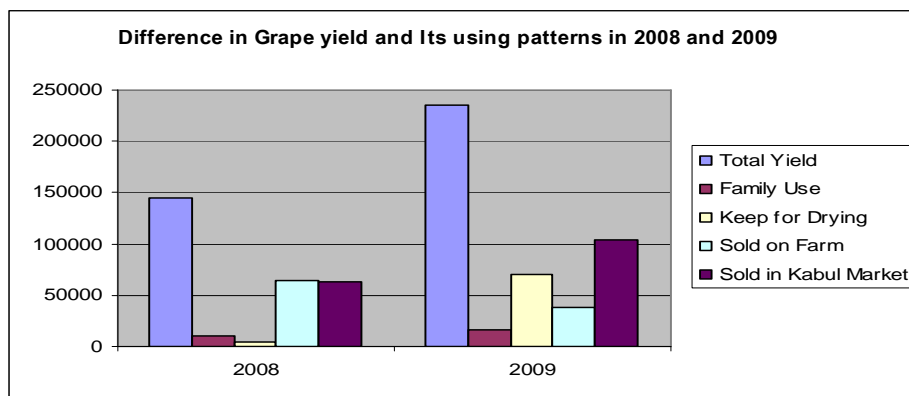
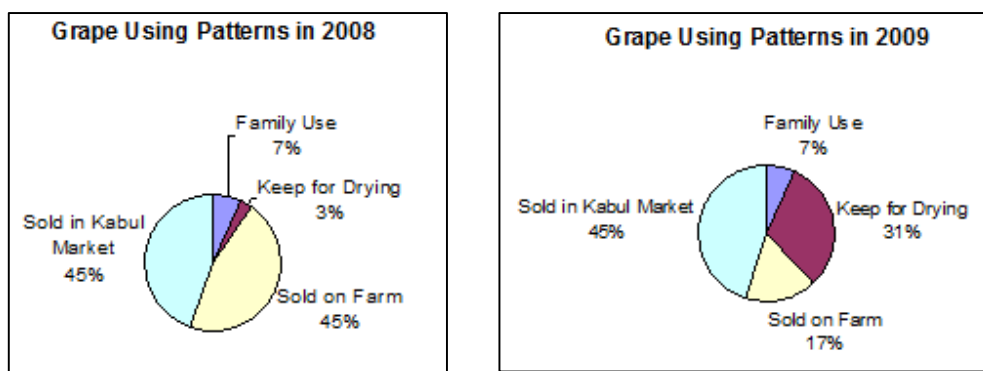


Chart 3: Grape yield and its using patterns by percentage in 2008 and 2009 (N=30) (Based on Tables B3 and B4)



4.3 Input used for Grape Production:

The total, percentage of household using the inputs, average, maximum and minimum quantity and prices of all 30 farmers are shown in the following table for 2008 and 2009.

Table 8: shows the input used for grape production in 2008 and 2009 (Based on Tables B9, B10, B11, B12, B13 and B14)

Inputs		Area	2008					2009				
			HH	No. of Units	Unit Price [Afs]	Total Cost	Cost/ha	HH	No. of Units	Unit Price [Afs]	Total Cost	Cost/ha
Urea	Total	89.5	27	6600	379	91150	1018	30	9500	465	144950	1620
	%	73.7	90				0	100				0
	Ave	3		244.4	14.0	3375.9	1125		316.7	15.5	4831.7	1611
	Max	12		1050	15	12600	1050		1400	16	19600	1633
	Min	0.5		100	12	1300	2600		100	13	1400	2800
DAP	Total	89.5	24	3250	644	87500	978	27	4700	826	142400	1591
	%	73.7	80				0	90				0
	Ave	3		135.4	26.8	2916.7	972		174.1	30.6	4746.7	1582
	Max	12		350	30	9100	758		500	36	14000	1167
	Min	0.5		50	24	0	0		50	24	0	0
Manure	Total	89.5	16	3590	205	44000	492	16	3590	205	44000	492
	%	73.7	53.3				0	53.3				0
	Ave	3		224.4	12.8	1466.7	489		224.4	12.8	1466.7	489
	Max	12		700	15	7000	583		700	15	7000	583
	Min	0.5		20	10	0	0		20	10	0	0
Sulfur Dust	Total	89.5	30	2261	493	37160	415	30	1123	592.24	21668.0	242
	%	73.7	100				0	100				0
	Ave	3	1	75.4	16.4	1238.7	413	1.0	37.4	19.7	722.3	241
	Max	12	1	210	20	3000	250	1	100	30	1800	150
	Min	0.5	1	14	13	182	364	1	7	13	210	420
Super Top	Total	89.5	2	550	2	550	6	0	0	0	0	0
	%	73.7	6.7				0	0.0				0
	Ave	3		275	1	275	92					0
	Max	12		500	1	500	42		0	0	0	0
	Min	0.5		50	1	50	100		0	0	0	0
Lime Sulfur	Total	89.5	0	0	0	0	0	10	260000	0	0	0
	%	73.7					0	30				0
	Ave	3					0		26000	0	0	0
	Max	12					0		40000	0	0	0
	Min	0.5					0		20000	0	0	0
Overall Cost/ha		89.5				260360	2909.1				353018	3944.33

The increase in cost/ha of Urea and DAP from 2008 to 2009 is because of the quantity and unit price increased from 2008 to 2009. Manure is used the same for both years. The decrease 50% in cost/ha of Sulfur dust and 100% of Super Top from 2008 to 2009 is because of lime sulfur application which reduced the fungal diseases in 2009.

4.4 Hired and Family Labor used for Grape Production:

The total, average, maximum and minimum number of days and wage rate for all 30 farmers are shown in the following table for 2008 and 2009.

Table 9: shows the family labor and hired labor in 2008 and 2009 (Based on Tables B15, B16, B17, B18, B19, B20 and B21)

Orchard Practice		Family Members 2008			Hired Male Labor 2008			Family Members 2009			Hired Male Labor 2009		
		Male	Wage Rate	Total	Hired Male Labor			Male	Wage Rate	Total	Hired Male Labor		
					Male	Wage Rate	Total Cost				Male	Wage Rate	Total Cost
		[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Digging	Total	221		55250	39		9750	233		58250	30		7500
	Average	7	250.0	1841.7	5	250.0	325.0	8	250.0	1941.7	5	250.0	250.0
	Maximum	14	250	3500	12	250	3000	14	250	3500	10	250	2500
	Minimum	3	250	750	2	250	0	3	250	750	2	250	0
Pruning	Total	189		47250	59		14750	189		47250	59		14750
	Average	6	250	1575	7	250	491.7	6	250.0	1575.0	7	250.0	491.7
	Maximum	12	250	3000	15	250	3750	12	250	3000	15	250	3750
	Minimum	2	250	500	2	250	0	2	250	500	2	250	0
Pesticide	Total	72		14400				42		8400			
	Average	2	200	480				1	200	280			
	Maximum	4	200	800				3	200	600			
	Minimum	1	200	200				1	200	200			
Fertilizer	Total	49		9800	21		4200	49		9800	26		5200
	Average	2	200.0	326.7	3	200.0	140.0	2	200.0	326.7	4	200.0	173.3
	Maximum	3	200	600	7	200	1400	3	200	600	8	200	1600
	Minimum	1	200	200	2	200	0	1	200	200	2	200	0
Weeding	Total	41		8200				41		8200			
	Average	1	200.0	273.3				1	200.0	273.3			
	Maximum	2	200	400				2	200	400			
	Minimum	1	200	200				1	200	200			
Harvesting	Total	80		16000	49		10900	86		17200	91		20400

	Average	5	200.0	533.3	5	215.0	363.3	6	200.0	573.3	10	222.2	680.0
	Maximum	10	200	2000	10	250	2000	10	200	2000	20	250	5000
	Minimum	4	200	0	2	200	0	4	200	0	3	200	0
Irrigation	Total	140		28000				140		28000			
	Average	5	200.0	933.3				5	200.0	933.3			
	Maximum	6	200	1200				6	200	1200			
	Minimum	3	200	600				3	200	600			

The wage rate of digging of orchard, pruning and harvesting is higher than the pesticide application, weeding and irrigation because these are hard and technical work, every body can not do that, but pesticide application, weeding and irrigation is simple work everybody can do it and the labor is easily found.

4.5 Family Income:

The family income calculation has been done based on average number of units (of all variable cost, production and unit price) for all 30 farmers in 2008 and 2009.

The family income has been calculated based on the net result plus calculated family labor cost. And the net result has been calculated based on the total production/gross out put minus the total cost price (fixed cost+ variable cost+ calculated family labor cost) which is net result of the farm and then calculated family labor cost has been added to net result to find out the family income from the farm as show in table 10 and 11 separately for 2008 and 2009.

Table 10: Revenue in 2008 (Based on Tables B9, B10, B11, B12, B13, B14, B15, B16, B17, B18, B19, B20 and B21)

Grape vineyard average cost price and selling price for 30 farmers in 2008								
Cost				Revenue				
Description	Unit	Price/Unit	Total [Afs]	Description	Unit	Price/Unit	Total [Afs]	€
Fixed cost	1	1000	1000	Total Production/ gross out put	4693	16.8	78842	1359
Urea	244	14.0	3425	Total Revenue			78842	1359
DAP	135	26.8	3623	Total Cost			22296	384
Manure	224	12.8	2870	Net Result			56546	975
Sulfur Dust	75	16.4	1233					
Super Top	275	1.0	275					
Lime sulfur				Net Result			56546	975
Hired Labor				Calculated Family labor			6250	108
Digging	6	250.0	1393	Family Income			62796	1083
Pruning	7	250.0	1844					
Fertilizer App	3	200.0	600					

Harvesting	5	215.0	1054					
Total of input and hired labor			16315					
Family Labor								
Digging	7	250.0	1750					
Pruning	6	250.0	1500					
Fertilizer App	2	200.0	400					
Harvesting	5	200.0	1000					
Pesticide App	2	200.0	400					
Weeding	1	200.0	200					
Irrigation	5	200.0	1000					
Total of Family labor			6250					
Total Cost			22565					

Table 11: Revenue in 2009 (No of farmers=30) (Based on Tables B9, B10, B11, B12, B13, B14, B15, B16, B17, B18, B19, B20 and B21)

Grape vineyard average cost price and selling price for 30 farmers in 2009								
Cost				Revenue				
Description	Unit	Price/Unit	Total [Afs]	Description	Unit	Price/Unit	Total [Afs]	€
Fixed cost	1	1000	1000	Total Production/ gross out put	7609	13.9	105765	1824
Urea	317	15.5	4914	Total Revenue			105765	1824
DAP	174	30.6	5323	Total Cost			31559	544
Manure	224	12.8	2870	Net Result			74206	1279
Sulfur Dust	37	19.7	730					
Super Top			0					
Lime sulfur	260	20.0	5200	Net Result			74206	1279
Hired Labor				Calculated Family labor			6500	112
Digging	5	250.0	1250	Family Income			80706	1391
Pruning	7	250.0	1750					
Fertilizer App	4	200.0	800					
Harvesting	10	222.2	2222					
Total of input and hired labor			25059					
Family Labor								
Digging	8	250.0	2000					
Pruning	6	250.0	1500					
Fertilizer App	2	200.0	400					
Grape harvesting	6	200.0	1200					
Pesticide App	1	200.0	200					
Weeding	1	200.0	200					
Irrigation	5	200.0	1000					

Total of Family labor		6500					
Total Cost		31559					

Based on the comparison of table10 and table11 it is acknowledged that the 50% of the sulfur dust replaced by the lime sulfur 2009. Sulfur dust is expensive compared to the lime sulfur and it cost more money for the farmer to use as pesticide.

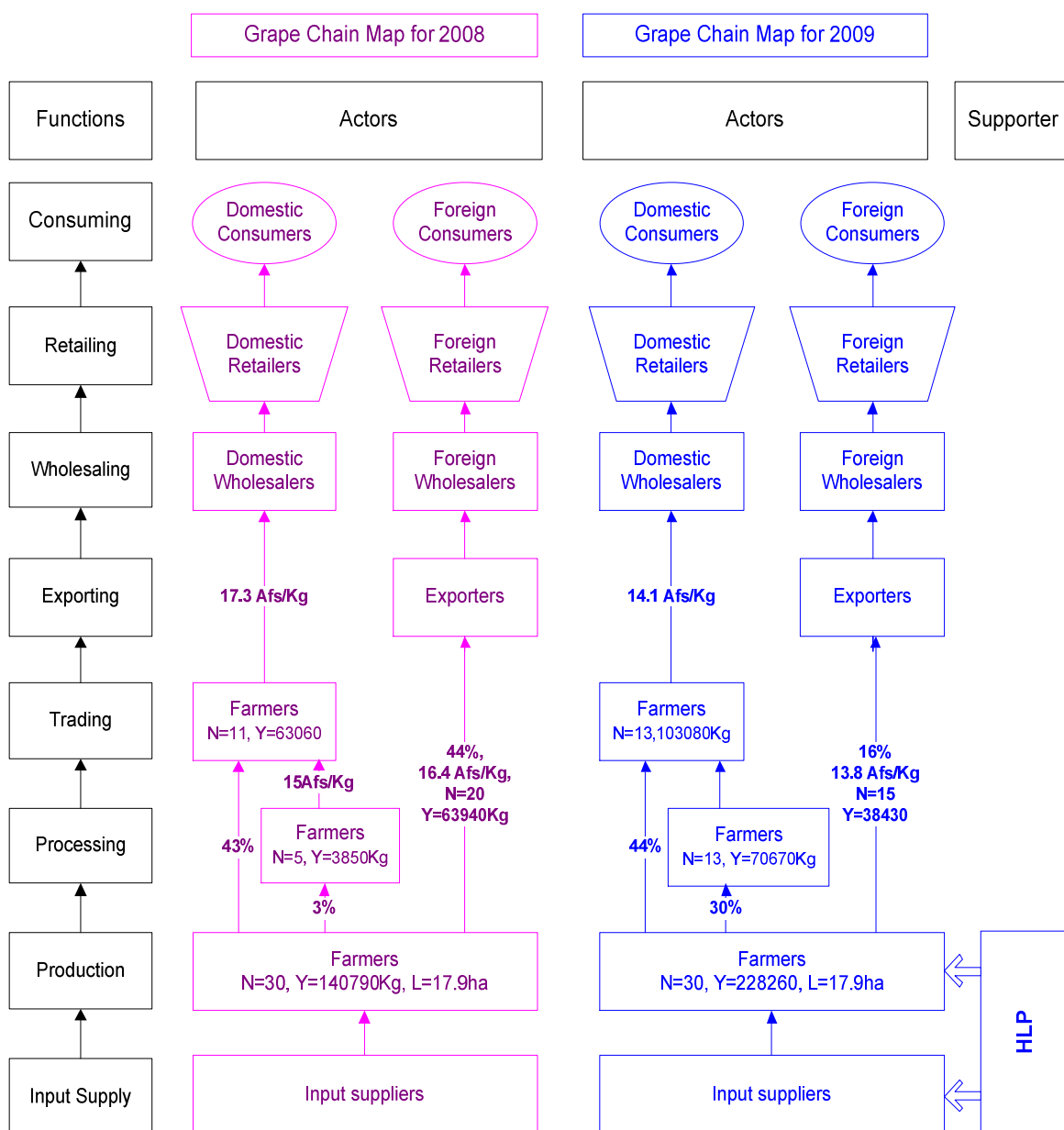
Table 12: show the net increment in family income from 2008 to 2009 (Based on Tables11 and 12)

Revenue	2008	2009	Increase Income from 2008-2009
Net Result from the farm	56546	74206	17660
Calculated Family Labor (Income)	6250	6500	-250
Family Income	62796	80706	17910

The result in table 12 shows that the average family income of the farmers has been increased 17910 Afs (€308) in 2009 because of the HLP intervention.

4.6 Grape Value Chain:

Looking to the grape value chain for 2008 and 2009, the only difference is in number of the farmers changed their market, quantity exported, quantity sold in domestic market and kept for drying. See the grape chain map bellow.



N= No of farmers, Y= Yield, L= Land, Afs/Kg= Cost of 1Kg grape in Afghani.

The above grape chain map has been developed based on the data received from 30 HLP target farmers interviewed in 10 villages.

Looking to the grape chain map, it is acknowledged that the farmers are changing their strategies according to the market. As the price has been reduced in 2009, chart 2 shows that the family consumption has been remain the same in percentage, it mean as much as the production is increase the family consumption also increases; keeping for making raisin has been increased by 27% (as 3% of the grape kept for drying in 2008) they think that after making raisin they may get good price than the fresh grape selling; selling on farm (selling on export traders) has been decreased by 28% (as 44% of the grape exported in 2008) and selling of the grapes has been increased by 1% in Kabul market. Furthermore the farmers are not getting good price from the raisin as well

because they make raisin on soil surface (poor system of making raisin) which has no good quality and no good market.

A Roots of Peace is another organization working in the area to increase the grape production and export it to Pakistan and India.

Production Tests

- Pruning low-value grape clusters from vine tree early in the production season applying Gibberellins to Kishmish grapes
- Applying dipping oil to grapes to speed drying into raisins
- Testing solar-tent drying of raisins

Production Results

- Participating farmers were convinced of benefit of pruning secondary bunches
- Farmers were convinced of the benefits of Gibberellins: significant increase in marketable weight of fresh grapes and raisins and increased quality
- Quantity Increase: 61% yield increase
- Quality Increase: 57% price increase on grapes with Gibberellins applied Farm gate price of \$0.32/kg versus \$0.20/kg without Gibberellins
- Farmers were convinced of the benefit of dipping oil: faster drying and increased market price of yellow raisins

Marketing Tests

- Establishing profitable trade routes for large scale export
- Marketing to high-value Pakistani buyers beyond the traditional Peshawar auction market
- Test two new types of packaging of grapes in the Pakistani markets. The new, branded packages contain less quantity, but higher-grade grapes than the traditional packages. The new packaging is designed for buyers willing to pay for the highest-quality Afghan grapes
- Test of air transport of grapes to buyers in India
- Test of refrigerated land transport of grapes to Karachi (first step to transporting grapes to Dubai and Mumbai by sea) (Roots of Peace, 2009)

4.7 Functions of Farmer Organizations/Groups:

Results from the 30 farmers interviewed from 10 farmer organizations in 10 villages show that none of the 10 farmer organizations collect the grape and none of the 30 farmers sell their grapes to the farmer groups. The grapes are sold on farm to export traders and in Kabul market as fresh by the farmers. As shown in chart 2, 17% of the grapes is kept for drying by the farmers due to low price in the market in 2009.

The farmer organization has only introduced how to make, apply and when to apply the lime sulfur as supported by the HLP.

Considering the importance of the farmer group, the farmers stated as bellow:

10 out of 10 group leaders stated that farmer organizations are important for the following functions: (Based on Table B22)

1. Solving the problems of each other
2. Exchange of knowledge and experiences

3. Helping each other (Ashar) during the hard work in sharp time

1 out of 10 group leaders stated that farmer group is important for:

1. Making a saving box, so the farmer can get the money while needed for the inputs

18 out of 20 group members stated that farmer group is important for:

1. Exchange of knowledge and experiences
2. Helping each other (Ashar) during the hard work in sharp time

3 out of 20 group members stated that farmer group is important for:

1. Making a saving box, so the farmer can get the money while needed for the inputs

17 out of 20 group members stated that farmer group is important for:

1. Solving the problems of each other

8 out of 20 group members stated that farmer group is important for:

1. Helping each other in order to save the hired labor
2. Collecting of the grape and selling it with higher price

4.8 Chain Improvement:

As a result of discussion with 30 HLP farmers in 10 villages about the improvement of the grape chain they recommended as follow:

“Concerning to the political situation of Afghanistan especially diplomatic relationship of Afghanistan and Pakistan, no trust between the farmers and traders, the government of Afghanistan should take the action. The government of Afghanistan particularly the chamber of commerce should make contract with other countries like India. Encourage the private sector and provide them the facilities for exporting fresh and dried grapes. The private sector should make the grape collection centers in different places; grade, pack and dry the grapes and then export it to the foreign market so, we can get higher price than what we get from the Pakistan market”.

Chapter V

Discussion

5.1 Farm Holding Size of Target Farmers:

Results show that 74% of the total land is used for grape production and 26% area is used for field crop cultivation. Based on having experience of 3 years, in the area some major field crops are: wheat, tomato, potato, onion, cucumber, okra, egg plan, beans, and other vegetables. However the farmer have 26% of the area for field crops, they are not using all the 26% of the area for field crops, because of the water shortage in the area especially in the summer season when the field crop need more water. Most of the field crop area remains fallowed. Furthermore out of 30 farmers 60% are raising cows, cow ranges 1 to 3 per household. It means that grape production is not the only farming system, but also some field crops and having dairy production for their livelihood.

5.2 Effect of HLP Extension Package on Grape Production:

Considering the HLP out come survey on fruit production there is 10% increment of in grape production, due to introduction of extension package (HLP, 2008), and the result of this study, the grape production has been increased by 61% (48% of lead farmers and 74% of member farmers) in 2009. It is worth to mention that there is possibility that increase in production is not only caused by the HLP intervention but also the good climatic condition of the year 2009. The lime sulfur within the HLP extension package has been recommended by HLP to the targeted farmers, to be used in late winter (Feb to March) when the plant is till in dormant stage for prevention of some fungal diseases.

Furthermore as the price has been reduced in 2009 the grape using patterns strategies has also been changed by the grape producer households. The family consumption has been remain the same in the percentage, it means the as much as the grape production increases the family consumption also increases; keeping for making raisin has been increased by 27% (as 3% of the grape kept for drying in 2008), selling on farm (selling on export traders) has been decreased by 28% (as 44% of the grape exported in 2008) and selling of the grapes has been increased by 1% in Kabul market. Further more the farmers are not getting good price from the raisin as well because they make raisin on soil surface (poor system of making raisin) which has no good quality and no good market. So these are the causes that farmers are suffering from low prices.

Although the increase in production because of HLP and Roots of Peace intervention is the same (61%) but the use of Gibberellins is not recommended by the MAIL because the Gibberellins is a growth hormone which not good for the health and reduce the shelf life of the grapes. But the marketing gap especially export of the fresh grape is really a good idea for keeping the balance of supply and demand in domestic market and getting higher income from the grape production.

5.3 Family Income:

Table 12: show the net increment in family income from 2008 to 2009 (Based on Tables 11 and 12)

Revenue	2008	2009	Increase Income from 2008-2009
Net Result from the farm	56546	74206	17660
Calculated Family Labor (Income)	6250	6500	-250
Family Income	62796	80706	17910

The result in table 12 shows that the average family income of the farmers has been increased 17910 Afs (€308) in 2009 because of the HLP intervention. From the other hand the grape production increased 61% by the intervention of the both organizations HLP and Roots of Peace, but here the average family income without exporting the grapes are 17910 Afs/year, but it should be mentioned that the increase in grape production is not only because of the intervention of these organizations but the good climate condition of the year also have significant role in increase in grape production.

5.4 Farmer Organizations/Groups:

According to Holtland (2007) the functions of potato farmer organization in Kyrgyzstan outlined as:

- Providing high quality of potato seeds
- Farming inputs
- Mechanization services
- Loans
- Quality control system and
- Improving marketing channel

Based on the results from the 30 farmers, the functions of farmer organizations, established by the HLP have been outlined as:

1. Solving the problems of each other
2. Exchange of knowledge and experiences
3. Collecting of the grape and selling it with higher price
4. Making the saving box, so the farmer can get the money while needed for the inputs

Results from this study show that the farmer organization established by the HLP has been only introduced how to make, apply and when to apply the lime sulfur as supported by the HLP.

Comparing the above results with the functions of potato farmer organization in Kyrgyzstan, it has been acknowledged that farmer organizations are not functioning well. The reason for not functioning well is that HLP has provided some inputs e.g. 50 Kg of Urea, 50 Kg of DAP, sprayer, pruning saw and scissor freely only to the group leader but not to the other group members.

From the other hand as in the post conflict situation in Afghanistan, some international organizations has distributed some food stuff, shelter materials for making house and other things freely to the farmers and other people, the farmers in Afghanistan got the habit that every thing should be provided freely by either the government or international organizations.

Considering the importance of the farmer group, the farmers stated as bellow:

Socially:

1. Solving the problems of each other
2. Exchange of knowledge and experiences
3. Helping each other (Ashar) during the hard work in sharp time

Economically:

1. Helping each other in order to save the hired labor
2. Collecting of the grape and selling it with higher price
3. Making the saving box, so the farmer can get the money while needed for the inputs

The above importance of the farmer organization has been revealed from the 30 HLP target farmers (including lead farmers and members) in 10 villages.

From the above information it has been acknowledged that however, the farmers know about the importance of the farmer organization, but 3 decades of war, many disappointed occasions in different places, with different people, in different issues have alerted the people especially the farmers to distrust any body. As most of the farmers are poor, they are afraid of loosing their income by cheating from the other person, they don't trust anybody easily. Every body is trying to do something his self.

From the above discussion with the literature it has been acknowledged that farmer organizations are not functioning well.

5.4 Grape Value Chain:

Looking to the grape chain map, it is acknowledged that the farmers are changing their strategies according to the market. As the price has been reduced in 2009, the family consumption has been remain the same in percentage, it means as much as the production is increase the family consumption also increases; keeping for making raisin has been increased by 27% (as 3% of the grape kept for drying in 2008) they think that after making raisin they may get good price than the fresh grape selling; selling on farm (selling on export traders) has been decreased by 28% (as 44% of the grape exported in 2008) and selling of the grapes has been increased by 1% in Kabul market. Furthermore the farmers are not getting good price from the raisin as well because they make raisin on soil surface (poor system of making raisin) which has no good quality and no good market.

From the above discussion it is has been acknowledged that the chain actors processor and exporters are not functioning well. And the government is also not supporting the chain sufficiently to improve.

5.5 Livelihood:

In literature livelihood is defined as: "livelihood comprises the capabilities, assets, and activities required for a means of living (DFID, 1999)". And the 5 livelihood capitals are categorized as (FAO, 2009):

- Human capital:
- Natural capital:
- Social capital:
- Physical capital:
- Financial capital:

HLP tries to increase the financial capital (family income) by increasing the production of cash crop (grape).

Results from this study show that the average family income has been increased by 17910 Afs (€308) in 2009. Furthermore 26% of the land is used for field crop cultivation, as the farmers stated that they are not using all 26% of the area but only 6% area for field crops, because of the water shortage.

More over grape producer household are depend on market for their staple food and most of the staple food is exported from the neighboring countries; the prices of the food stuff in the market are fluctuating over the time. So, even with 17910 Afs/year income increase the farmers are not food secure throughout the year.

From the above discussion it is acknowledged that although there is increase in the family income but as they are depending on market for their staple food, they are not food secure throughout the year.

5.6 To Improve the Grape Chain

Results from the 30 HLP target farmers interviewed in 10 villages, regarding the improvement of existing grape chain, show as follow:

Concerning to the political situation of Afghanistan especially diplomatic relationship of Afghanistan and Pakistan, social situation of the farmers and no trust between the farmers and traders, the government of Afghanistan should take the action. The government of Afghanistan particularly the chamber of commerce should make contract with other countries like India. Encourage the private sector and provide them the facilities for exporting fresh and dried grapes. The private sector should make the grape collection centers in different places; grade, pack and dry the grapes and then export it to the foreign market so, that the farmer can get higher price than what they get from the Pakistan market.

Looking to the current situation of farmers and social instability, the farmers have no ability to make self operated organizations to do the recommended jobs, so it is feasible for the private sector to take over the recommended activities, in order to improve the chain.

5.7 Reliability of the Data:

In this study the following issues regarding the reliability of the data, are outlined:

- Farmer may have not told true because they afraid of payment of government tax by telling the true data to the interviewer.
- Some farmers may not have told true because they think about if I tell less income there maybe some donation from the government or any organization.
- The data collected by HLP responsible person and the DEO of Mirbachakot, who helped me in data collection my have not been understood what to ask and how to ask.

By realizing the above issues regarding the reliability of the data for this study, there is no guaranty of 100% true data.

Chapter VI

Conclusions and Recommendations

6.1 Conclusions:

Based on the results from 30 HLP target farmers in 10 villages of Mirbachakot, and discussion the following conclusion has been made:

- HLP is only considered about the increase in grape production but not about the market of the grape, which not profitable to the farmers without having good market.
- It has been acknowledged that however the grape production has been increased (48% of lead farmers and 74% of member farmers) in 2009 compared to 2008 because of the HLP intervention, but it is also possible that the increase in grape production is because of the good climate condition of the year 2009.
- The chain actors are not functioning well, especially the processors and exporters to have balance of supply and demand in the market. The government is also did not support the chain sufficiently to improve.
- Farmer organizations/groups are poorly functional. The farmer group has only introduced how to make, apply and when to apply the lime sulfur, pruning, fertilizer and weeding techniques as introduced by the HLP. After that the farmer organization did not do any thing for the farmers such as:
 1. Solving the problems of each other
 2. Exchange of knowledge and experiences
 3. Helping each other (Ashar) during the hard work in sharp time
 4. Helping each other in order to save the hired labor
 5. Collecting of the grape and selling it with higher price
 6. Making the saving box, so the farmer can get the money while needed for the inputs
- Although there is increase in the family income but as they are depending on market for their staple food, they are not food secure throughout the year.

6.2 Recommendations:

Based on the findings and conclusion of this study I would like to recommend the following instructions:

Recommendation for the farmers:

- The farmers are recommended to start their own enterprise in a cooperative form to grade, pack the fresh and dry grapes (raisin) and then export it to the foreign market so, they can keep the balance of supply and demand in the market themselves, get higher price from their production, increase family income so they are food secure throughout the year.

Recommendations for HLP:

- HLP is recommended to focus on market issue as well beside the increase in production and improvement in quality. HLP is recommended to train the farmer organizations on grapes collection, grading, packing, processing and marketing.
- HLP is recommended to support all the group members not only the group leader so; they are encouraged to join the group until the group is strong enough so it can operate their own enterprise in long term.

Recommendation for NAEC:

- NAEC is recommended to use different parts of this study (such as: sample selection of the farmers, extension package for grape production, extension approach, farm income calculation, cost price, selling price, revenue and family income calculations) as lessons for their students.

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Annex A: Questionnaire

HLP Target Farmer Survey Form
Mirbachakot District, Kabul Province Afghanistan

Name of Village: اسم قریه

Name of farmer: اسم دهقان

آیا شما عضویت در گروپ دهاقین HLP دارید؟

1 Are you member of HLP farmer organization? ☐ Yes بلی ☐ No نه خیر

If yes, بلی اگر ☐ Lead farmer رییس گروپ ☐ Member عضو گروپ

2 Are you Literate? آیا شما با سواد هستید؟ ☐ Yes بلی ☐ No نه خیر

If yes, to what grade? اگر بلی به کدام سطح؟

3 Total Land جمله ساحه زمینداری Grape Vineyard ساحه باغ

4 No of Cows تعداد گاو

آیا شما تهیه و استعمال لایم سلفر را میدانید؟

5 Do you know how to make and apply the lime sulfur?

☐ Yes بلی ☐ No نه خیر

6 What is the effect of lime sulfur on grapes production? تاثیر لایم سلفر بالای انگور چیست؟

Quality: تاثیر بالای کیفیت انگور از نگاه درجه

.....
.....

Quantity (Volume): تاثیر بالای کیفیت انگور از نگاه کمیت

.....
.....

Income [Afs]: عاید به افغانی

7 Production: به کلو حاصل

Area ساحه باغ	Family consumption برای استفاده فامیل	Kept for Drying نگهداشت برای خشک کردن	Sold on farm فروش در باغ		Sold in Kabul فروش در کابل	
			Kg	Afs/Kg	Kg	Afs/Kg

8 Revenue from the grapes: عاید از انگور

Before HLP Intervention (2008) HLP از قبل	After HLP intervention (2009) HLP بعد از
Cost Price [Afs]: مصارف به افغانی	Cost Price [Afs]: مصارف به افغانی
<u>No of Family Labors: تعداد کارگر از فامیل</u>	<u>No of Family Labors: تعداد کارگر از فامیل</u>
Pruning شاخه بری..... Wage/day..... روزمزد	Pruning شاخه بری..... Wage/day..... روزمزد
Weeding خیشاوه..... Wage/day.....	Weeding خیشاوه..... Wage/day.....
Fertilizer Application کود.....Wage/day.....	Fertilizer Application کود.....Wage/day.....
Irrigation آبیاری..... Wage/day.....	Irrigation آبیاری..... Wage/day.....
Pesticide Application دوا پاشی..... Wage/day...	Pesticide Application دوا پاشی..... Wage/day...
Harvesting جمع آوری..... Wage/day.....	Harvesting جمع آوری..... Wage/day.....
<u>No of Hired Labors: تعداد مزدور کار</u>	<u>No of Hired Labors: تعداد مزدور کار</u>
Pruning شاخه بری..... Wage/day..... روزمزد	Pruning شاخه بری..... Wage/day..... روزمزد
Weeding خیشاوه..... Wage/day.....	Weeding خیشاوه..... Wage/day.....
Fertilizer Application کود.....Wage/day.....	Fertilizer Application کود.....Wage/day.....
Irrigation آبیاری..... Wage/day.....	Irrigation آبیاری..... Wage/day.....
Pesticide Application دوا پاشی..... Wage/day...	Pesticide Application دوا پاشی..... Wage/day...
Harvesting جمع آوری..... Wage/day.....	Harvesting جمع آوری..... Wage/day.....
Fertilizer: مصرف کود.....	Fertilizer: مصرف کود.....
Pesticide: مصرف ادویه.....	Pesticide: مصرف ادویه.....
Irrigation: مصرف آبیاری.....	Irrigation: مصرف آبیاری.....
Others: مصرف دیگر.....	Others: مصرف دیگر.....

قبل از HLP (2008) HLP Intervention	بعد از HLP (2009) HLP Intervention
<p>Selling Price [Afs]: قیمت فروخت به افغانی</p> <p>Grapes Grade1 Kg: X Price.....</p> <p>Grapes Grade2 Kg: X Price.....</p>	<p>Selling Price [Afs]: قیمت فروخت به افغانی</p> <p>Grapes Grade1 Kg: X Price.....</p> <p>Grapes Grade2 Kg: X Price.....</p>

عاید اضافی که از سبب HLP به دست آمده از جمله چقدر آن بخاطر غذا و دیگر مدرک مصرف شده؟

9 How much of the extra revenue is spent on food and other things?

Food [Afs]: برای غذا	Other things [Afs]: برای دیگر مدرک
----------------------	------------------------------------

بخاطر تهیه و استعمال لایم سلفر چقدر دهاقین را کمک نموده اید؟

10 How many farmers did you helped on making and application of lime sulfur?

11 Where do you sell the grapes? انگور را در کجا می فروشید؟

- On farm در باغ
- In Kabul market در مارکیت کابل
- To farmer organization بالای گروپ دهاقین

12 To whom do you sell the grapes? بالای کی انگور را می فروشید؟

- Local trader تجار محلی
- Wholesaler in Kabul market عمده فروش در مارکیت کابل
- Exporter بالای صادر کننده
- Fresh to farmer organization تازه بالای گروپهای دهاقین
- Dried to farmer organization خشک بالای گروپهای دهاقین

13 What does the farmer organization do for the farmers?

گروههای دهاقین برای شما کدام کارها را انجام میدهد؟

- a.
- b.
- c.
- d.

14 What is the importance of farmer organization for you?

اهمیت گروههای دهاقین برای شما چیست؟

Socially: از نگاه اجتماعی:

- a.
- b.
- c.
- d.

Economically: از نگاه اقتصادی:

- e.
- f.
- g.
- h.

15 Existing chain? سلسله فروخت فعلی انگور

.....
.....
.....

16 What have to be done to improve the chain? برای بهبود سلسله فروخت انگور چی باید شود؟

.....
.....
.....
.....
.....

Annex B: Data Tables Calculated for the Results

Annex B presents all the tables based on the data collected from the 30 selected HLP farmers, according to the questionnaire developed for the data collection.

Table B1: General Information about the 10 lead farmers/group leaders

General Information of Lead Farmers:

S N	Provinc e	District	Village	Group Member		Educated		Total Cultivate d Area	Grape Vineyar d Area	HHs raising cow	No of Cow
				Lea d	Radia l	Ye s	Grad e				
1	Kabul	Mirbacha Kot	Aab Chakan	1		1	8	12.5	7	1	3
2	Kabul	Mirbacha Kot	Baba Qochqar	1				3	3		
3	Kabul	Mirbacha Kot	Da Saqi Payan	1				3.5	3	1	1
4	Kabul	Mirbacha Kot	Dako-e-Bala	1				1	1	1	2
5	Kabul	Mirbacha Kot	Deh Saqi Bala	1				2.5	2.5		
6	Kabul	Mirbacha Kot	Khawja Gyan	1		1	12	18	12		
7	Kabul	Mirbacha Kot	Laghmani	1				10	7	1	1
8	Kabul	Mirbacha Kot	Mewa Khatoon	1				8	8	1	1
9	Kabul	Mirbacha Kot	Qala Rokai	1		1	10	4	2	1	1
10	Kabul	Mirbacha Kot	Sarak Farza	1				2	2		
TOTAL				10	0	3		64.5	47.5	6	9
PERCENT									73.6	60	90
AVERAGE				1	0	1	10	6.45	4.8	1	
RANGE	MAXIMU M			1	0	1	12	18	12	1	3
	MINIMUM			1	0	1	8	1	1	1	1

Table B2: General Information about the 20 group members

General Information of Member Farmers:

S N	Provinc e	District	Village	Group Member		Educated		Total Cultivate d Area	Grape Vineyar d Area	HHs raising cow	No of Cow
				Lea d	Radia l	Ye s	Grad e				
1	Kabul	Mirbachako t	Aab Chakan		1			6.5	3		
2	Kabul	Mirbachako t	Aab Chakan		1			10	6	1	2
3	Kabul	Mirbachako t	Baba Qochqar		1			1	1	1	1
4	Kabul	Mirbachako t	Baba Qochqar		1			5	5	1	1
5	Kabul	Mirbachako t	Da Saqi Payan		1	1	6	1	1		
6	Kabul	Mirbachako t	Da Saqi Payan		1			6.5	4		
7	Kabul	Mirbachako t	Dako-e-Bala		1			2	1		
8	Kabul	Mirbachako t	Dako-e-Bala		1			1	1		
9	Kabul	Mirbachako t	Deh Saqi Bala		1	1	6	2	2		
10	Kabul	Mirbachako t	Deh Saqi Bala		1			2	2	1	1
11	Kabul	Mirbachako t	Khawja Gyan		1			2	1.5		
12	Kabul	Mirbachako t	Khawja Gyan		1			1	1		
13	Kabul	Mirbachako t	Laghmani		1			2.5	2.5	1	1
14	Kabul	Mirbachako t	Laghmani		1			4	2	1	1
15	Kabul	Mirbachako t	Mewa Khatoon		1			3.5	3.5		
16	Kabul	Mirbachako t	Mewa Khatoon		1			2	1		
17	Kabul	Mirbachako t	Qala Rokai		1			1	1	1	2
18	Kabul	Mirbachako t	Qala Rokai		1			0.5	0.5		
19	Kabul	Mirbachako t	Sarak Farza		1			2	2		
20	Kabul	Mirbachako t	Sarak Farza		1			1.5	1		
TOTAL				0	20	2		57	42	7	9
PERCENT									73.7	35	30
Average				0	1	1	6	2.85	2.1	1	
RANGE	MAXIMU M			0	1	1	6	10	6	1	2
	MINIMUM			0	1	1	6	0.5	0.5	1	1

Table B3: Grape Production in 2008 (of all 30 farmers)

F/Name	Total Yield	Use of Fruit Harvest 2008						
		Family Used	Kept for Drying	Quantity Sold				
				On farm		Kabul Market		Total
	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
Abdul Rasool	12860	560				12300	18	12300
Abdul Rahim	1400	350		1050	28			1050
Muhammad Taher	3170	320	1050	1800	11			1800
Mihrab	1800	250		1550	30			1550
Jalaluddin	2750	300				2450	33	2450
Jalaluddin	5420	420		5000	18			5000
Ghulam Muhammad	1750	250		1500	12			1500
Ahmadullah	600	30		570	13			570
M. Usman	4510	150				4360	15	4360
Aziz Muhammad	2580	480	500	1600	13			1600
Dad Muhammad	1500	500		1000	14			1000
Muhammad Afzal	600	30		570	14			570
Ahmaduddin	6850	1200	650	5000	8			5000
Muhammad Azim	2350	700	600	1050	20			1050
Baaz Muhammad	1350	150		1200	10			1200
Khawja Sher Sayed	10860	500		2100	15	8260	15	10360
Muhammad Noor	2800	350				2450	12	2450
Ghulam Jan	1720	600				1120	17	1120
Abdul Wakeel	1230	180	1050					0
Mula Firoz Khan	16200	200				16000	10	16000
Fida Muhammad	3800	300		3500	9			3500
Mula Muhammad	660	100				560	10	560
Meer Ihsan	1420	120				1300	20	1300
Saeed Kamaluddin	7910	350				7560	30	7560
Hazrat Gul	9150	350		2100	19	6700	10	8800
Khan Aqa	850	300		550	18			550
Abdul Ajan	22150	150		22000	17			22000
Abdul Ahad	4700	200		4500	22			4500
Meraj Uddin	1800	400		1400	17			1400
Meraj Uddin	6050	150		5900	20			5900
Total	140790	9940	3850	63940	328	63060	190	127000
Percent		7.1	2.7	45.4152		44.7901		90.205
Average	4693.0	331.3	770.0	3197.0	16.4	5732.7	17.3	4233.3
Max	22150	1200	1050	22000	30	16000	33	22000
Min	600	30	500	550	8	560	10	0

Table B4: Grape Production in 2009 (of all 30 farmers)

F/Name	Total Yield	Use of Fruit Harvest 2009						
		Family Used	Kept for Drying	Quantity Sold				
				On farm		Kabul Market		Total
	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
Abdul Rasool	16170	1050	1120			14000	15	14000
Abdul Rahim	2380	700	560	1120	22			1120
Muhammad Taher	3810	450	1120	2240	11			2240
Mihrab	3550	400	1050	2100	24			2100
Jalaluddin	5600	350	2800			2450	22	2450
Jalaluddin	6600	1000		5600	17			5600
Ghulam Muhammad	2030	350		1680	11			1680
Ahmadullah	670	100		570	13			570
M. Usman	4610	250				4360	13	4360
Aziz Muhammad	17450	700	15000	1750	12			1750
Dad Muhammad	11550	1050	10500					0
Muhammad Afzal	690	120		570	11			570
Ahmaduddin	15210	210	10000	5000	7			5000
Muhammad Azim	11550	1050	9000	1500	20			1500
Baaz Muhammad	1750	350		1400	9			1400
Khawja Sher Sayed	11300	800		2240	15	8260	13	10500
Muhammad Noor	2950	500				2450	11	2450
Ghulam Jan	1920	800				1120	18	1120
Abdul Wakeel	2500	500	2000					0
Mula Firoz Khan	16400	400				16000	10	16000
Fida Muhammad	4950	450		4500	9.5			4500
Mula Muhammad	810	250				560	7	560
Meer Ihsan	1700	400				1300	17	1300
Saeed Kamaluddin	8160	600				7560	23	7560
Hazrat Gul	11300	800	3800			6700	8	6700
Khan Aqa	7600	600	7000					0
Abdul Ajan	31950	350				31600	14	31600
Abdul Ahad	13740	300	6720			6720	12	6720
Meraj Uddin	2240	700		1540	12			1540
Meraj Uddin	7120	500		6620	14			6620
Total	228260	16080	70670	38430	207.5	103080	183	141510
Percent		7.0	31.0	16.836		45.159		61.995
Average	7608.7	536.0	5436.2	2562.0	13.8	7929.2	14.1	4717.0
Max	31950	1050	15000	6620	24	31600	23	31600
Min	670	100	560	570	7	560	7	0

Table B5: Grape Production in 2008 (of only 10 lead farmers)

Total Yield	Vineyard Area	Yield/ha	Use of Fruit Harvest 2008						
			Family Used	Kept for Drying	Quantity Sold				
					On farm		Kabul Market		Total
[Kg]	[Ha]	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
1400	1.4	1000	350		1050	28			1050
2750	0.6	4583	300				2450	33	2450
1750	0.6	2917	250		1500	12			1500
2580	0.2	12900	480	500	1600	13			1600
6850	0.5	13700	1200	650	5000	8			5000
10860	2.4	4525	500		2100	15	8260	15	10360
16200	1.4	11571	200				16000	10	16000
7910	1.6	4944	350				7560	30	7560
9150	0.4	22875	350		2100	19	6700	10	8800
6050	0.4	15125	150		5900	20			5900
65500	9.5	6895	4130	1150	19250	115	40970	98	60220
			6.3	1.8	29.3893		62.5496		91.9389
6550.0	1.0	6895	413.0	575.0	2750.0	16.4	8194.0	19.6	6022.0
16200	2.4	6750	1200	650	5900	28	16000	33	16000
1400	0.2	7000	150	500	1050	8	2450	10	1050

Table B6: Grape Production in 2009 (of only 10 lead farmers)

Total Yield	Vineyard Area	Yield/ha	Use of Fruit Harvest 2009						
			Family Used	Kept for Drying	Quantity Sold				
					On farm		Kabul Market		Total
[Kg]	[Ha]	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
2380	1.4	1700	700	560	1120	22			1120
5600	0.6	9333	350	2800			2450	22	2450
2030	0.6	3383	350		1680	11			1680
17450	0.2	87250	700	15000	1750	12			1750
15210	0.5	30420	210	10000	5000	7			5000
11300	2.4	4708	800		2240	15	8260	13	10500
16400	1.4	11714	400				16000	10	16000
8160	1.6	5100	600				7560	23	7560
11300	0.4	28250	800	3800			6700	8	6700
7120	0.4	17800	500		6620	14			6620
96950	9.5	10205	5410	32160	18410	81	40970	76	59380

			5.6	33.2	18.989		42.259		61.248
9695.0	1.0	10205	541.0	6432.0	3068.3	13.5	8194.0	15.2	5938.0
17450	2.4	7271	800	15000	6620	22	16000	23	16000
2030	0.2	10150	210	560	1120	7	2450	8	1120

Table B7: Grape Production in 2008 (of only 20 member farmers)

Total Yield	Vineyard Area	Yield/ha	Use of Fruit Harvest 2008						
			Family Used	Kept for Drying	Quantity Sold				
					On farm		Kabul Market		Total
[Kg]	[Ha]	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
12860	0.6	21433	560				12300	18	12300
3170	1.2	2642	320	1050	1800	11			1800
1800	0.2	9000	250		1550	30			1550
5420	1.0	5420	420		5000	18			5000
600	0.2	3000	30		570	13			570
4510	0.8	5638	150				4360	15	4360
1500	0.2	7500	500		1000	14			1000
600	0.2	3000	30		570	14			570
2350	0.4	5875	700	600	1050	20			1050
1350	0.4	3375	150		1200	10			1200
2800	0.3	9333	350				2450	12	2450
1720	0.2	8600	600				1120	17	1120
1230	0.5	2460	180	1050					0
3800	0.4	9500	300		3500	9			3500
660	0.7	943	100				560	10	560
1420	0.2	7100	120				1300	20	1300
850	0.2	4250	300		550	18			550
22150	0.1	221500	150		22000	17			22000
4700	0.4	11750	200		4500	22			4500
1800	0.2	9000	400		1400	17			1400
75290	8.4	8963	5810	2700	44690	213	22090	92	66780
			7.7	3.6	59.3572		29.3399		88.697
3764.5	0.4	8963	290.5	900.0	3437.7	16.4	3681.7	15.3	3339.0
22150	1.2	18458	700	1050	22000	30	12300	20	22000
600	0.1	6000	30	600	550	9	560	10	0

Table B8: Grape Production in 2009 (of only 20 member farmers)

Total Yield	Vineyard Area	Yield/ha	Use of Fruit Harvest 2009						
			Family Used	Kept for Drying	Quantity Sold				
					On farm		Kabul Market		Total
[Kg]	[Ha]	[Kg]	[Kg]	[Kg]	Kg Sold	Price/Kg	Kg Sold	Price/Kg	[Kg]
16170	0.6	26950	1050	1120			14000	15	14000
3810	1.2	3175	450	1120	2240	11			2240
3550	0.2	17750	400	1050	2100	24			2100
6600	1.0	6600	1000		5600	17			5600
670	0.2	3350	100		570	13			570
4610	0.8	5763	250				4360	13	4360
11550	0.2	57750	1050	10500					0
690	0.2	3450	120		570	11			570
11550	0.4	28875	1050	9000	1500	20			1500
1750	0.4	4375	350		1400	9			1400
2950	0.3	9833	500				2450	11	2450
1920	0.2	9600	800				1120	18	1120
2500	0.5	5000	500	2000					0
4950	0.4	12375	450		4500	9.5			4500
810	0.7	1157	250				560	7	560
1700	0.2	8500	400				1300	17	1300
7600	0.2	38000	600	7000					0
31950	0.1	319500	350				31600	14	31600
13740	0.4	34350	300	6720			6720	12	6720
2240	0.2	11200	700		1540	12			1540
131310	8.4	15632	10670	38510	20020	126.5	62110	107	82130
			8.1	29.3	15.246		47.3		62.547
6565.5	0.4	15632	533.5	4813.8	2224.4	14.1	7763.8	13.4	4106.5
31950	1.2	26625	1050	10500	5600	24	31600	18	31600
670	0.1	6700	100	1050	570	9	560	7	0

Table B9: Urea used in 2008 and 2009 (of all 30 farmers)

F/Name	2008					2009				
	Unit	HH	No. of Units	Unit Price	Total Cost	Unit	HH	No. of Units	Unit Price	Total Cost
				Afs/Unit	Afs				Afs/Unit	Afs
Abdul Rasool	Kg	1	600	14	8400	Kg	1	700	16	11200
Abdul Rahim	Kg	1	300	14	4200	Kg	1	450	16	7200
Muhammad Taher	Kg	1	350	15	5250	Kg	1	450	16	7200
Mihrab	Kg	1	100	15	1500	Kg	1	100	16	1600
Jalaluddin	Kg	1	350	13	4550	Kg	1	450	13	5850
Jalaluddin	Kg	1	150	14	2100	Kg	1	200	16	3200
Ghulam Muhammad	Kg	1	300	15	4500	Kg	1	450	16	7200
Ahmadullah	Kg	1	100	14	1400	Kg	1	150	16	2400
M. Usman	Kg	1	300	15	4500	Kg	1	450	16	7200
Aziz Muhammad	Kg	1	150	14	2100	Kg	1	200	16	3200
Dad Muhammad	Kg	1	100	14	1400	Kg	1	100	16	1600
Muhammad Afzal	Kg	1	150	13	1950	Kg	1	250	13	3250
Ahmaduddin	Kg	1	350	13	4550	Kg	1	450	13	5850
Muhammad Azim	Kg	1	200	15	3000	Kg	1	350	16	5600
Baaz Muhammad						Kg	1	200	16	3200
Khawja Sher Sayed	Kg	1	1050	12	12600	Kg	1	1400	14	19600
Muhammad Noor	Kg	1	150	12	1800	Kg	1	300	14	4200
Ghulam Jan	Kg	1	100	14	1400	Kg	1	150	16	2400
Abdul Wakeel	Kg	1	350	14	4900	Kg	1	450	16	7200
Mula Firoz Khan	Kg	1	150	15	2250	Kg	1	300	16	4800
Fida Muhammad	Kg	1	200	15	3000	Kg	1	300	16	4800
Mula Muhammad						Kg	1	250	16	4000
Meer Ihsan	Kg	1	100	14	1400	Kg	1	150	16	2400
Saeed Kamaluddin	Kg	1	350	15	5250	Kg	1	350	16	5600
Hazrat Gul	Kg	1	100	14	1400	Kg	1	100	16	1600
Khan Aqa	Kg	1	150	15	2250	Kg	1	300	16	4800
Abdul Ajan						Kg	1	100	16	1600
Abdul Ahad	Kg	1	150	14	2100	Kg	1	150	16	2400
Meraj Uddin	Kg	1	100	13	1300	Kg	1	100	14	1400
Meraj Uddin	Kg	1	150	14	2100	Kg	1	150	16	2400
Total		27	6600	379	91150		30	9500	465	144950
Percent		90					100			
Average			244	14.04	3376			317	15.50	4832
Max			1050	15	12600			1400	16	19600
Min			100	12	1300			100	13	1400

Table B10: DAP used in 2008 and 2009 (of all 30 farmers)

F/Name	2008					2009				
	Unit	HH	No. of Units	Unit Price	Total Cost	Unit	HH	No. of Units	Unit Price	Total Cost
				Afs/Unit	Afs				Afs/Unit	Afs
Abdul Rasool	Kg	1	200	30	6000	Kg	1	350	32	11200
Abdul Rahim	Kg	1	350	26	9100	Kg	1	500	28	14000
Muhammad Taher					0					0
Mihrab	Kg	1	50	27	1350	Kg	1	50	28	1400
Jalaluddin	Kg	1	100	28	2800	Kg	1	100	30	3000
Jalaluddin	Kg	1	150	30	4500	Kg	1	250	36	9000
Ghulam Muhammad	Kg	1	150	30	4500	Kg	1	200	36	7200
Ahmadullah	Kg	1	100	30	3000	Kg	1	100	36	3600
M. Usman	Kg	1	150	28	4200	Kg	1	200	36	7200
Aziz Muhammad	Kg				0	Kg				0
Dad Muhammad	Kg	1	50	27	1350	Kg	1	100	36	3600
Muhammad Afzal	Kg	1	50	26	1300	Kg	1	100	30	3000
Ahmaduddin					0	Kg	1	100	32	3200
Muhammad Azim					0	Kg	1	100	30	3000
Baaz Muhammad	Kg	1	200	26	5200	Kg	1	300	30	9000
Khawja Sher Sayed	Kg	1	250	26	6500	Kg	1	400	26	10400
Muhammad Noor	Kg	1	100	26	2600	Kg	1	100	26	2600
Ghulam Jan	Kg	1	100	27	2700	Kg	1	100	30	3000
Abdul Wakeel	Kg	1	300	28	8400	Kg	1	400	30	12000
Mula Firoz Khan	Kg	1	100	28	2800	Kg	1	150	28	4200
Fida Muhammad	Kg	1	200	24	4800	Kg	1	250	24	6000
Mula Muhammad	Kg	1	100	25	2500	Kg	1	100	30	3000
Meer Ihsan	Kg	1	150	25	3750	Kg	1	200	36	7200
Saeed Kamaluddin	Kg	1	100	24	2400	Kg	1	100	24	2400
Hazrat Gul					0	Kg	1	50	36	1800
Khan Aqa	Kg	1	150	26	3900	Kg	1	150	28	4200
Abdul Ajan	Kg	1	50	26	1300	Kg	1	50	32	1600
Abdul Ahad	Kg	1	50	27	1350	Kg	1	100	32	3200
Meraj Uddin					0					0
Meraj Uddin	Kg	1	50	24	1200	Kg	1	100	24	2400
Total		24	3250	644	87500		27	4700	826	142400
Percent		80					90			
Average			135	26.83	2917			174	30.59	4747
Max			350	30	9100			500	36	14000
Min			50	24	0			50	24	0

Table B11: Manure used in 2008 and 2009 (of all 30 farmers)

F/Name	2008					2009				
	Unit	HH	No. of Units	Unit Price	Total Cost	Unit	HH	No. of Units	Unit Price	Total Cost
				Afs/Unit	Afs				Afs/Unit	Afs
Abdul Rasool					0					0
Abdul Rahim	WB	1	700	10	7000	WB	1	700	10	7000
Muhammad Taher	WB	1	400	15	6000	WB	1	400	15	6000
Mihrab					0					0
Jalaluddin					0					0
Jalaluddin					0					0
Ghulam Muhammad					0					0
Ahmadullah	WB	1	200	10	2000	WB	1	200	10	2000
M. Usman	WB	1	150	15	2250	WB	1	150	15	2250
Aziz Muhammad	WB	1	150	10	1500	WB	1	150	10	1500
Dad Muhammad					0					0
Muhammad Afzal					0					0
Ahmaduddin					0					0
Muhammad Azim					0					0
Baaz Muhammad					0					0
Khawja Sher Sayed	WB	1	100	15	1500	WB	1	100	15	1500
Muhammad Noor					0					0
Ghulam Jan	WB	1	70	15	1050	WB	1	70	15	1050
Abdul Wakeel	WB	1	200	15	3000	WB	1	200	15	3000
Mula Firoz Khan	WB	1	300	15	4500	WB	1	300	15	4500
Fida Muhammad					0					0
Mula Muhammad	WB	1	300	10	3000	WB	1	300	10	3000
Meer Ihsan	WB	1	450	10	4500	WB	1	450	10	4500
Saeed Kamaluddin					0					0
Hazrat Gul	WB	1	100	15	1500	WB	1	100	15	1500
Khan Aqa	WB	1	150	10	1500	WB	1	150	10	1500
Abdul Ajan	WB	1	20	10	200	WB	1	20	10	200
Abdul Ahad	WB	1	100	15	1500	WB	1	100	15	1500
Meraj Uddin	WB	1	200	15	3000	WB	1	200	15	3000
Meraj Uddin					0					0
Total		16	3590	205	44000		16	3590	205	44000
Percent		53.3					53.33			
Average			224	12.81	1467			224	12.81	1467
Max			700	15	7000			700	15	7000
Min			20	10	0			20	10	0

Table B12: Sulfur Dust used in 2008 and 2009 (of all 30 farmers)

F/Name	2008					2009				
	Unit	HH	No. of Units	Unit Price	Total Cost	Unit	HH	No. of Units	Unit Price	Total Cost
				Afs/Unit	Afs				Afs/Unit	Afs
Abdul Rasool	Kg	1	80	18	1440	Kg	1	40	22.5	900
Abdul Rahim	Kg	1	150	20	3000	Kg	1	50	24	1200
Muhammad Taher	Kg	1	105	19	1995	Kg	1	50	20	1000
Mihrab	Kg	1	35	17	595	Kg	1	20	17	340
Jalaluddin	Kg	1	50	15	750	Kg	1	30	16	480
Jalaluddin	Kg	1	75	16	1200	Kg	1	50	20	1000
Ghulam Muhammad	Kg	1	70	16	1120	Kg	1	50	13	650
Ahmadullah	Kg	1	21	16	336	Kg	1	14	17.14	239.96
M. Usman	Kg	1	140	15	2100	Kg	1	75	18	1350
Aziz Muhammad	Kg	1	35	20	700	Kg	1	25	20	500
Dad Muhammad	Kg	1	42	18	756	Kg	1	25	13	325
Muhammad Afzal	Kg	1	70	16	1120	Kg	1	25	13	325
Ahmaduddin	Kg	1	140	15	2100	Kg	1	75	17	1275
Muhammad Azim	Kg	1	14	13	182	Kg	1	14	15	210
Baaz Muhammad	Kg	1	100	19	1900	Kg	1	50	24	1200
Khawja Sher Sayed	Kg	1	175	17	2975	Kg	1	100	18	1800
Muhammad Noor	Kg	1	100	15	1500	Kg	1	50	17	850
Ghulam Jan	Kg	1	35	15	525	Kg	1	21	20	420
Abdul Wakeel	Kg	1	105	16	1680	Kg	1	50	25	1250
Mula Firoz Khan	Kg	1	70	15	1050	Kg	1	50	20	1000
Fida Muhammad	Kg	1	52	16	832	Kg	1	21	28	588
Mula Muhammad	Kg	1	40	18	720	Kg	1	21	22	462
Meer Ihsan	Kg	1	40	16	640	Kg	1	21	20	420
Saeed Kamaluddin	Kg	1	35	18	630	Kg	1	14	22	308
Hazrat Gul	Kg	1	70	16	1120	Kg	1	25	24	600
Khan Aqa	Kg	1	70	17	1190	Kg	1	25	20	500
Abdul Ajan	Kg	1	20	15	300	Kg	1	7	30	210
Abdul Ahad	Kg	1	70	15	1050	Kg	1	50	20	1000
Meraj Uddin	Kg	1	210	14	2940	Kg	1	50	14	700
Meraj Uddin	Kg	1	42	17	714	Kg	1	25	22.6	565
Total		30	2261	493	37160		30	1123	592.24	21667.96
Percent		100					100			
Average		1.00	75	16.43	1239		1.00	37	19.74	722
Max		1	210	20	3000		1	100	30	1800
Min		1	14	13	182		1	7	13	210

[illegible]

Table B14: Lime Sulfur used in 2008 and 2009 (of all 30 farmers)

F/Name	2008					2009				
	Unit	HH	No. of Units	Unit Price	Total Cost	Unit	HH	No. of Units	Unit Price	Total Cost
				Afs/Unit	Afs				Afs/Unit	Afs
Abdul Rasool										
Abdul Rahim						Cc	1	40000	0	
Muhammad Taher										
Mihrab										
Jalaluddin						Cc	1	20000	0	
Jalaluddin										
Ghulam Muhammad						Cc	1	20000	0	
Ahmadullah										
M. Usman										
Aziz Muhammad						Cc	1	30000	0	
Dad Muhammad										
Muhammad Afzal										
Ahmaduddin						Cc	1	30000	0	
Muhammad Azim										
Baaz Muhammad										
Khawja Sher Sayed						Cc	1	30000	0	
Muhammad Noor										
Ghulam Jan										
Abdul Wakeel										
Mula Firoz Khan						Cc	1	30000	0	
Fida Muhammad										
Mula Muhammad										
Meer Ihsan										
Saeed Kamaluddin						Cc	1	20000		
Hazrat Gul						Cc	1	20000		
Khan Aqa										
Abdul Ajan										
Abdul Ahad										
Meraj Uddin										
Meraj Uddin						Cc	1	20000	0	
Total		0	0	0	0		10	260000	0	0
Percent							30			
Average								26000	0.00	0
Max								40000	0	0
Min								20000	0	0

Table B15: Labor used for digging in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Hired Male Labor 2008			Family Members 2009			Hired Male Labor 2009		
	Male	Wage Rate	Total	Hired Male Labor			Male	Wage Rate	Total	Hired Male Labor		
				Male	Wage Rate	Male Labor Cost				Male	Wage Rate	Male Labor Cost
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	10	250	2500			0	10	250	2500			0
Abdul Rahim	12	250	3000	6	250	1500	14	250	3500	2	250	500
Muhammad Taher	10	250	2500	4	250	1000	12	250	3000	4	250	1000
Mihrab	3	250	750			0	3	250	750			0
Jalaluddin	6	250	1500	2	250	500	12	250	3000			0
Jalaluddin	4	250	1000	3	250	750	4	250	1000	3	250	750
Ghulam Muhammad	10	250	2500			0	10	250	2500			0
Ahmadullah	3	250	750			0	3	250	750			0
M. Usman	12	250	3000			0	12	250	3000			0
Aziz Muhammad	3	250	750			0	3	250	750			0
Dad Muhammad	4	250	1000			0	4	250	1000			0
Muhammad Afzal	3	250	750			0	3	250	750			0
Ahmaduddin	10	250	2500			0	10	250	2500			0
Muhammad Azim	8	250	2000			0	8	250	2000			0
Baaz Muhammad	8	250	2000			0	8	250	2000			0
Khawja Sher Sayed	12	250	3000	12	250	3000	14	250	3500	10	250	2500
Muhammad Noor	8	250	2000			0	8	250	2000			0
Ghulam Jan	6	250	1500			0	6	250	1500			0
Abdul Wakeel	5	250	1250			0	5	250	1250			0
Mula Firoz Khan	12	250	3000	6	250	1500	12	250	3000	6	250	1500
Fida Muhammad	7	250	1750			0	7	250	1750			0
Mula Muhammad	12	250	3000			0	12	250	3000			0
Meer Ihsan	4	250	1000			0	4	250	1000			0
Saeed Kamaluddin	14	250	3500	6	250	1500	14	250	3500	5	250	1250
Hazrat Gul	8	250	2000			0	8	250	2000			0
Khan Aqa	4	250	1000			0	4	250	1000			0
Abdul Ajan	3	250	750			0	3	250	750			0
Abdul Ahad	8	250	2000			0	8	250	2000			0
Meraj Uddin	4	250	1000			0	4	250	1000			0
Meraj Uddin	8	250	2000			0	8	250	2000			0
Total	221		55250	39		9750	233		58250	30		7500

Average	7	250	1842	6	250	325	8	250	1942	5	250	250
Max	14	250	3500	12	250	3000	14	250	3500	10	250	2500
Min	3	250	750	2	250	0	3	250	750	2	250	0

Table B16: Labor used for pruning in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Hired Male Labor 2008			Family Members 2009			Hired Male Labor 2009		
	Male	Wage Rate	Total	Hired Male Labor			Male	Wage Rate	Total	Hired Male Labor		
				Male	Wage Rate	Male Labor Cost				Male	Wage Rate	Male Labor Cost
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	10	250	2500			0	10	250	2500			0
Abdul Rahim	5	250	1250	10	250	2500	5	250	1250	10	250	2500
Muhammad Taher	4	250	1000	10	250	2500	4	250	1000	10	250	2500
Mihrab	3	250	750			0	3	250	750			0
Jalaluddin	6	250	1500	3	250	750	6	250	1500	3	250	750
Jalaluddin	4	250	1000	3	250	750	4	250	1000	3	250	750
Ghulam Muhammad	10	250	2500			0	10	250	2500			0
Ahmadullah	3	250	750			0	3	250	750			0
M. Usman	8	250	2000	2	250	500	8	250	2000	2	250	500
Aziz Muhammad	3	250	750			0	3	250	750			0
Dad Muhammad	4	250	1000			0	4	250	1000			0
Muhammad Afzal	3	250	750			0	3	250	750			0
Ahmaduddin	10	250	2500			0	10	250	2500			0
Muhammad Azim	8	250	2000			0	8	250	2000			0
Baaz Muhammad	8	250	2000			0	8	250	2000			0
Khawja Sher Sayed	10	250	2500	15	250	3750	10	250	2500	15	250	3750
Muhammad Noor	8	250	2000			0	8	250	2000			0
Ghulam Jan	6	250	1500			0	6	250	1500			0
Abdul Wakeel	5	250	1250			0	5	250	1250			0
Mula Firoz Khan	10	250	2500	10	250	2500	10	250	2500	10	250	2500
Fida Muhammad	7	250	1750			0	7	250	1750			0
Mula Muhammad	12	250	3000			0	12	250	3000			0
Meer Ihsan	4	250	1000			0	4	250	1000			0
Saeed Kamaluddin	4	250	1000	6	250	1500	4	250	1000	6	250	1500
Hazrat Gul	8	250	2000			0	8	250	2000			0
Khan Aqa	4	250	1000			0	4	250	1000			0
Abdul Ajan	2	250	500			0	2	250	500			0
Abdul Ahad	8	250	2000			0	8	250	2000			0
Meraj Uddin	4	250	1000			0	4	250	1000			0
Meraj Uddin	8	250	2000			0	8	250	2000			0
Total	189		47250	59		14750	189		47250	59		14750

Average	6	250	1575	7	250	491.7	6	250	1575	7	250	491.7
Max	12	250	3000	15	250	3750	12	250	3000	15	250	3750
Min	2	250	500	2	250	0	2	250	500	2	250	0

Table B17: Labor used for pesticide application in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Family Members 2009		
	Male	Wage Rate	Total	Male	Wage Rate	Total
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	2	200	400	3	200	600
Abdul Rahim	4	200	800	2	200	400
Muhammad Taher	3	200	600	2	200	400
Mihrab	2	200	400	1	200	200
Jalaluddin	2	200	400	1	200	200
Jalaluddin	2	200	400	1	200	200
Ghulam Muhammad	3	200	600	2	200	400
Ahmadullah	2	200	400	1	200	200
M. Usman	3	200	600	2	200	400
Aziz Muhammad	3	200	600	1	200	200
Dad Muhammad	2	200	400	1	200	200
Muhammad Afzal	3	200	600	1	200	200
Ahmaduddin	2	200	400	1	200	200
Muhammad Azim	4	200	800	2	200	400
Baaz Muhammad	3	200	600	1	200	200
Khawja Sher Sayed	2	200	400	2	200	400
Muhammad Noor	1	200	200	1	200	200
Ghulam Jan	2	200	400	1	200	200
Abdul Wakeel	3	200	600	2	200	400
Mula Firoz Khan	1	200	200	1	200	200
Fida Muhammad	2	200	400	1	200	200
Mula Muhammad	3	200	600	2	200	400
Meer Ihsan	2	200	400	1	200	200
Saeed Kamaluddin	2	200	400	1	200	200
Hazrat Gul	2	200	400	1	200	200
Khan Aqa	3	200	600	2	200	400
Abdul Ajan	2	200	400	1	200	200
Abdul Ahad	3	200	600	2	200	400
Meraj Uddin	2	200	400	1	200	200
Meraj Uddin	2	200	400	1	200	200
Total	72		14400	42		8400
Average	2	200	480	1	200	280
Max	4	200	800	3	200	600
Min	1	200	200	1	200	200

Table B18: Labor used for fertilizer application in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Hired 2008			Family Members 2009			Hired 2009		
	Male	Wage Rate	Total	Male	Wage Rate	Total	Male	Wage Rate	Total	Male	Wage Rate	Total
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	2	200	400			0	2	200	400			0
Abdul Rahim	2	200	400	7	200	1400	2	200	400	8	200	1600
Muhammad Taher	2	200	400	3	200	600	2	200	400	4	200	800
Mihrab	1	200	200			0	1	200	200			0
Jalaluddin	2	200	400			0	2	200	400			0
Jalaluddin	1	200	200			0	1	200	200			0
Ghulam Muhammad	2	200	400			0	2	200	400			0
Ahmadullah	1	200	200	2	200	400	1	200	200	2	200	400
M. Usman	2	200	400			0	2	200	400			0
Aziz Muhammad	1	200	200			0	1	200	200			0
Dad Muhammad	1	200	200			0	1	200	200			0
Muhammad Afzal	2	200	400			0	2	200	400			0
Ahmaduddin	1	200	200			0	1	200	200			0
Muhammad Azim	2	200	400			0	2	200	400			0
Baaz Muhammad	2	200	400			0	2	200	400			0
Khawja Sher Sayed	2	200	400			0	2	200	400			0
Muhammad Noor	1	200	200			0	1	200	200			0
Ghulam Jan	1	200	200			0	1	200	200			0
Abdul Wakeel	1	200	200	2	200	400	1	200	200	2	200	400
Mula Firoz Khan	2	200	400	3	200	600	2	200	400	4	200	800
Fida Muhammad	2	200	400			0	2	200	400			0
Mula Muhammad	2	200	400			0	2	200	400			0
Meer Ihsan	2	200	400	2	200	400	2	200	400	3	200	600
Saeed Kamaluddin	1	200	200			0	1	200	200			0
Hazrat Gul	3	200	600			0	3	200	600			0
Khan Aqa	3	200	600			0	3	200	600			0
Abdul Ajan	1	200	200			0	1	200	200			0
Abdul Ahad	2	200	400			0	2	200	400			0
Meraj Uddin	1	200	200	2	200	400	1	200	200	3	200	600
Meraj Uddin	1	200	200			0	1	200	200			0
Total	49		9800	21		4200	49		9800	26		5200
Average	2	200	326.7	3	200	140	2	200	326.7	4	200	173.3
Max	3	200	600	7	200	1400	3	200	600	8	200	1600

Min	1	200	200	2	200	0	1	200	200	2	200	0
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Table B19: Labor used for weeding in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Family Members 2009		
	Male	Wage Rate	Total	Male	Wage Rate	Total
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	2	200	400	2	200	400
Abdul Rahim	2	200	400	2	200	400
Muhammad Taher	1	200	200	1	200	200
Mihrab	1	200	200	1	200	200
Jalaluddin	1	200	200	1	200	200
Jalaluddin	1	200	200	1	200	200
Ghulam Muhammad	2	200	400	2	200	400
Ahmadullah	1	200	200	1	200	200
M. Usman	2	200	400	2	200	400
Aziz Muhammad	1	200	200	1	200	200
Dad Muhammad	1	200	200	1	200	200
Muhammad Afzal	2	200	400	2	200	400
Ahmaduddin	1	200	200	1	200	200
Muhammad Azim	2	200	400	2	200	400
Baaz Muhammad	2	200	400	2	200	400
Khawja Sher Sayed	1	200	200	1	200	200
Muhammad Noor	1	200	200	1	200	200
Ghulam Jan	1	200	200	1	200	200
Abdul Wakeel	2	200	400	2	200	400
Mula Firoz Khan	1	200	200	1	200	200
Fida Muhammad	2	200	400	2	200	400
Mula Muhammad	1	200	200	1	200	200
Meer Ihsan	1	200	200	1	200	200
Saeed Kamaluddin	1	200	200	1	200	200
Hazrat Gul	1	200	200	1	200	200
Khan Aqa	2	200	400	2	200	400
Abdul Ajan	1	200	200	1	200	200
Abdul Ahad	2	200	400	2	200	400
Meraj Uddin	1	200	200	1	200	200
Meraj Uddin	1	200	200	1	200	200
Total	41		8200	41		8200
Average	1	200	273.3	1	200	273.3
Max	2	200	400	2	200	400
Min	1	200	200	1	200	200

Table B20: Labor used for harvesting in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Hired Male Labor 2008			Family Members 2009			Hired Male Labor 2009		
	Male	Wage Rate	Total	Hired Male Labor			Male	Wage Rate	Total	Hired Male Labor		
				Male	Wage Rate	Male Labor Cost				Male	Wage Rate	Male Labor Cost
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	4	200	800	2	200	400	6	200	1200	14	200	2800
Abdul Rahim			0			0			0			0
Muhammad Taher			0			0			0			0
Mihrab			0			0			0			0
Jalaluddin	6	200	1200	3	200	600	8	200	1600	15	200	3000
Jalaluddin			0			0			0			0
Ghulam Muhammad			0			0			0			0
Ahmadullah			0			0			0			0
M. Usman	5	200	1000	2	200	400	5	200	1000	10	200	2000
Aziz Muhammad			0			0			0			0
Dad Muhammad	4	200	800			0	6	200	1200			0
Muhammad Afzal			0			0			0			0
Ahmaduddin			0			0			0			0
Muhammad Azim			0			0			0			0
Baaz Muhammad			0			0			0			0
Khawja Sher Sayed			0	10	200	2000			0			0
Muhammad Noor	8	200	1600	8	250	2000	8	200	1600	10	250	2500
Ghulam Jan	6	200	1200	2	200	400	6	200	1200			0
Abdul Wakeel	5	200	1000			0	5	200	1000	5	200	1000
Mula Firoz Khan	10	200	2000	6	200	1200	10	200	2000	3	200	600
Fida Muhammad			0			0			0			0
Mula Muhammad	5	200	1000			0	5	200	1000			0
Meer Ihsan	4	200	800	2	200	400	4	200	800			0
Saeed Kamaluddin	4	200	800	6	250	1500	4	200	800	20	250	5000
Hazrat Gul	4	200	800	8	250	2000	4	200	800	8	250	2000
Khan Aqa	5	200	1000			0	5	200	1000			0
Abdul Ajan	4	200	800			0	4	200	800			0
Abdul Ahad	6	200	1200			0	6	200	1200	6	250	1500
Meraj Uddin			0			0			0			0
Meraj Uddin			0			0			0			0
Total	80		16000	49		10900	86		17200	91		20400

Average	5	200	533.3	5	215	363.3	6	200	573.3	10	222.2	680
Max	10	200	2000	10	250	2000	10	200	2000	20	250	5000
Min	4	200	0	2	200	0	4	200	0	3	200	0

Table B21: Labor used for Irrigation in 2008 and 2009 (of all 30 farmers)

F/Name	Family Members 2008			Family Members 2009		
	Male	Wage Rate	Total	Male	Wage Rate	Total
	[PD]	[Afs/PD]	[Afs]	[PD]	[Afs/PD]	[Afs]
Abdul Rasool	6	200	1200	6	200	1200
Abdul Rahim	6	200	1200	6	200	1200
Muhammad Taher	5	200	1000	5	200	1000
Mihrab	4	200	800	4	200	800
Jalaluddin	4	200	800	4	200	800
Jalaluddin	4	200	800	4	200	800
Ghulam Muhammad	5	200	1000	5	200	1000
Ahmadullah	4	200	800	4	200	800
M. Usman	5	200	1000	5	200	1000
Aziz Muhammad	5	200	1000	5	200	1000
Dad Muhammad	4	200	800	4	200	800
Muhammad Afzal	5	200	1000	5	200	1000
Ahmaduddin	4	200	800	4	200	800
Muhammad Azim	6	200	1200	6	200	1200
Baaz Muhammad	5	200	1000	5	200	1000
Khawja Sher Sayed	5	200	1000	5	200	1000
Muhammad Noor	4	200	800	4	200	800
Ghulam Jan	4	200	800	4	200	800
Abdul Wakeel	6	200	1200	6	200	1200
Mula Firoz Khan	3	200	600	3	200	600
Fida Muhammad	5	200	1000	5	200	1000
Mula Muhammad	5	200	1000	5	200	1000
Meer Ihsan	4	200	800	4	200	800
Saeed Kamaluddin	4	200	800	4	200	800
Hazrat Gul	4	200	800	4	200	800
Khan Aqa	5	200	1000	5	200	1000
Abdul Ajan	4	200	800	4	200	800
Abdul Ahad	6	200	1200	6	200	1200
Meraj Uddin	5	200	1000	5	200	1000
Meraj Uddin	4	200	800	4	200	800
Total	140		28000	140		28000
Average	5	200.0	933.3	5	200.0	933.3

Max	6	200	1200	6	200	1200
Min	3	200	600	3	200	600

Table B22: Importance of Farmer Organization/Group (of all 30 farmers)

Type of Farmer	Solving the problem of each other	Exchange of knowledge and experiences	Helping each other (Ashar) during the hard work in sharp time	Helping each other in order to save the hired labor	Collection of the grape and selling it with higher price	Making the saving box
10 Group Leaders	1	1	1			
	1	1	1			1
	1	1	1			
	1	1	1			
	1	1	1			
	1	1	1			
	1	1	1			
	1	1	1			
	1	1	1			
	1	1	1			
Total	10	10	10	0	0	1
20 Group Members	1		1		1	
	1	1	1			
		1	1			
	1	1	1	1	1	1
	1	1	1			
	1	1	1	1		
	1	1	1	1	1	
	1	1	1			
	1	1	1	1		
		1		1		
	1	1	1		1	
	1		1			1
	1	1	1	1		1
	1	1	1	1		
	1	1	1		1	
	1	1			1	
		1	1	1		
	1	1	1			
	1	1	1		1	
Total	17	18	18	8	8	3