

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

**A study of date palm market chain and its role in food security
and livelihoods of farmers in the South Punjab**

By

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A thesis submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE (HONS.)

IN

AGRI. EXTENSION



Department of Agri. Extension,
University of Agriculture,
Faisalabad

2011

To

The Controller of Examinations,
University of Agriculture,
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This humble effort

Is

Dedicated

To

***MY LOVING
PARENTS***

Acknowledgements

I feel highly privileged to express my gratitude to my sincere and honorable supervisor **Dr. Babar Shahbaz**, Assistant Professor, Department of Agricultural Extension for his keen interest, untiring guidance, creative criticism and sympathetic attitude throughout the study. Without his enthusiastic scholarly guidance, this manuscript would not have seen the light of day at best in its present form.

With deep sense of honor, I wish to express my sincere gratitude to **Dr. Munir Ahmad**, Professor, Department of Agricultural Extension for his inspiring help, proper guidance, keen interest and sympathetic attitude during writing and completion of the thesis.

Sincere and special thanks are executed to **Dr. Izhar Ahmad Khan**, Assistant Professor, Department of Rural Sociology, for his cooperation.

I greatly acknowledge the support provided by the **International Centre for Development and Decent Work (ICDD)** for this research project.

Declaration

I hereby declare that contents of the thesis, “**A study of date palm market chain and its role in food security and livelihoods of farmers in the South Punjab**” are product of my own research and no part has been copied from any published source (except the references, standard mathematical or genetic models/equations/formulate/protocols etc.). I further declare that this work has not been submitted for award of any other diploma/degree. The university may take action if the information provided is found inaccurate at any stage. (In case of any default, the scholar will be proceeded against as per HEC plagiarism policy).

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2009-ag-1127

Abstract

Date palm is one of the most important trees in semi arid and dry areas of the world and has become a part of the cultural life of the people in these areas. The tree is capable to provide a broad range of products and services, and is considered as a natural renewable resource. As fruits of date palm (dates) are rich in carbohydrates, vitamins and minerals, they have immense importance as a healthy food as well as a desert fruit providing a wide range of essential nutrients. The tree provides food, fuel, shelter and is used in manufacturing of different handicrafts. The present study was conducted to explore the date palm market chain and its role in food security and livelihoods of farmers in the South Punjab. Structured interview schedule was prepared to collect quantitative data from 120 randomly selected respondents of Tehsil Dera Ghazi Khan whereas qualitative data were carried out through key informants and focus group interview. The results revealed that a wide range of products from date palm are prepared by the rural people which were used within the household as well as marketed. It was concluded that date palm tree has potential to improve food security and economic condition of farmers because of its diverse usages and high nutritional value. The study recommends that government should provide improved varieties, credit facilities and training opportunities to growers in order to enhance yield and farmers' profit.

CHAPTER 1

INTRODUCTION

The date palm (*Phoenix dactylifera* L.) is possibly the most ancient cultivated tree in the world (Zaid and Wet, 2002). This tree is considered as an important constituent of farming system in dry and semi-arid regions and is suitable for both small and large scale farming (Khushk *et al.*, 2009). Furthermore, the date palm is one of the greatest producers of food per hectare (Zaid and Wet, 2002). The high nutritional composition, profitability in addition to environmental advantages makes date palm an excellent food for the future generation. The fruits of the date palm (dates) have a high percentage of carbohydrate (total sugars, 44-88%), fat (0.2-0.5%), protein (2.3-5.6%), pectin (0.5-3.9%), dietary fibre (6.4-11.5%), fifteen salts, at least fifteen minerals and six vitamins. The flesh of dates contains 0.2-0.5% oil, while in seed it is 7.7-9.7%. Both flesh and seed contain fatty acids. Moreover, the seeds contain aluminum, cadmium, chloride, lead, sulphur and oleic acid in various proportions. In many ways, dates may be considered as an almost ideal food and provide a wide range of essential nutrients and potential health benefits. The date palm has the capability to improve the diet of a considerable number of people in areas where dates are eaten as a food rather than as a delicacy (Al-Shahib and Marshall, 2003).

1.1 Date palm in Pakistan: an overview

Pakistan is facing many problems, among these uncertainty in food production and rising population are important. It is difficult to fulfill the food requirement of rising population of the country with traditional crops. In this situation date palm cultivation is a good option to improve the food and economic status of many people in Pakistan (Hassan *et al.*, 2006).

Pakistan is among top producers of dates (PHDEB, 2008). During the year 2007-08, Pakistan exported 88,451 tones of dried dates and 4,687 tones of fresh dates and earned \$36.033 million from export of both fresh and dried dates (EPB, 2009). Pakistan, on an average, export 10 % of total dates production and 90 % is either consumed locally

or wasted (PHDEB, 2008). Table 1.1 shows year wise area and production of dates in different provinces of Pakistan.

Table 1.1: Area ("000" hectares) under cultivation and production ("000" tons) of date palm in all provinces of Pakistan

Year	Punjab		Sindh		KPK		Balochistan		Pakistan	
	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.	Area	Prod.
1995-96	11.1	92.5	19.7	31.5	0.9	5.9	42.2	403.6	73.9	532.5
1996-97	11.1	92.2	20.1	32.1	0.9	6.0	42.4	404.1	74.5	534.4
1997-98	11.1	93.7	20.6	34.0	1.0	6.3	42.4	403.5	75.1	537.5
1998-99	11.1	95.4	20.8	33.9	1.0	6.5	42.6	404.3	75.1	540.1
1999-00	11.1	89.5	22.2	244.6	1.0	6.6	42.6	239.2	76.9	579.9
2000-01	11.4	97.9	23.1	266.0	1.0	6.6	43.1	242.0	78.6	612.5
2001-02	11.4	94.1	23.4	288.9	1.0	6.7	42.6	240.6	78.5	630.3
2002-03	8.5	62.1	25.3	317.1	1.2	8.1	42.9	237.7	77.9	625.0
2003-04	5.7	41.7	25.5	151.6	1.3	8.6	42.3	224.9	74.8	426.8
2004-05	5.8	42.7	26.4	318.2	1.4	9.3	48.1	252.2	81.7	622.4
2005-06	5.8	42.6	26.7	192.8	1.4	8.9	48.1	252.3	82.0	496.6
2006-07	5.9	43.2	29.3	201.0	1.4	10.0	48.2	172.1	84.8	426.3
2007-08	5.9	44.3	32.0	253.1	1.4	10.4	50.8	249.7	90.1	557.5

Source: Govt. of Pakistan, 2009

In Pakistan, a significant increase in area was reported from 1992 - 93 to 1993 – 94, when area increased from 101.81 thousand acres to 180.88 thousand acres, while for the remaining years this increase was slight over time.

It is generally assumed that production of any crop should increase with rise in area under cultivation. In case of Pakistan, however, production of date palm indicated a somewhat decreasing trend during some years and an increasing trend for other years (Hassan *et al.*, 2006).

About 300 date varieties exist in Pakistan (Arifeen, 2009). Pakistan's commercially important date varieties include Aseel, Karbalai, Fasli, Muzawati, Hillawi, Begum Jhangi, Dashtiari, Sabzo, Jaan Swore, Kehraba, Rabai and Dhakki. Aseel of Sindh, Dhakki of Dera

Ismail Kkan and Begum Jhangi of Balochistan are best in terms of demand and popularity. These varieties can compete with world's popular date varieties in the international date market (PHDEB, 2008).

Although Pakistan is one of the leading producers of dates yet its date industry is unable to process a reasonable production of especially dried date for export. It has the potential to become the largest source of foreign exchange earner in the world from dried date. The chances for value addition are very bright if Pakistan introduces new modern technique in management practices and improve a lot in date packing, packaging, storing, marketing and advertising (Arifeen, 2009).

1.2 Date palm usage pattern

Dates have a great importance as a staple food as they contain a high amount of carbohydrates, minerals and vitamins. The fruit is generally related with health foods. Date consumption is very high during the month of Ramadan. Similarly, the fruit has enormous significance on the occasion of Divali, Christmas and such festivals in other religions. Dates are used in sweets, confectionery, chocolates, baking products, preservatives, salads, sauces, and breakfast cereals. Dates also have many industrial uses (PHDEB, 2008).

The fruit and trunk of date palm is utilized in local industries, which supply packing materials for local marketing of fruits and vegetables as well as for many other uses. The tree and fruit by-products offer an extra income (Hassan *et al.*, 2006). Various parts of date tree have been used for preparation of animal feed, construction materials, household goods, and paper (Anwar, 2006).

The leaves of date palm are used for making huts, mats, manual fans, rugs, bread dishes, baskets, different types of containers for domestic use and also provide packing material for fruits and vegetables. Dried branches are used as sticks, brooms and fuel. Rope and large hats are made from old leaf sheath. Fruit stalk is used as brooms and for kite making, whereas the trunk of date palm is used to make pillars for huts, roofing of small houses and is also utilized for construction of aqueducts and bridges. All remaining parts of date palm are used as a fuel (PHDEB, 2008).

1.3 Marketing system of date palm in Pakistan

Agricultural marketing in Pakistan is not sophisticated and there is a series of intermediaries between producers and consumers. This large market chain along with lack of storage facilities result in spoiling of 30-40% fresh produce before reaching the consumer (PHDEB, 2008).

Like other horticulture crops, dates trade is with the private sector. However, Government assists the system by offering physical infrastructure particularly wholesale markets and communication, market promotion, market intelligence and regulatory measures to remove the difficulties in business operations (PHDEB, 2008).

Date producers often rely on relatively high cost informal credit sources and advances from date contractors because they face many difficulties in marketing their produce. They have little access to the credit and other facilities in wholesale and assembly markets; and are treated as temporary clients (Khushk *et al.*, 2006).

1.4 Potential of dates in ensuring food security and poverty reduction in South Punjab

Agriculture is one of the most important drivers of growth in Pakistan. But, in spite of being an agricultural country, food insecurity is a main threat to Pakistan. The incidence of poverty in rural areas is higher than the urban areas and there exist differences in Human Development Index of different provinces. Table 1.2 shows the rank of provinces by urban/ rural and overall Human Development Index (HDI).

Table 1.2: Rank of Provinces by Urban/Rural and Overall HDI

Province.....	HDI.....	HDI Ranking
Punjab	0.557	1
Sindh	0.54	2
KPK	0.51	3
Balochistan	0.499	4
Sindh (Urban)	0.659	1
Punjab (Urban)	0.657	2
KPK (Urban)	0.627	3
Balochistan (Urban)	0.591	4
Punjab Rural)	0.517	5
KPK (Rural)	0.489	6
Balochistan (Rural)	0.486	7
Sindh (Rural)	0.456	8

Source: Hussain. 2003

Punjab has been divided into three regions: Northern Punjab, Central Punjab, and Southern Punjab (ADB, 2002). The living standard of the people within the Punjab is different. The status of living standards, poverty, and social indicators generally follows a North-South pattern in Punjab: income and non- income indicators of welfare are better

in the North, followed by Central Punjab, and worst in South Punjab; similarly, poverty is lowest in the North and highest in the South of Punjab (Government of the Punjab, 2005).

The main date palm growing areas in South Punjab are Multan, Muzaffargarh and D.G. Khan (PARC, 2009). The climatic and soil conditions are severe in most of the date palm growing areas. Moreover, the socio-economic conditions and food security status in these areas are not satisfactory (SDPI, 2009).

As dates are rich in carbohydrates, vitamins and minerals, they have immense importance as a healthy food as well as a desert fruit. The tree provides food, fuel, shelter and is used in manufacturing of different handicrafts (PHDEB, 2008) which indicates the importance of date palm to reduce food deficiency and to ensure livelihoods sustainability in resource poor areas. This research project was therefore proposed to test the hypothesis that the date palm tree has the potential to reduce food insecurity and ensuring decent living as the tree provides food, fuel, shelter, and market opportunities. The level of awareness and training needs of the farmers were also identified and analyzed.

OBJECTIVES

General Objective:

To study the date palm usage pattern, its marketing chain and role in food security and livelihoods of small farmers in the South Punjab

Specific Objectives:

1. To identify the role of date palm in livelihoods (food, shelter, business etc) of date palm growers in the study area
2. To study the supply chain of date palm products by identifying the stakeholders and institutions involved in the marketing chain of dates and other products of date palm tree
3. To assess the level of awareness among date palm growers regarding date palm production technology
4. To identify training needs of date growers in South Punjab

5. To give policy recommendations for agricultural extension for maximum utilization of date palm tree and ensuring decent living of farmers in the study area

Limitations of the study

1. The quantitative study was limited to Tehsil Dera Ghazi Khan due to shortage of time and resources.
2. The study was further limited to 120 respondents (farmers) in Tehsil Dera Ghazi Khan.
3. Keeping in view the illiteracy level of the respondents Saraiki language was used for data collection.
4. The farmers had no records about their farming business. Therefore, the reliability and validity of the results of the study were limited to the extent to which the respondents were able to provide correct information.
5. Female respondents could not be approached directly due to the social and cultural values, customs and traditions of the area.

CHAPTER 2

REVIEW OF LITERATURE

A detailed and refined review of literature is the basis and inspiration for significant, useful research (Boote and Beile, 2005). The purpose is to justify and provide a context for the research. The purpose of review of literature is also to illustrate how the subject has been studied previously and what were the gaps (Boote and Beile, 2005).

Some of the relevant reviews are presented under the following research parameters

2.1 Date palm usage pattern

According to FAO (1993) the usages of date palm by-products in the date producing areas is positively associated with the remoteness of these areas and modern technological improvements may decrease their uses in one hand and increase the possibility of their industrial uses on the other hand.

Al-Sulaiman (2000) investigated basic mechanical properties of leaves of date palm and concluded that cheap and abundant leaves of date palm had higher tensile and specific strength than many other building materials like wood, aluminum and steel. These characteristics made date palm leaves an excellent building block in composite structures.

Al-Shahib and Marshall (2003) reviewed the data on the nutritional characteristics of date palm and concluded that rich nutrient composition of date palm makes it an almost ideal food and increase in its production would improve the nutrition of many people around the world.

Ismail *et al.* (2006) determined the consumption of dates among different subgroups (males, females, workers, students etc) in United Arab Emirates and concluded that dates had a considerable contribution in the daily diet of the people.

Ghosh *et al.* (2010) concluded that particle board made from leaves of date palm can be used as an alternate of wood/plywood at low cost. They further suggested that date

palm leave particle board may be used commercially for developing door/window panels, false ceiling, book shelf and packing material for fruits.

Chao and Krueger (2007) argued that date palm has enormous usages and has a key role in ecological improvement of the deserts. Furthermore, the tree has a great cultural and traditional importance in the Arab and other Islamic countries and with the increase of population in these countries, the demand is expected to increase in the future.

Safwat (2007) stated that biologically recycled products of date palm can be used as high quality compost, animal feed and for medical purposes. This recycling process of date palm is very important in balancing the environment and raising the living standards of the farmers.

Chowdhury *et al.* (2008) reported that beside the use of wild date palm in sugar manufacturing, it is also used for other purposes like mat making, fencing, animal feeding, sun-shading etc, hence contributes significantly to the livelihoods of the people in rural Bangladesh.

Agoudjila *et al.* (2011) investigated the thermophysical, chemical and dielectric properties of date palm wood and concluded that wood of date palm is a good example of renewable material in the development of efficient and safe insulating materials.

Khiari *et al.* (2011) compared rachises of date palm with other sources of lignocellulosic fibres such as wood, non-wood species, and agricultural wastes and concluded that date palm rachises could be considered a good candidate as a source of fibres for papermaking.

Movahed *et al.* (2011) concluded that presence of many essential and anti-inflammatory nutrients as well as high amount of crude fibre in date palm makes it a valuable dietary product to be used as a tasty cholesterol free nutrient.

Synthesis

The rich composition of date palm makes it a valuable dietary product which can improve the nutrition of many people around the world. Beside the fruit, date palm has many other household, commercial and industrial usages. In remote areas, by-products of date palm are used extensively for both household and commercial purposes which provide substantial returns to rural people. Modern technological improvements increase

the possibility of industrial usages of date palm such as paper making, insulating material, and particle board. Furthermore, the tree has a great cultural and traditional importance in many date producing countries and with the increase of population in these countries, the demand of dates is expected to increase in the future

2.2 Agricultural marketing

Heltberg (1998) concluded that improvement in the rural markets by improved access to credit, training and extension for small farmers, and removal of those subsidies and policies which have different effect on small and large farmer would leads to increase in efficiency, productivity, employment and equity.

Goletti and Samman (2000) reported that promotion of economic growth and rural livelihoods can be achieved by efficient post-production system which becomes increasingly important for developing countries.

Hine and Ellis (2001) examined the relationship between accessibility, marketing and agricultural development and concluded that a great variation in market prices showed that food marketing is inefficient and is subjected to monopolistic practices.

Liu (2003) reported that demand in the date market of European Union (EU) is increasing quickly and supply at present is mainly restricted to only two major countries (Tunisia and Algeria). There is a possibility for other countries to enter in the EU date market. Sharp increase in organic date market should be considered by the producers.

Pearce (2003) stated that credit provided by the traders, processors, input suppliers, and exporters is the major source of finance for agricultural producers in many countries. However small or more remote farmers often have limited access to credit and, in many cases, with unfavorable credit conditions.

Eskola (2005) reported that inadequate physical infrastructure, lack of market information, and inefficient institutional framework are the major barriers in agricultural trade in Tanzania. Increased funding for physical infrastructure, improvement in fair access to credit and dissemination of market information are necessary to understand the full potential of agricultural trade as a tool in the fight against poverty.

Khushk *et al.* (2006) conducted a study to understand the marketing system of dates in Sindh, Pakistan and reported, on the basis of data collected from date growers and market intermediaries, that contract system of date orchards provides economic advantages to date growers as they faced many difficulties in marketing their produce. In assembly and whole sale markets, they have no access to the credit and other facilities.

Shilpi and Umali-Deininger (2007) analyzed the relationship between facilities and infrastructure available at the market and decision of farmers to sell their produce at the market in India and concluded that farmers prefer to sale the produce in the markets with improved facilities and easy access.

Wasilwa *et al.* (2007) reported that there is a need to train extension staff and farmers about the date palm production and processing by using seminars, workshops and tours. Research should be conducted to develop production and processing technologies.

Dorward *et al.* (2008) concluded that domestic agricultural marketing system in developing countries is important for both producers and consumers but these markets are subjected to poor price integration, weak institutions, poor transport and communications infrastructure, and large number of small traders, which results in poor market operations and development.

Jairath (2008) predicted the extent of investment made in promotion of marketing infrastructure in India and concluded that private investment enhanced public investment in the promotion of agricultural marketing.

Kleiner and Green (2008) stated that it is necessary for the extension of sustainable agriculture to develop substitute for existing production techniques and improve marketing strategies.

Mahmoudi *et al.* (2008) reported that trade of organic dates is increasing internationally but developing countries paid little attention to its organic cultivation.

Chaudhry (2009) suggested that government intervention in improving the access of household to market, education and assets along with lowering the household size is necessary in alleviating the poverty in remote areas of Pakistan.

Jari and Fraser (2009) conducted a study to identify the technical and institutional factors affecting marketing choice behaviour of small farmers in the Kat River Valley,

South Africa and recognized market information, contract agreements, knowledge about grades and standard, social capital, market infrastructure, group participation, and tradition as a major factor determining the behaviour of households towards agricultural market choice.

Synthesis

Agricultural marketing system in developing countries is important for both producers and consumers. Promotion of economic growth and rural livelihoods can be achieved by efficient marketing system of agricultural products. Inadequate physical infrastructure, lack of market information, and inefficient institutional framework are the major barriers in agricultural marketing. Increased funding for physical infrastructure, improvement in fair access to credit and dissemination of market information are necessary to understand the full potential of agricultural marketing as a tool in the fight against poverty.

2.3 Food security

Ahmed and Siddiqui (1995) suggested that food sufficiency in Pakistan can be achieved by giving proper incentives to farmers and checking rapid growth in population.

Ayres and McCalla (1996) reported that improvement in the rural welfare and private agriculture for small and medium-sized land holders is necessary to ensure food for all people.

Sanchez *et al.* (1997) stated that high-value trees have a great role in increasing income and improving food security status of the rural people. Agroforestry diversify and improve food production in a sustainable manner.

Sutherland *et al.* (1999) concluded that, unlike the common views, semi arid regions often have agricultural growth potential. Linking research, extension and development functions, and enhancing participation of the farmers in the process of food security policy and strategy is needed for external or public-sector support to integrated longer-term development initiatives.

Dilley and Boudreau (2001) argued that vulnerability, in contexts of food security, is often defined in relation to an outcome, such as hunger, food insecurity or famine. This is a barrier in employing the concept for the more specific task of evaluating

the susceptibility of a population to explicitly-identified exogenous events or shocks that could lead to these outcomes.

Berti *et al.* (2003) reviewed the impact of agricultural interventions on nutritional status in participating households and concluded that those agriculture interventions that invested broadly in different types of capital were more likely to improve nutrition outcomes.

del Ninno *et al.* (2005) reported that food aid strategy, adopted by many developing countries is not the only effective way in combating food insecurity. Private markets, in many cases, can effectively overcome the problem of shortage in food availability.

Muro and Burchi (2007) stated that for the promotion of national food security, education for the people of rural areas is a major factor.

Ejeta (2009) reported that insuring local food security with renewed support for the science of agriculture, natural resource conservation, and protection of the environment, is critical for global peace and prosperity.

According to SDPI (2009) 48.6 percent of total population of Pakistan is victim of different degrees of food insecurity, out of total food insecure people 22.4 percent are chronically food insecure.

Jaron and Galal (2009) stated that a large proportion of the world's population, especially in Sub-Saharan Africa and in South East Asia, is chronically food insecure. A considerable reduction in global food insecurity is not possible only with the distribution of food items. Promotion of agricultural development, economic growth and education assistance are important in order to improve health and well being.

Khan and Gill (2009) reported that there is a difference in food security status among provinces, districts and households; therefore achieving food security at national level does not mean that it is achieved at province, district or household levels.

Pinstrup-Andersen (2009) reported that concept of food security is valuable if used with a clear understanding of what it means, its limitations, and the way it interacts with the behaviour and non-food factors.

Songlin and Ruihong (2010) evaluated the state of sustainable food security in Henan, China and suggested that development of water-saving agriculture, reduction of energy consumption and lowering proportion of agricultural population are important steps for sustaining food safety.

Synthesis

The concept of food security is valuable if used with a clear understanding of what it means, its limitations, and the way it interacts with the behaviour and non-food factors. A large proportion of the world's population is chronically food insecure. A considerable reduction in global food insecurity is not possible only with the distribution of food items. Promotion of agricultural development, economic growth and education assistance are important in order to improve health and well being. Linking research, extension and development functions, and enhancing participation of the farmers in the process of food security policy and strategy is needed for external or public-sector support to integrated longer-term development initiatives.

2.4 Rural Livelihoods

Farrington *et al.* (1999) stated that sustainable livelihoods approach helps to bring together different perceptions on poverty, identify the fundamental constraints to improved livelihoods and their solutions, and link improved micro-level understanding of poverty into policy and institutional change processes.

Baumann (2000) stated that factors examined by sustainable livelihoods framework at local level are incomplete without considering political capital which is one of the key capital on which 'people draw to build their livelihoods'.

Davis (2000) conducted a participatory cross-sectional study in Zambia and reported that transport was the serious concern to livelihoods of the rural people. Improvement in the accessibility and institution capacity was suggested to reduce the vulnerability and improve livelihood outcomes.

Meinzen-Dick and Adato (2001) argued that sustainable livelihoods framework has the advantage over conventional approaches as this framework also includes many factors and relationships that are often missing in conventional approaches.

Rivera and Qamar (2003) suggested that to advance the livelihoods in rural areas it is necessary that government build up a new and expanded policy in favour of agricultural extension and catalyze institution changes within the public sector.

Bosma *et al.* (2006) conducted a study to determine the farmer' motives for agricultural diversification and its contribution toward the livelihoods of farmers in Vietnam and concluded that desire to improve the livelihoods and diet of the family was the important motive. They suggested that land adjacent to home and knowledge is necessary for effective integration of farm components.

Haan and Zoomers (2005) reported that two major challenges faced by the livelihoods approach are problem of access and the relationship between access and decision-making. Social relations, institutions and organizations have a strong influence on the access to livelihood opportunities. The relationship between access and decision-making is closely connected with both strategic and unintentional behaviour and structural factors.

Dercon and Hoddinott (2005) explore the nature of link of rural households to market towns in Ethiopia and concluded that local markets towns have a significant contribution to the economic transactions of rural households. There exists a positive link between improved access to market and rural livelihoods welfare.

Hassan *et al.* (2006) conducted a field survey to determine the profitability of date palm orchards and concluded that date plantation is highly profitable and maintains positive returns for a long period of time, hence improving the livelihoods of the growers.

Butler and Mazur (2007) stated that livelihood diversification play an important role in improving food security and income of people in rural communities of Africa. They suggested that improvement in the production technology of crops, forms of social organization and marketing are necessary for the encouragement of sustainable rural livelihoods.

Byrn *et al.* (2007) argued that energy requirements of the rural livelihoods can be satisfied by cost effective renewable energy technologies. Creation of renewable energy markets, improvement in the services and training for renewable energy technologies and

expansion in the microfinance in rural areas are important policy strategies for stimulating renewable energy development in rural communities.

Chianu *et al.* (2008) conducted a study to examine livelihoods and wealth distribution among farm households in western Kenya and concluded that there was very high wealth inequality among households.

Ian Scoones (2009) stated that livelihoods perspectives is essential to rural development thinking and practice and it must be concentrated across the four themes; knowledge, politics, scale and dynamics.

Rana and Islam (2010) conducted a study to explore the role of palm husbandry in the rural economy of the south-eastern region of Bangladesh and reported that palm husbandry had a significant contribution towards the living standard of the farmers.

Jamali *et al.* (2011) suggested that starting different public welfare schemes at grass root level, strengthening rural women NGOs, provision of facilities by the government for the institutional building of NGOs, and strong monitoring and evaluation of NGOs are essential steps for the improvement of livelihoods of the poor in Sindh.

Synthesis

Livelihood diversification plays an important role in improving food security and income of people in rural communities. Date palm cultivation also had a significant contribution towards the living standard of the farmers. To advance the livelihoods in rural areas it is necessary that government build up a new and expanded policy in favour of agricultural extension and catalyze institution changes within the public sector.

2.5 Awareness level of date growers about production technology of date palm

Luqman *et al.* (2002) conducted a survey to explore the reasons of non adaptation of date palm cultivation in district Karak and concluded that unawareness about the benefits of date cultivation, no tradition of its cultivation in the area, poverty and unawareness about production technology were the main obstacles hindering the date palm cultivation in the area.

Rahim *et al.* (2003) conducted a study to determine the role of extension agent in improving the production of dates in District Panjgur (Balochistan). They suggested that

for rapid diffusion of date cultivation among the farmers, it is necessary to bridge the gap between extension, research department and farmers.

Al-Sakran and Muneer (2006) conducted a study about the adoption of date palm tissue culture technology among date palm growers in the central region of Saudi Arabia and concluded that adoption level of farmers was very low as compared to awareness level because of unclear relative advantage, lack of compatibility and uncertainty about the results of adopting the technology.

Eshchanov *et al.* (2007) assess the farmer's knowledge and perceptions about multipurpose trees and tree intercropping systems in Uzbekistan and reported that financial and economic reasons largely affect the selection of land use by the farmers

Abbas (2008) conducted a study to investigate the awareness and adoption of date palm production technologies among the farmers of District Bahawalpur and reported that the awareness level of farmers in the study area was high as compared to adoption level regarding the date palm production technologies.

Ajayi and Solomon (2010) assessed the effect of extension contact on the socio-economic characteristics of farmers in adopting the oil palm technologies in Nigeria and concluded that frequency of extension contact, year of farmer's experience and farm size had a significant association with adoption of oil palm technologies.

Maity and Chatterjee (2010) conducted a study to estimate the perceptions of farmers towards modern inputs and their impact on perceived sustainability and concluded that education level of farmers has a positive impact on perceived sustainability. Awareness level of farmers was highest for irrigation and the lowest for high yielding varieties.

Synthesis

Frequency of extension contact, year of farmer's experience, education and farm size had a significant association with the awareness level of farmers regarding date palm production technology. For rapid diffusion of date cultivation among the farmers, it is necessary to bridge the gap between extension, research department and farmers

2.6 Training needs of the farmers

Koffa *et al.* (2001) identified training areas for both extension workers and farmers and concluded that training was needed in prenursery stages, nursery and post nursery stages activities, composting and green manuring, livestock husbandry, collecting market information, leadership and entrepreneurial skills, effective processing and facilitation skills, agroforestry processes and component techniques.

Roy (2003) conducted a face to face survey to determine the training needs in modern agriculture and other employment generating activities and concluded that farmers need training in the field of crop and vegetable cultivation, dairy farming, motor repairing and the use of modern information technology respectively.

Barghouti *et al.* (2004) concluded that the needs for training farmers for diversification are wide ranging. Farmers need to be trained not only in the new technologies of the traditional crops but also new methods of cultivation in new crops, commodity packaging, sorting, grading, processing, financial management system and international trade.

Nickols (2005) presented that training need assessment is a useful tool but it is a tool that must be adapted for the task and conditions at hand. Training Need Assessment (TNA) can involve one set of activities and resources on one occasion and a very different set of activities and resources on another. However, the ends remain the same: recommendations and accompanying rationales regarding training to make use of it or not, to pursue some other course of action with some other intervention.

Okorley *et al.* (2005) stated that the major step to achieve is to help the farmers to acquire the necessary competencies through relevant and appropriate training after training needs assessment.

Yaseen (2005) stated that to meet international standard set out under WTO agreements, farmers have to very high quality agricultural produce. To achieve this, we have to train our farmers competent and skilled through proper training which is an important tool for assisting policy makers, government functionaries, development professionals, programmes and projects, similarly farmers need training to increase yield

per unit area because agricultural technology is constantly changing and farmers need to keep abreast of new technologies.

Motkaluk (2006) concluded that the identifying training needs of farmers are important to improve their skills. The trainings especially for farmers, their spouses and other members of farming families presently involved on a full-time or part-time basis on family farms are reliant on the farm for all or part of their livelihood.

Synthesis

Training need assessment is a useful tool but it is a tool that must be adapted for the task and conditions at hand. Training Need Assessment (TNA) can involve one set of activities and resources on one occasion and a very different set of activities and resources on another. However, the ends remain the same: recommendations and accompanying rationales regarding training to make use of it or not, to pursue some other course of action with some other intervention. Farmers need to be trained not only in the new technologies of the traditional crops but also new methods of cultivation in new crops, commodity packaging, sorting, grading, processing, financial management system and international trade.

Overall synthesis of review of literature

The rich composition of date palm makes it a valuable dietary product. Beside the fruit, date palm has many other household, commercial and industrial usages. The date palm, thus, provides substantial returns to rural people and can improve the nutrition of many people around the world. Agricultural marketing system in developing countries is important for both producers and consumers. Promotion of economic growth and rural livelihoods can be achieved by efficient marketing system of agricultural products. Private markets, in many cases, can effectively overcome the problem of shortage in food availability. Livelihood diversification also plays an important role in improving food security and income of people in rural communities. Improvement in the production technology of crops, forms of social organization and marketing are necessary for the encouragement of sustainable rural livelihoods. However a research gap exists regarding the date palm supply chain and its role in food security in the South Punjab. The present study was conducted to add knowledge in this important area of research.

CHAPTER 3

MATERIALS AND METHOD

3.1 QUANTITATIVE DATA

3.1.1 Research area – Universe

The South Punjab of Pakistan was selected purposively for the present research because it is one of the regions in Pakistan with largest area under date palm. Within South Punjab, Dera Ghazi Khan District was selected purposively because it is one of the leading districts within Punjab in terms of date production.

3.1.2 The District Dera Ghazi Khan

The district Dera Ghazi Khan is situated in the southwestern part of Pakistan. The district is bounded on the north by the District Dera Ismail Khan (KPK) and its adjoining area; on the east by Muzaffargarh and Layyah separating these two districts by river Indus; on the south by Rajanpur; and on the west by Musa Khail and Barkhan districts of Balochistan Province. The total area of the district is 119224 square kilometers.

Climatically, the area is in an arid zone having an average annual rainfall of no more than 125 mm. The summers are very hot and the winters are mild to cold. The temperature generally ranges between 13° to 50° C. The area is categorized as Barani, in general, because the western side of the city receives hill torrents of Sulaiman Range. The hill torrents of Suleiman Mountain range and Indus flood affects Dera Ghazi Khan almost every year.

3.1.3 Population

All the date palm growers in the district Dera Ghazi Khan were considered as population for quantitative study whereas all date growers and stakeholders involved in the supply chain of dates in Pakistan were considered as population of qualitative study.

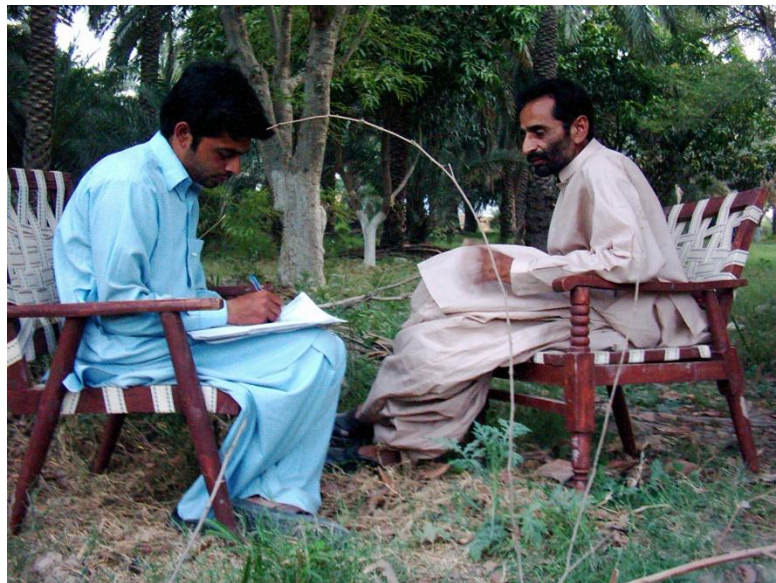
3.1.4 The sample

Within the D.G Khan District one tehsil (D.G Khan) was selected purposively. Tehsil Dera Ghazi Khan comprises 41 union councils (7 urban and 34 rural union councils). Out of 34 rural union councils, 4 union councils were selected randomly and

from each selected union council, 3 villages were selected at random. A list of growers was prepared in each selected villages with the participation of local residents and 10 respondents from each village were selected through simple random sampling technique thereby making a sample size of 120 respondents. The growers having at least 20 date trees in their fields were considered as respondents.



Flood effected area (Photo by author)



Author (left) interviewing a key informant



Overview of a field in D.G Khan (Photo by author)



Overview of a field in D.G Khan (Photo by author)

3.1.5 Research instrument

Structured interview schedule was prepared to collect quantitative data. The interview schedule was pre-tested to 15 farmers before data collection and necessary amendments were made.

3.1.6 Data analysis

The quantitative data were analyzed using the software Statistical Package for Social Sciences (SPSS).

3.2 QUALITATIVE DATA

The qualitative data were carried out by key informants and focus group interview. The respondents of qualitative data were selected through snow ball and convenient sampling techniques. The main purpose was to study the supply chain of date palm products by identifying the stakeholders and institutions involved in the marketing chain of dates and other products of date palm tree in Pakistan. The areas surveyed during the study were

- 1) Dera Ghazi Khan, Muzaffargarh and Faisalabad (Punjab)
- 2) Sukkur (Sindh)
- 3) Dera Ismail Khan (Khyber Pakhtunkhwa)

Open ended mail questionnaire and telephonic interview was conducted to collect data from respondents of Balochistan province. As Faisalabad is not included in the list of major date producing regions, it was selected to study the marketing of dates in areas where dates are not produced in sufficient quantities. The key informants included in the study were

- 1) Agricultural officers
- 2) Research officers
- 3) Progressive farmers
- 4) Local knowledgeable persons
- 5) Stakeholders involved in the supply chain of dates

The qualitative data were analyzed using content analysis technique.

CHAPTER 4

RESULTS AND DISCUSSION

4.1 Demographic characteristics of the respondents

In this section the information of general characteristics of the respondents such as age, educational level, size of land holding, annual income and area under date palm cultivation were collected. The data regarding these characteristics are presented here under.

4.1.1 Age

It is generally believed that with the increase in age, the individual becomes mentally mature and takes rational decisions and thereof, age can be one of the important factors affecting the adoption behavior of respondents. The respondents were asked about their age and on basis of their responses they were classified into three categories. The data regarding this aspect are given in Table 4.1.

Table 4.1: Distribution of the respondents according to their age

Age of respondents	Frequency	Percentage
Young (up to 30)	32	26.7
Middle aged (30-50)	60	50.0
Old (> 50)	28	23.3
Total	120	100.0

Table 4.1 shows that half (50%) of the respondents were middle aged followed by young (26.7%) and old (23.3%). It means that half of the respondents belonged to middle age category.

These results are more or less similar to those of Abbas (2010) who reported that 60% of the respondents had middle age (36-50 years), whereas 28% of the respondents belonged to old aged category (above 50) years and remaining 11.6% of the respondents belonged to young age (up to 35).

4.1.2 Literacy level

Education is the aggregate of all the process for bringing about change in human behavior. For bringing a positive change in the behavior of individual, education is the main and very important weapon. Education expands knowledge and other wanted qualities of mind and general capability, especially by means of formal schooling. It is a fact that an educated person is expected to be analytical and logical towards things. It is confirmed through many research studies that education plays a significant role in the adoption process of recommended agricultural practices. Furthermore education of the people is a major factor for the promotion of national food security (Muro and Burchi, 2007).

Keeping this fact in view, the respondents were asked about their education level. The data are given in Table 4.2.

Table 4.2: Distribution of the respondents according to their literacy level

Literacy level	Frequency	Percentage
Illiterate	71	59.2
Primary	21	17.5
Middle	13	10.8
Matric and above	15	12.5
Total	120	100.0

Table 4.2 depicts that more than half (59.2%) of the respondents were illiterate while 17.5% had literacy level up to primary, 12.5% were "Matric and above" and only 10.8% of the respondents had literacy level up to middle.

These results are somewhat contradictory with those of Rayit (2010) who reported that majority (50.8%) of the respondents were illiterate, 29.2% belonged to literacy level of primary, whereas remaining 14.2% and 5.8% belonged to educational level middle and "Matric and above".

4.1.3 Family size

Family size of the respondents is an important indicator that influences livelihoods diversification. Keeping in view the importance of family size, respondents were asked about their family size (total family members). The data collected are presented graphically.

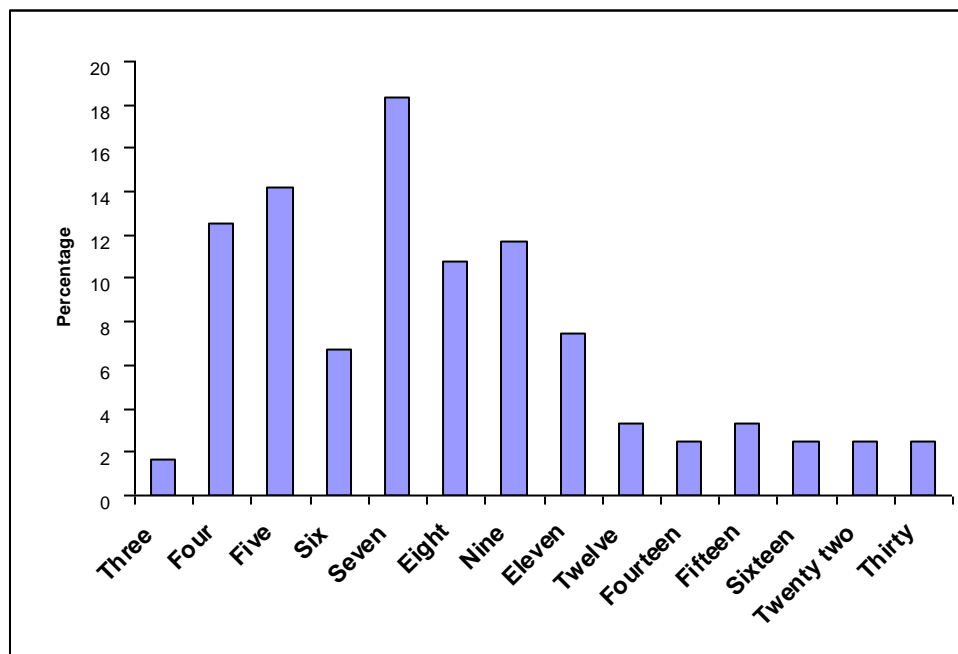


Fig. 4.1 Total family size

About 18% of the respondents told that they had 7 household members, 14.2% consisted of 5 members, and 12.5% consisted of 4 family members.

4.1.4 Type of tenure

The concept of tenureship means the manners and conditions of land holding and property rights of the individual to the land (Munir, 1988). In our country mostly the types of land tenures are owner, owner-cum tenants and tenants. It is assumed that owner cultivators are always better than tenants and owner-cum tenants. So data were collected regarding tenancy status of respondents, which are presented in Table 4.3

Table 4.3: Distribution of the respondents according to their type of tenure

Tenure	Frequency	Percent
Owner	117	97.5
Tenant	3	2.5
Total	120	100.0

Table 4.3 shows that an overwhelming majority (97.5%) of the respondents was owner and only 2.5% were tenant. It means that an overwhelming majority of the respondents was owner.

These results are more or less similar with those of Raza (2010) who concluded that 91.7% of the respondents were owner while results are contradictory with those of Rayit (2010) who reported that that 43.3% of the respondents was owner, 17.5% of the respondents were tenants and remaining were owner-cum tenant.

4.1.5 Total area of the land

The size of land holding refers to the piece of land cultivated by a farmer and his family (Nawaz.1989). It is generally thought that farmers having large land holdings can take risks and usually they have more contacts with information sources. Therefore it was thought essential to collect information about the size of land holding of the respondents which is given in Table 4.4.

Table 4.4: Distribution of the respondents according to their total area of the land

Total area (acres)	Frequency	Percent
Up to 5	69	57.5
6-15	39	32.5
16-25	9	7.5
>25	3	2.5
Total	120	100.0

Table 4.4 reveals that more than half (57.5%) of the respondents had a land up to 5 acres, 32.5% had 6-15 acres, 7.5% had 16-25 acres while only 2.5% had more than 25 acres of land. These results are more or less similar to those of Abbas (2010) who reported that 85% of the respondents had a size of land holding up to 12 acres 8% of the respondents had more than 25 acre of land.

4.1.6 Annual net income

Different respondents have different sources of income. The overall income of the respondents during one year earned from all sources of income is called annual net income. The net income affects dissemination of improved agricultural practices among the farming community. The information about the net income is shown in Table 4.5.

Table 4.5: Distribution of the respondents according to their annual net income

Annual income	Frequency	Percent
Up to 100,000 Rs	37	30.8
100,001-150,000	48	40.0
150,001 Rs. and above	35	29.2
Total	120	100.0

Table 4.5 depicts that 40% of the respondents had 100,001-150,000 Rs annual income, 30.8% had up to 100,000 Rs and 29.2% had 150,001 Rs and above annual income.

These results are more or less similar with those of Raza (2010) who concluded that 35% of the respondents had annual income up to 100,000 Rs.

4.1.7 Crops grown

The respondents were asked to specify the crops they grown in their land. The responses are presented in Table 4.6.

Table 4.6: Distribution of the respondents according to the crops grown

Crops grown	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Wheat	120	100		
Cotton	19	15.8	101	84.2
Sugarcane	9	7.5	111	92.5
Rice	117	97.5	3	2.5
Sorghum	17	14.2	103	85.8
Maize	8	6.7	112	93.3
Barseem	46	38.3	74	61.7

Wheat was grown by all the respondents. Rice was grown by 97.5% of the respondents while Barseem, cotton, maize, sugarcane and sorghum was grown by 38.3%, 15.8%, 14.2%, 7.5% and 6.7% of the respondents respectively.

Wheat-rice cropping pattern was adopted by the overwhelming majority of the respondents in the study area.

4.1.8 Pattern of date palm cultivation

Pattern of date palm cultivation was categories as orchard, scattered trees and intercropping. The data in this regard are presented in table 4.7.

Table 4.7: Distribution of the respondents according to their pattern of date palm cultivation

Pattern of cultivation	Frequency	Percentage
Orchard	3	2.5
Scattered trees	117	97.5
Intercropping	0	0
Total	120	100.0

An overwhelming majority of the respondent had scattered date palm trees while only 2.5% had well developed orchards. No intercropping system was found. The data shows that there was less trend of establishing date orchards in the study area. A farmer said,

“There is no place in my knowledge from where I can get good quality varieties”.

The above remark indicates the reason of less trend of establishing date orchards in the area. The qualitative data reveals that date palm propagated in the area mostly due to dispersion of seed through man, birds, winds etc.

4.1.9 Total number of mature date palm trees

The respondents were asked to point out the total number of mature date palm trees in their fields. The data collected in this regard are presented in Table 4.8

Table 4.8: Distribution of the respondents according to total no. of mature date trees

No. of date palm trees	Frequency	Percent
20-40	53	44.2
41-60	26	21.7
61-80	27	22.5
81-100	10	8.3
>100	4	3.3
Total	120	100.0

About 44% of the respondents had 20-40 date palm trees, 22.5% had 61-80 trees, and 21.7% had 41-60 trees while 8.3% and 3.3% of the respondents had 81-100 and more than 100 date palm trees respectively. The data shows that majority (65%) of the respondents had 20-60 trees in their fields.

4.1.10 Varieties grown

The adoption of productive and resistant date varieties is a key factor for improved production (Rahim *et al.*, 2003). The data collected in this aspect are presented in table 4.9

Table 4.9: Distribution of the respondents according to varieties grown

Varieties grown	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Hillawi	3	2.5	117	97.5
Karbalain			120	100.0
BJ			120	100.0
Dhakki	3	2.5	117	97.5
Khudrawi	2	1.7	118	98.3
Muzawati			120	100.0
Shamran	4	3.3	116	96.7
Aseel	1	.8	119	99.2
Jaman	120	100.0		
Don't know	116	96.7	4	3.3

Table 4.9 shows that 96.7% of the respondents were unaware about the exact name of the date varieties grown in their fields and only few, who had well developed orchards, had improved varieties. Almost all date palms in Dera Ghazi Khan are propagated through seed and no scientific or local nomenclature system prevailed in the area. Local people often named the dates according to their colour. A farmer during interview said,

“The date palm trees in my field are propagated through seed or planted by our forefathers. Although there is a variation in the quantity and quality of fruits but neither I nor any other fellow farmers know the exact name of these varieties”.

4.2 Role of date palm in livelihoods of farmers

Date palm tree contributes significantly to the livelihoods of the farmers in date growing areas (Chowdhury *et al.*, 2008). The data collected in this aspect are presented

4.2.1 Income generating activities

Livelihood diversification plays an important role in improving food security and income of people in rural areas (Butler and Mazur, 2007). The data collected for primary, secondary and tertiary income generating activities by the respondents' households are presented graphically in the figure 4.2.

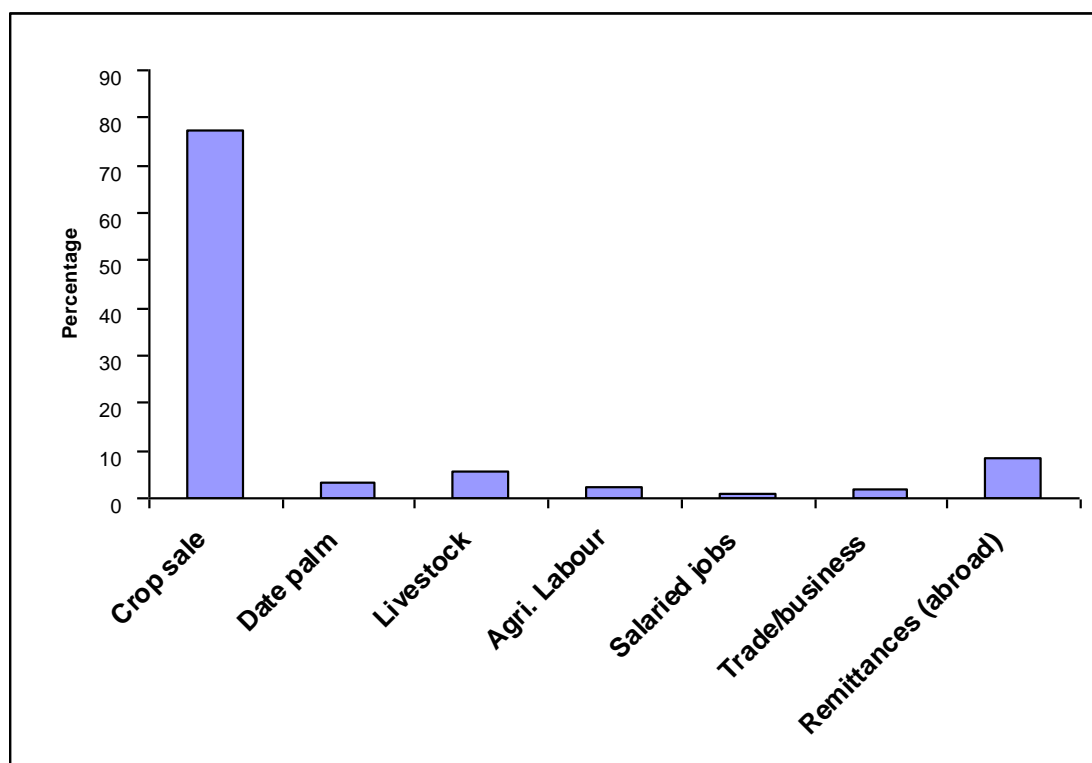


Fig. 4.2 Primary source of income

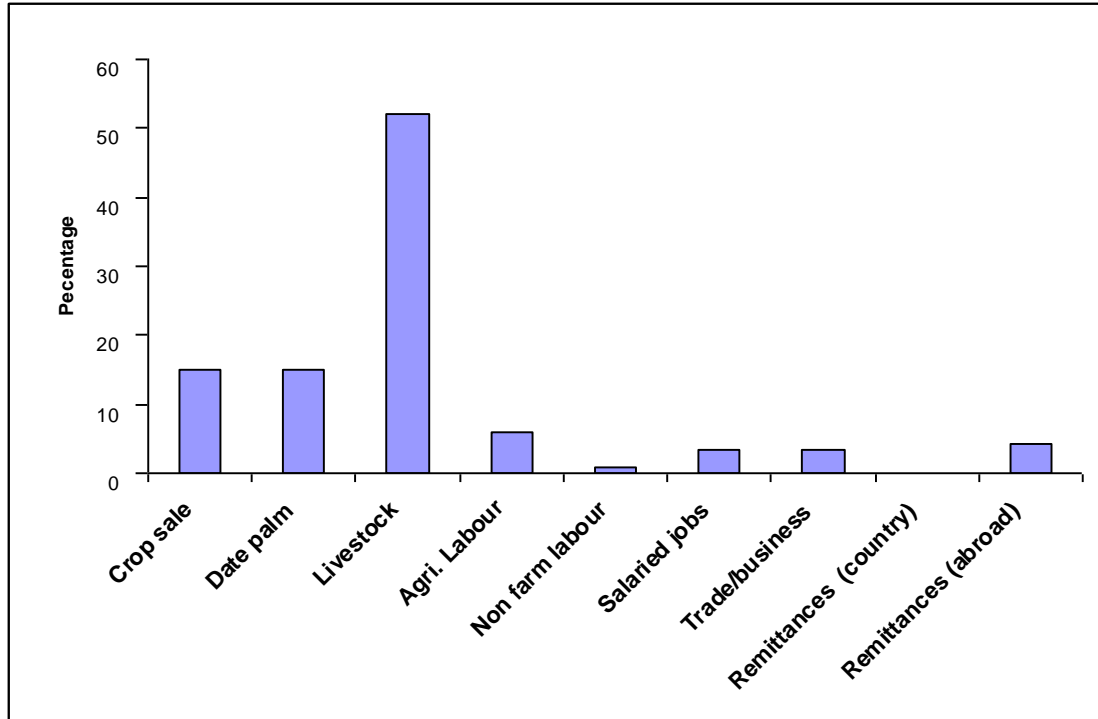


Fig. 4.3 Secondary source of income

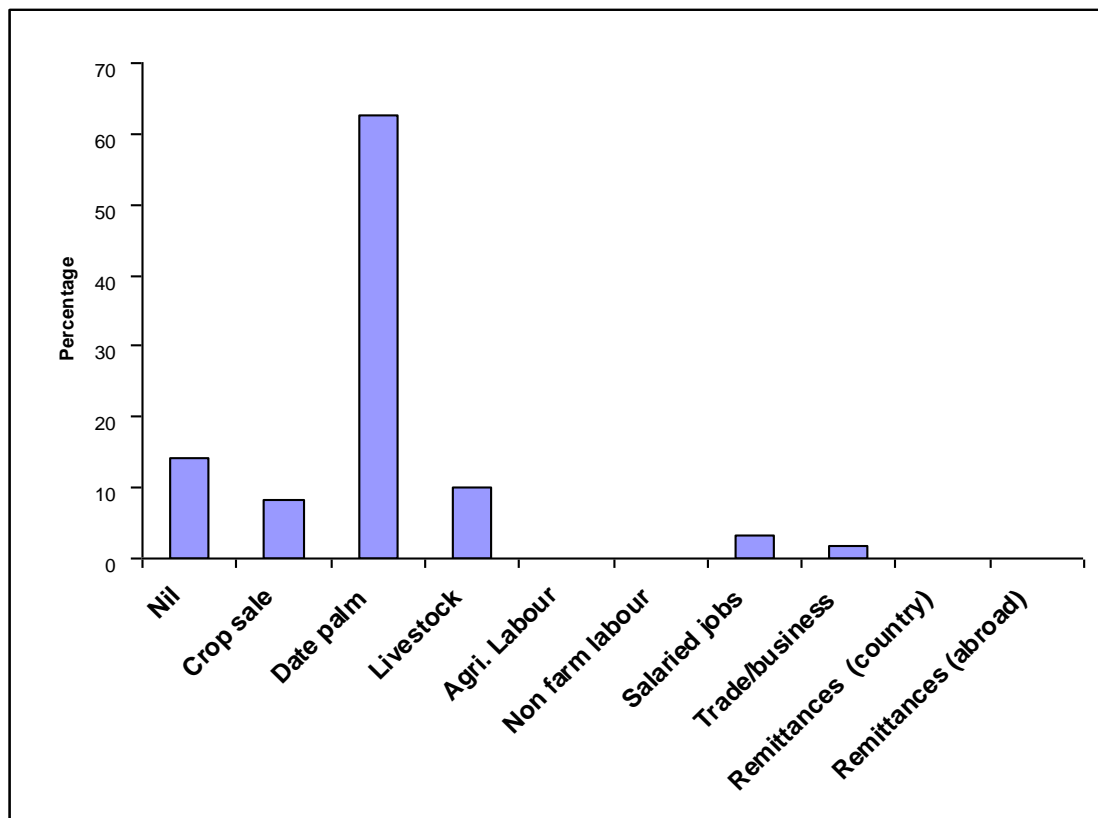


Fig. 4.4 Tertiary source of income

The data reveals that primary source of income for majority of the respondents was crop sale followed by remittances received from outside country and livestock rearing. A trend of going abroad (Saudi Arabia and Dubai) as a labour was found in the study area. A farmer during discussion said,

“People in this region (D.G. Khan) are very poor and farming cannot improve their lives so most of the people in rural areas try to go to Saudi Arabia or Dubai to improve their living standards”.

The data presented in figure 4.3 further depict that livestock rearing was the secondary source of income for more than half of the respondents followed by crop sale (15%), date palm (15%) and agricultural labour (5.84%).

The date palm was the tertiary source of income of 62.5% of the respondents (figure 4.4) and 14.16% of the respondents had no tertiary source of income while crop sale and salaried jobs were tertiary source of income for 8.3% and 3.3% of the respondents respectively.

It is evident from the above discussion that crop sale, livestock and date palm respectively were the major income generating activities of most of the respondents. The date palm tree appeared to be third main source of income for a large majority of the respondents. Thus its contribution to livelihoods in the study area was significant.

4.2.2 Income from date palm

The income from date palm include all the income collected from selling of dates and other products of date palm tree like mats, manual fans, ropes etc in one year. The data collected on this aspect are presented in Table 4.10.

Table 4.10: Distribution of the respondents according to their income from date palm

Rupees (Rs)	Frequency	Percentage
0	13	10.8
1000-5000	24	20
5001-10000	23	19.2
10001-15000	12	10
15001-20000	28	23.3
20001-50000	11	9.2
>50001	9	7.5
Total	120	100

The data in table 4.10 reveals that 23.3% of the respondents earn Rs 15001-20000 annually from date palm while 20%, 19.2% and 10% of the respondents earn Rs 1000-5000 and Rs 5001-10000 and Rs 10001-15000 respectively. The data shows that 10.8% of the respondents had no income from date palm while only 7.5% and 9.2% of the respondents earn more than Rs 50001 and Rs 20001-50000 annually from date palm.

In fact the return from one acre (90 trees) of a well developed date orchard is approximately Rs 156600-200250 (Hassan *et al.*, 2006). It means that income of the respondents from date palm was very low as compared to potential income. Qualitative interviews revealed that the low yielding varieties, improper marketing infrastructure, and unawareness about production technology greatly reduced the income from date palm tree.

4.2.3 Date palm usage pattern

Beside the use of date palm as a food, it is used in manufacturing of enormous household and commercial products (Chao and Krueger, 2007) and also serves as a construction material (FAO, 1993). Both household and commercial usages of date palm were explored in the study area and results are presented in the following section.

a) Range of household and commercial products of date palm

Respondents were asked to indicate that in what different ways they use date palm tree for household and commercial purposes regardless of their percentages. The responses in this regard are presented graphically in Fig. 4.5 and 4.6 respectively.

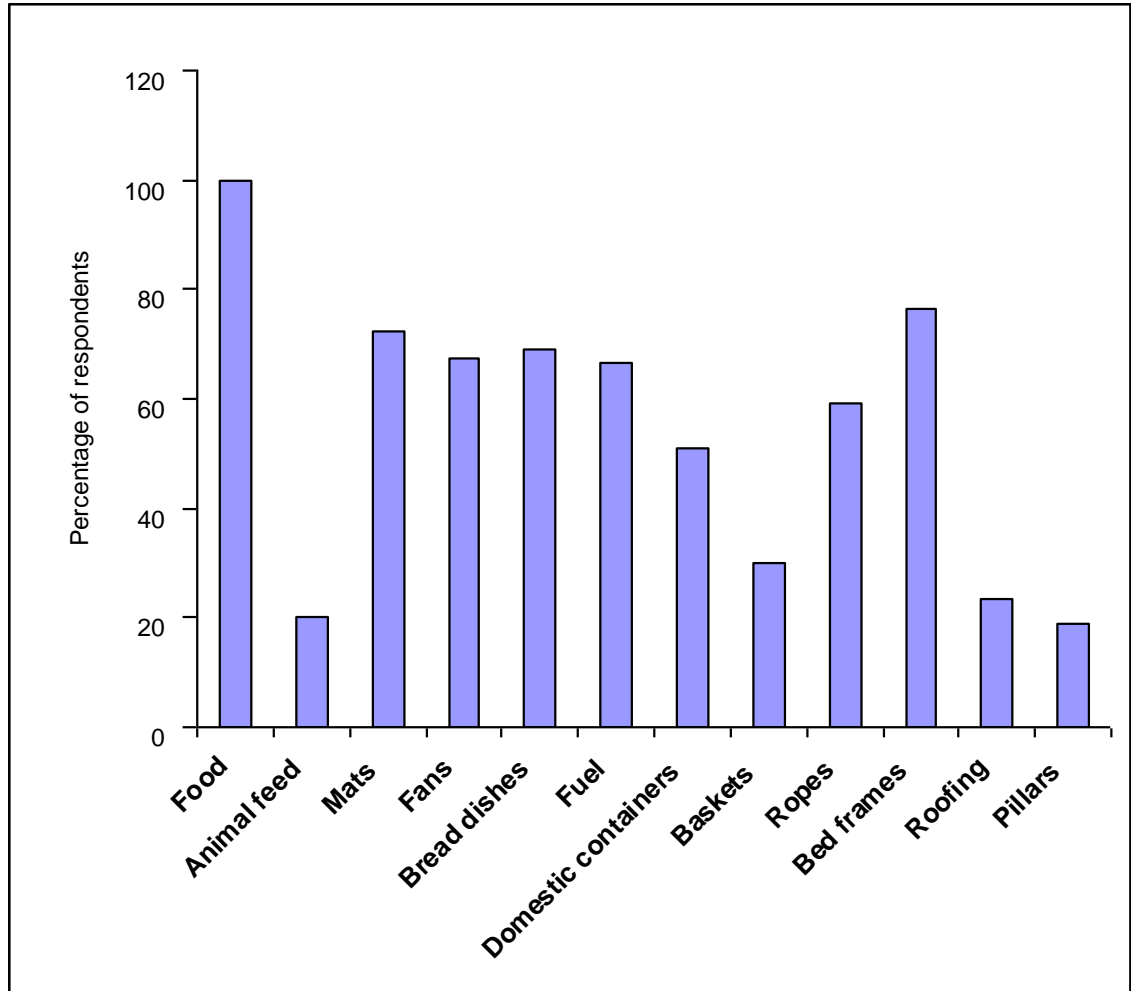


Fig 4.5: Household usages of date palm

The results reveal that all (100%) the respondents used date palm as a food while 20% of the respondents fed dates to their animals. About 76% of the respondents prepared bed frames, 72.5% of the respondents prepared mats while 69.1%, 67.5%, 59.1% and 50.8% of the respondents prepared bread dishes, manual fans, ropes and domestic container respectively. Moreover 66.6% of the respondents used trunk and other parts of date palm tree as a fuel while 23.3% and 19.1% used date palm in roofing and as a pillar for small houses and/or shelters.

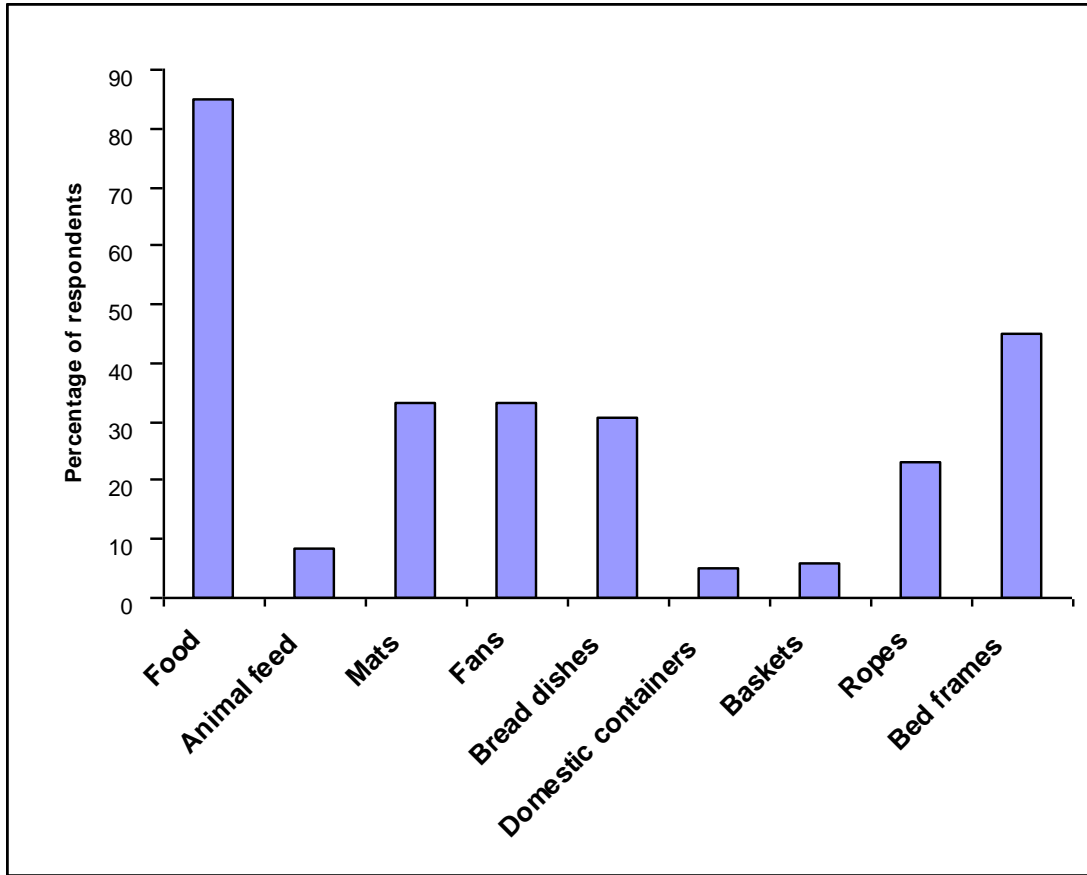


Fig 4.6 Commercial usages of date palm

The results regarding commercial usages of date palm given in figure 4.6 depict that 85% of the respondents sell their dates while 8.33% of the respondent sell premature dates to livestock rears. As far as the other products of date palm were concerned, 45%, 33.3%, 33.3%, 30.88%, 23.33%, 5.8% and 5% of the respondent sell bed frames, mats, manual fans, bread dishes, ropes, baskets and domestic containers respectively.

Above data indicate that date palm was being used as a food, animal feed, construction material and was also used in manufacturing of different by-products. These diverse usages indicate the importance of date palm in daily life of the rural people.

b) The relative percentage of household and commercial usages of date palm products

Those respondents who were found to use date palm tree in different ways were asked to point out that what percent of total produce they use within household and what percent they sell to other people. The graphical representation of their responses is given in figure 4.7-4.14.

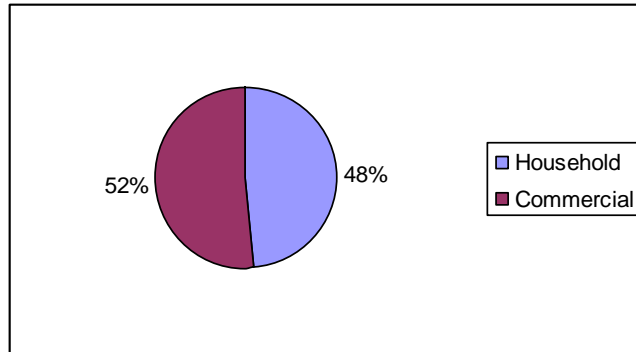


Fig 4.7 Food consumption

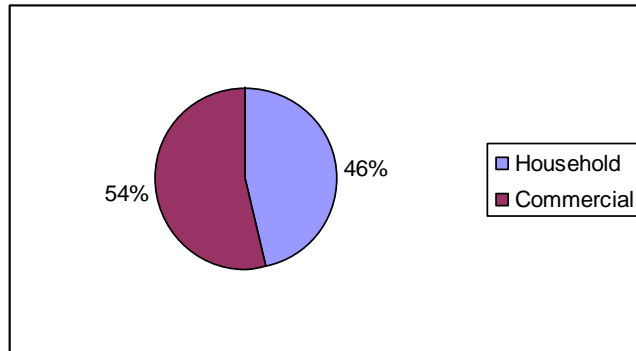


Fig 4.8 Animal feed

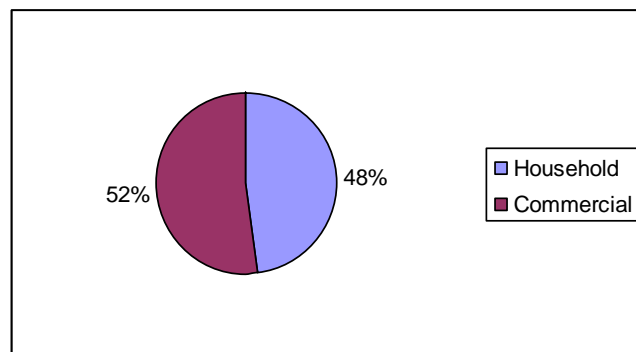


Fig 4.9 Manual fans

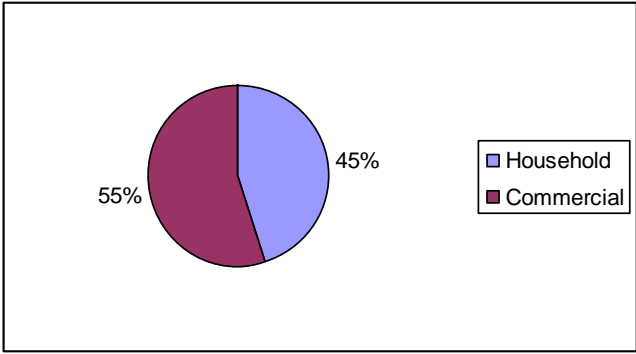


Fig 4.10 Bread dishes

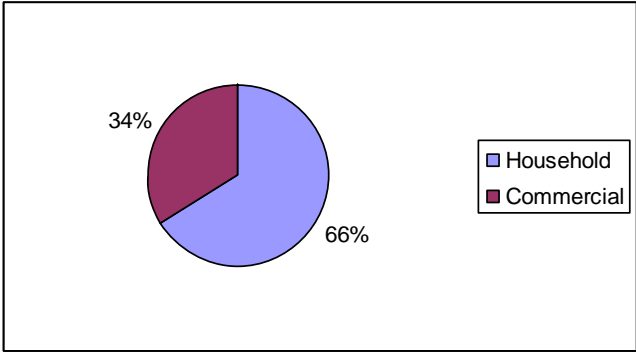


Fig 4.11 Baskets

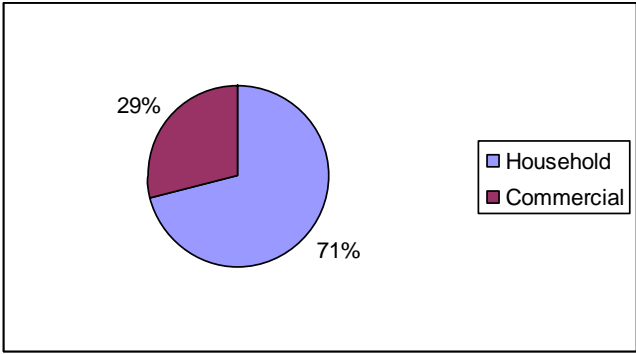


Fig 4.12 Domestic containers

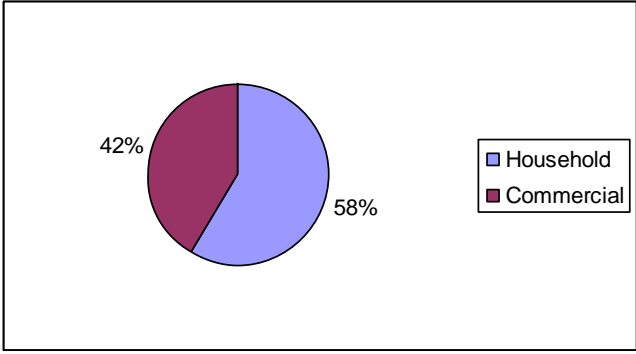


Fig 4.13 Ropes

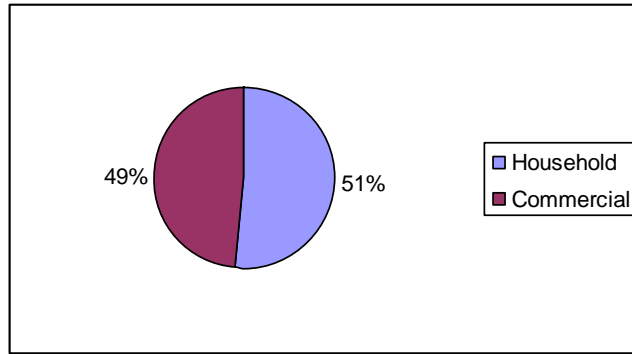


Fig 4.14 Bed frames

The results revealed that 48.4% of the dates were consumed within the household and 51.6% were marketed while 46.6% were fed to domestic livestock and 53.4% were sold to other livestock rears. The household percentages for domestic containers, baskets, ropes, bed frames, manual fans, mats and bread dishes were 71%, 66.6%, 58.3%, 51%, 48.2%, 46.27%, and 45% respectively. The commercial percentages for bread dishes, mats, manual fans, bed frames, ropes, baskets and domestic containers were 55%, 53.73%, 52.8%, 49%, 41.7%, 34.4% and 29% respectively.

The results depicts that commercial percentage of dates was not very impressive. Some of the reasons explored during the qualitative study were following

- 1) Farmers don't care much about the marketing of dates because of low quantity and quality, different time of ripening and low expected prices of dates.
- 2) The distance from farm to suitable market was high
- 3) The relatively rich farmers in the study area often hesitate to sell their dates because of their status in the community. They usually gift dates to friends and relatives
- 4) In most of the cases there were too little or no expenditures on the production of date palm so farmers considered it as an extra source of income and don't expect more from it.

The products like mats, manual fans, bread dishes etc are extensively used in the rural and urban areas of the study area and are among many necessities of life in the region. These products, in some cases, become more essential than dates (FAO, 1993). In

the study area, these products were mostly prepared by the rural women at their homes and were either sold to local community or marketed in the urban centre. The contribution of these products in the total income from date palm was significant. Roughly speaking, the price of a mat was Rs 80 and from a single tree approximately 2 mats could be prepared annually.



Fig 4.15 Domestic container (Photo by author)



Fig 4.16 Collection of by-products of date palm (Photo by author)



Fig 4.17 Collection of by-products of date palm (Photo by author)



Fig 4.18 Bread dish (Photo by author)



Fig 4.19 Bread dish (Photo by author)



Fig 4.20 Bed frame (Photo by author)



Fig 4.21 Mat (Photo by author)

4.2.4 Commercial usages of dates according to type

In Pakistan dates are mostly sell in three forms; premature, *Chuhara* and fresh. The respondents were asked to point out which form of dates they sell. Their responses are presented in graphically in fig. 4.22.

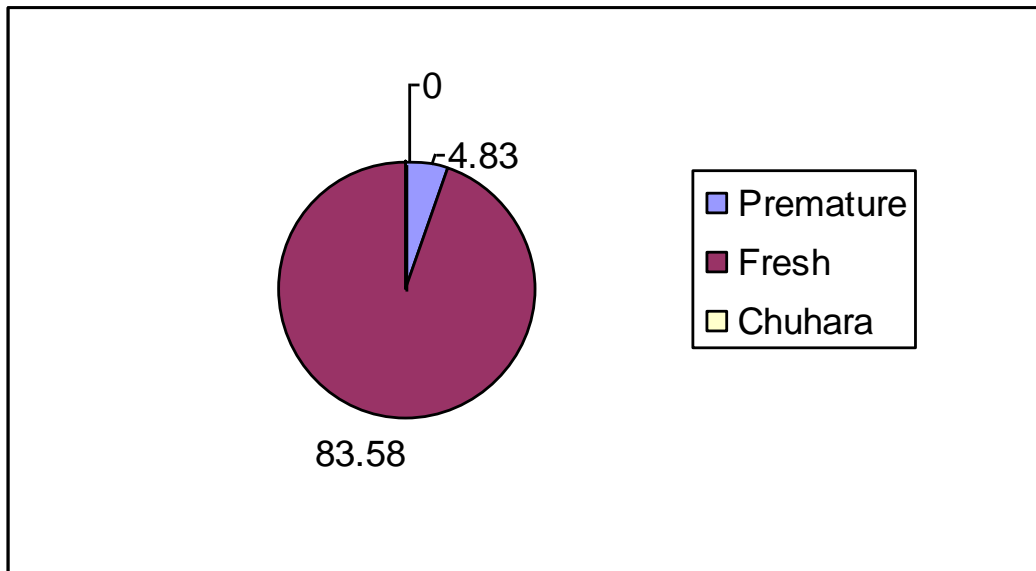


Fig. 4.22 Percentage of sale of dates according to type

The data shows that an overwhelming majority (83.58%) of the respondents sell fresh dates while only 4.83% of the respondents sell premature dates. No respondent in the study area was found to sell Chuhara. Chuhara is a special type of dried dates which is prepared by boiling premature dates and adding *Rang kat* (sodium formaldehyde) as per formula (SMEDA, 2009). This form has very long shelf life and can be preserved throughout the year. The people in the study area were found to be unaware about preparation of *Chuhara* so most of the people sell fresh dates and only inferior quality dates were sold prematurely mainly to herdsmen.

4.2.5 Average rate of dates according to type

The respondents were asked to indicate the prices they receive by selling one kilogram of dates. Their responses are presented graphically in Fig. 4.23.

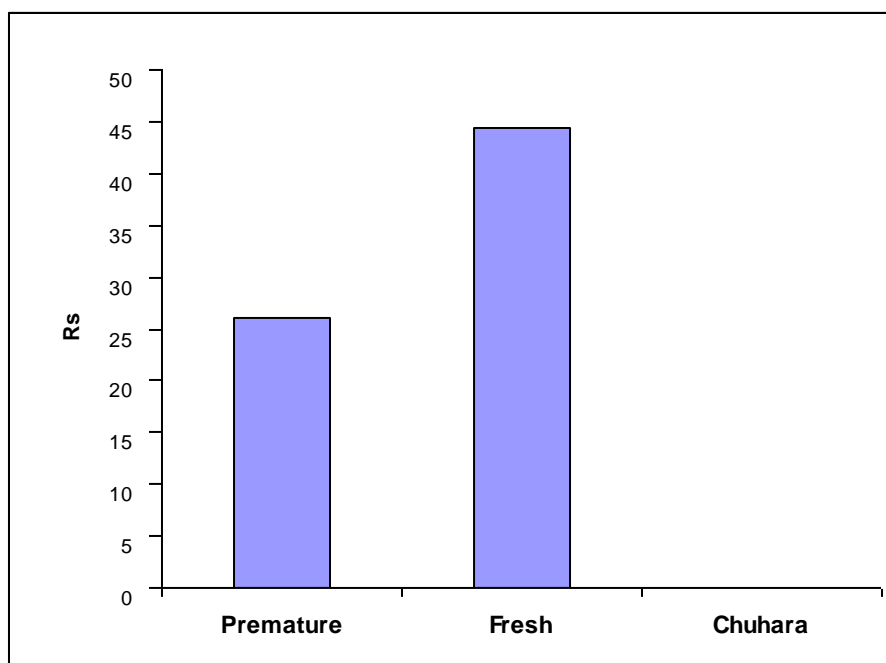


Fig. 4.23 Average rate (Rs) of dates according to type

The result revealed that average rate of fresh dates was Rs 44.32 per kg while rate of premature dates was Rs 26.1 per kg. The price received by the growers was less than half of the prices of the other improved varieties in Pakistan.

4.2.6 Comparison of income from date palm and other crops

The respondents were asked about the status of profitability of date palm as compared to other crops. The data collected in this aspect are presented in table 4.11.

Table 4.11: Distribution of the respondents according to comparison of income from date palm and other crops

Profitable than	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Wheat	4	3.3	116	96.7
Cotton	4	3.3	116	96.7
Sugarcane	4	3.3	116	96.7
Mango	4	3.3	116	96.7

An overwhelming majority (96.7%) of the respondents said that other crops were more profitable than date palm for them and according to only 3.3% of the respondent date palm was more profitable.

The causes of low profitability of date palm explored by the qualitative data were low yield, inferior quality, scattered pattern, pre and post harvested losses and less marketing information.

4.3 Marketing of dates and other products of date palm tree

Domestic agricultural marketing system in developing countries is important for both producers and consumers. Lack of emphasis on markets and their role in livelihood development can lead to failure to identify and act on prospective of marketing and on related institutional issues (Dorward *et al.*, 2008).

4.3.1 Marketing of dates and other products of date palm in the selected union councils

There are three main markets for dates in Dera Ghazi Khan; fruits and vegetables market of Tehsil D.G. Khan, main bazaar of D.G. Khan (city), and fruits and vegetables market of Tehsil Taunsa Sharif. The growers of Pir Aadil and Shah Sadder Din preferred to sell their dates in Tehsil Taunsa Sharif because of less distance and higher prices as compared to other two selected union councils (Ghousa Abad and Mammory) where dates were generally marketed at village level or at Dera Ghazi Khan City. According to majority of farmers of Shah Sadder Din and Pir Aadil, Tehsil Taunsa Sharif had less date production so prices were high there. Many farmers of these two union councils harvest dates before full maturity and use some chemical for quick ripening. The dates were put into baskets and brought to fruits and vegetable markets of Taunsa Sharif. A basket contained approximately 5-10 kg of dates. The selling of dates was carried out through commission agents who charged about 5 Rs and 2 Rs per basket from seller and buyer respectively. On the other hand, the farmers of Ghousa Abad and Mammory sell their dates either at fruits and vegetables market through commission agents or at main bazaar of Dera Ghazi Khan. However many farmers sell the dates at nearby assembly markets. The farmers who sell their dates in main bazaar had no proper place for marketing. They often sit on footpaths or such other places to offer dates for sale.

There was a wide range of date palm by-products like mats, bread dishes, manual fans, ropes, bed frames, hats etc. Most of the products obtained from date palm are prepared by women at their homes in rural areas which provide extra income besides the fruit. These products were either used within household or marketed. In Dera Ghazi Khan City, there were many shops of these products especially in *Chowk Chorhata* and *Golai committee* where people of surrounding rural areas were reported to sale their products to shopkeepers who then sell them to consumers. Some people (Block 25, Block 26, Block W of D.G Khan city) developed small industries of these products and had their own skilled labours who prepared vast range of products which were not only sold in the district but also supplied to other regions of Pakistan.

4.3.2 Distance from suitable market

The local markets towns have a significant contribution to the economic transactions of rural households. The improved market access and rural livelihoods welfare are positively linked with each other (Dercon and Hoddinott, 2005). Farmers generally prefer to sale the produce in the markets with improved facilities and easy access (Shilpi and Umali-Deininger 2007). The data collected in this regard are presented

Table 4.12: Distribution of the respondents according to the distance from suitable date market

Distance from market	Frequency	Percent
At farm gate	1	0.8
1-10 km	31	25.8
11-20 km	59	49.2
41-50 km	29	24.2
Total	120	100.0

About half of the respondents had a suitable market 11-20 km away from their fields while 25.8% and 24.2% had 1-10 km and 41-50 km market distance. Only 0.8% of the respondents had facility to market their dates at their farm gate.

4.3.3 Duration of date preservation

Dates can be stored or preserved for a long period of time if processed properly and lack of processing facilities greatly reduced the duration of date preservation (SMEDA, 2009). The data collected from respondents about the duration of date preservation are presented in Table 4.13.

Table 4.13: Distribution of the respondents according to the duration of date preservation

Preservation duration	Frequency	Percent
1-2weeks	21	17.5
1-2months	67	55.8
2-3months	11	9.2
3-4months	8	6.7
More than 4months	13	10.8
Total	120	100.0

About 56% of the respondent could preserve their dates for a period of 1-2 months, 17.5%, 10.8%,9.2% and 6.7% of the respondents preserved dates for 1-2 week, more than 4 months, 2-3 months and 3-4 months respectively.

4.4 Level of awareness among date palm growers regarding date palm production technology

4.4.1 Level of awareness

Awareness is essentially a mental representation, or a belief state, of somebody else's current situation. Awareness exists, ontologically speaking, primarily as a mind's construction rather than as a practice or activity. This does not mean that the activities where inferences take place are not important, as they evidently are. However, it does imply that it would be a fallacy to hold action and inference (or the resulting state of awareness) as somehow analytically inseparable (Oulasvirta, 2005).

The respondents were asked to indicate their awareness level about date palm production technology. Their responses in this regard are given in table 4.13.

Table 4.14: Distribution of the respondents according to their awareness level regarding date palm production technology

Awareness about	Yes		No	
	Frequency	Percentage	Frequency	Percentage
A) Varieties				
Hillawi	38	31.6	82	68.3
Karbalain	4	3.3	116	96.7
B.J	10	8.3	110	91.7
Dhakki	44	36.7	76	63.3
Khudrawi	5	4.2	115	95.8
Shamran	6	5.0	114	95.0
Aseel	70	58.3	50	41.7
Jaman	2	1.7	118	98.3
B) Irrigation				
Just after transplanting	88	73.3	32	26.7
Summer	68	56.7	52	43.3
Winter	66	55.0	54	45.0
C) Fertilizer				
FYM	20	16.7	100	83.3
DAP	24	20.0	96	80.0
SOP	6	5.0	114	95.0
Urea	13	10.8	107	89.2
D) Sucker transplanting				
August-Oct	25	20.8	95	79.2
Feb-March	17	14.2	103	85.8
E) Insect pests and diseases				
Aphids	3	2.5	117	97.5
Borer	11	9.2	109	90.8
Scales	6	5.0	114	95.0
Red palm weevil	3	2.5	117	97.5

Table 4.13 shows that 58.3% of the respondents were aware of Aseel variety while 36.7% and 31.6% of the respondents were aware of Dhakki and Hillawi varieties

respectively. Only 8.3%, 5%, 4.2%, 3.3% and 1.7% knew the Begum Jhangi, Shamran, Khudrawi, Karbalain and Jaman varieties respectively. A great majority (73.3%) of the respondents were aware of irrigation requirement just after planting while 56.7% and 50% of the respondents knew the irrigation interval during summer and winter. The time of DAP application was known by only 20% of the respondents while 16.7% of the respondents were aware of time of FYM application. Only 10.8% and 5% were aware about exact time of Urea and SOP application. About 21% of the respondents were aware about recommended time (August-October) of sucker transplanting while 14.2% of the respondents were aware about recommended time (Feb-March) of sucker transplanting. As far as diseases and pests of date palm are concerned, only 9.2% of the respondents were aware about borers while 5%, 2.5% and 2.5% of the respondents were aware about scales, aphids and red palm weevil. These results are contradictory with those of Abbas (2008) who reported that 86%, 68.6%, 90.1%, 47.9%, and 43.8% of the respondents were aware of the varieties Hillawi, Khudrawi, Aseel, Jaman, and Shamran varieties. He further reported that 96% of the respondents were aware of recommended time of irrigation while more or less same percentage was for sucker transplanting, fertilizer application and pests and diseases.

The results indicate that awareness level of farmers was very low regarding date palm production technology. A farmer said,

“I tried to plant some date trees last year but they all die because I don’t know how to transplant suckers and what their water and fertilizer requirements are. There is no one to tell me how I can plant these trees”.

The above remark indicates that farmers had low level of knowledge about production technology and don’t know from where they can get information about it. The production of date palm from inferior varieties and by using local cultural practices cannot satisfy the demand of increasing population and also to make substantial contribution to the nation’s gross national product. It is duty of agricultural extension department to motivate farmers to adopt recommended technologies and to educate them in overcoming the problems like unawareness about production technology, lack of credit facilities, and shortage of irrigation water (Hussain *et al.*, 2004).

4.4.2 Methods of dates preservation

The respondents were asked to indicate what methods they use to preserve their dates. The response in this regard is given in table 4.14.

Table 4.15: Distribution of the respondents according to method of dates preservation

Preservation method	Yes		No	
	Frequency	Percentage	Frequency	Percentage
Sun drying	112	93.3	8	6.7
Processing	0	0	120	100.0
Chemical treatment	22	18.3	98	81.7

Table showed that an overwhelming majority (93.3%) of the respondents sun dried their dates and 18.3% chemically treat the dates in order to preserve them.

There was no processing facility in the study area therefore farmers used traditional method of sun drying for the preservation of dates due to which there was high rate of post harvest losses.



Fig. 4.24 Traditional method of sun drying the dates (photo by author)

4.4.3 Yield of date palm

The respondents were asked to indicate the average yield of their date palm trees. The response in this regard is given in table 4.15

Table 4.16: Distribution of the respondents according to yield of date palm trees

Yield (kg per tree)	Frequency	Percentage
30-40	26	21.7
41-50	45	37.5
51-60	25	20.8
61-70	14	11.7
71-80	4	3.3
>80	6	5.0
Total	120	100.0

About 37% of the respondents had an average yield of 41-50 kg per tree, followed by 21.7%, 20.8%, 11.7%, 3.3% and 5% had an average yield of 30-40, 51-60, 61-70, more than 80 and 71-80 kg per tree. Ahmad *et al.* (2004) reported yield of Halini, Aseel and Shamran varieties 81 kg, 79 kg and 71 kg per plant respectively. It means that the yield of date palm in the study area was very low.

4.5 Training needs of date growers

Relevant and appropriate training after training needs assessment is the major step to help the farmers to acquire the necessary competencies (Okorley *et al.*, 2005). The data collected in this regard are presented under the following section

4.5.1 Sources of information

The respondents were asked to point out their sources of information regarding date palm production. The results are presented in Table 4.17.

Table 4.17: Distribution of the respondent according to their sources of information

Sources of information	Weighted score	Rank order	Mean	SD
Indigenous knowledge	675	1	4.78	0.41
Fellow farmers	574	2	4.07	0.55
Pesticide/private companies	431	3	3.05	0.33
Agri. Extension	274	4	1.94	0.63
NGOs	161	5	1.14	0.35

1= very low, 2= low, 3= medium, 4= high, 5= very high

The indigenous knowledge was ranked 1st with a mean of 4.78 while fellow farmers as a source of information regarding date palm production and marketing were ranked 2nd with a mean of 4.07. Pesticide/private companies, Agri. Extension Department and NGOs were ranked 3rd, 4th and 5th with mean values 3.05, 1.94 and 1.14 respectively.

4.5.2 Extension services

The role of extension agents is important in updating the farmers with new and better technology. The inappropriate and inefficient work of extension worker leads to failure of the dissemination process which ultimately affect the productivity (Rahim *et al.*, 2003) and rural livelihoods (Rivera and Qamar, 2003). The respondents were asked to specify the frequency of extension contact. The responses are presented in table 4.18.

Table 4.18: Distribution of the respondents according to extension services provided by agri. extension department

Duration	Yes		Yes	
	Frequency	Percentage	Frequency	Percentage
Last 1 month	0	0	120	100.0
6 months	0	0	120	100.0
1 year	1	0.8	119	99.2
2-4 year	1	0.8	119	99.2
Never	118	98.3	2	1.7

Table shows that according to an overwhelming majority (98.3%) of the respondent the agricultural extension staff never contacts them and only 0.8% said that agricultural extension staff provides services during last one and 2-4 years. The agricultural extension department was found to be ineffective regarding provision of services about date palm production. According to a farmer,

“I never get advisory service regarding date palm production and according to my knowledge there is no office of agriculture department in this area”.

This remark indicates that people were unaware even with the presence of agricultural extension department. An agricultural officer at Dera Ghazi Khan said,

“Our work is on major crops and we don’t include date palm in our training programs”

There is a need to train extension staff and farmers about the date palm production and processing by using seminars, workshops and tours. Research should be conducted to develop production and processing technologies (Wasilwa *et al.*, 2007).

4.6 Policy recommendations for agricultural extension

4.6.1 Problems faced by the respondents

The problems faced by the date growers were explored through qualitative data. Following were the main problem faced by the farmers regarding date palm production

- 1) Unavailability of improved varieties
- 2) Unawareness about production technology
- 3) Lack of finance
- 4) Large market distance and no proper place for date marketing
- 5) Low prices of dates at market

4.6.2 Suggestions by the respondents

The respondents were asked to rank the suggestions for the improvement date palm production in the study area. The results

Table 4.19: Distribution of the respondents according to their suggestions to improve date palm cultivation

Suggestions	Weighted score	Rank order	Mean	SD
Provision of improved varieties	545	1	4.54	0.71
Provision of credit facilities	392	2	3.27	0.76
Awareness abut production technology	366	3	3.05	1.20
Improved marketing infrastructure	355	4	2.95	1.15
Processing facilities	136	5	1.13	0.53

1= less important, 2=important, 3= average, 4= very important, 5= most important

Provision of improved varieties was considered most important by the respondents with a mean value of 4.54 while provision of credit facilities was considered important (3.27). Awareness about production technology of date palm, improvement in the marketing infrastructure and provision of processing facilities were ranked 3rd, 4th and 5th with mean values 3.05, 2.95, and 1.13 respectively.

4.7 Stakeholders and institutions involved in date marketing

The results of qualitative interview regarding marketing chain of dates are presented in this section.

4.7.1 SINDH

Sindh province had the highest share in total date production of Pakistan during the year 2007-08; however its total cultivated area was less than that of Balochistan. The major date growing areas in Sindh are Khairpur and Sukkur. The district of Sukkur was surveyed for the present study.

4.7.1.1 Farmers

The farmers in Sukkur are producing a huge quantity of dates. The varieties reported to be best marketed were Aseel and Karbalain. Many farmers said that demand of these varieties is increasing so almost all newly cultivated plants are of Aseel and Karbalain varieties. During the survey it was noticed that many farmers were bound to sale their produce to commission agents because they received loan from commission agents except those who gave the contract of their orchards to the contractors. The contractors paid an amount of Rs 1000-1600 per plant to the growers. On the other hand, the farmers who manage their own orchards faced the problems like lack of finance, transportation, post harvest losses, natural hazards especially monsoon rain and price uncertainty during the auction. Among all these problems, the lack of finance was reported to be the most serious problem which, in turn, affects the market choice of the farmers. A farmer Ghulam Murtaza in Sukkur said,

“many farmers in Sukkur are aware of other markets of dates other than terminal market of Sukkur where they can get relatively good price of their commodities but because they received the loan from a commission agent so they are bound to sale the dates through him”.

One of the most effective ways that farmers have of getting the best price for their produce is for them to sell it themselves directly to final consumers at rural or urban markets, and thus bypass the normal marketing system (Hine and Ellis, 2001). Commenting on the role of commission agents a farmer said,

“You (researcher) must spend some time in this area (Sukkur) during the harvesting season and observe how difficult is for us (farmers) to see that fruit of our hard work is eaten by them (commission agents)”.

According to farmers, the interest rate of commission agents was 10-13% per month and farmers generally return the amount after 3-5 months. Another farmer during discussion said,

“Provision of credit facilities by the government is the only way to get rid of loans from informal sources and to ensure farmers’ profit”.

The credit provided by the commission agents, contractors and traders was the major source of finance for the producers. However small or more remote farmers often had limited access to credit and, in many cases, with unfavorable credit conditions (Pearce, 2003).

4.7.1.2 Contractors

Contractor plays an important role in the marketing chain of dates. A contractor estimates the potential yield of date orchard and considers expected costs for transportation, supervision, labour, and marketing (Khushk *et al.*, 2009). The contractors of Sukkur had more resources and marketing knowledge than growers but not as much as a commission agent had. They usually get advances from commission agents and sell the dates through them and after selling they paid the amount of loan plus interest rate to commission agents. During the survey some contractors were found to sell the dates on wholesale in Punjab province. A contractor of Sukkur selling the dates in wholesale market of Dera Ghazi Khan said ***“we get the loan from commission agents of Sukkur, provide them jewelry of family women as a guarantee of loan recovery, and get the contract of a date orchard in Sindh before the pollination which is done manually. After harvesting we load dates in trucks and bring to Dera Ghazi Khan Market where***

we pay 7% of total price of dates in the truck to commission agent of Dera Ghazi Khan and he allows us to sale dates in his shop”.

4.7.1.3 Commission agents

Commission agent is a person who provides his services to sale the dates brought by the farmers or contractors on commission basis (Khushk *et al.*, 2009). They were found to be the owner of shops in the Sukkur market. They were financially stable and had enough knowledge about marketing situation in the country. They had enough storage facility for the farm produce. They also had contact with some agents in India and export *Chuharas* according to the demand.

4.7.1.4 Exporters

They export fresh and *Chuhara* to other countries. Exporter may be a commission agent or an owner of date processing or storage companies. According to respondents many commission agents were in fact exporters who export dates mainly to India.

4.7.2 DERA ISMAIL KHAN

4.7.2.1 Farmers

Farmers produced a large quantity of dates in Dera Ismail Khan. Dhakki was the prominent date variety grown by most of the farmers because of its increasing demand in the area, other provinces and abroad as well. Most of the farmers claimed that there was no proper facility for the processing and storage of fresh dates due to which there was an increasing trend of making *Chuhara* (dried dates). According to a progressive farmer Haji Muhammad Aslam, *“There is no proper processing facility in the area and fresh dates get spoiled, therefore we have started making Chuhara and 90% dates are converted into Chuhara which can be stored and sold for a long period of time”*. Another reason of less fresh date production was that of monsoon rain. As Dhakki, the most prominent variety of the area was found to be a late variety so it damaged seriously during this season.

The small farmers often sell their produce themselves in the market either in their own shops or shop of others, while the large land holder often rely on contractors to escape from complications of harvesting and marketing. Many farmers and contractors sell the dates in Sukkur (Sindh) market where they faced the problem like uncertainty in

prices of dates during the auction. According to a farmer Muhammad Iqbal *“farmers from D.I Khan are treated well initially in the Sukkur market, keeping this in view many other farmers also reach there with the hope to get good price but this time prices become low and farmers have no choice other than to sale their produce at low prices”*. A great variation in market prices showed that food marketing is inefficient and is subjected to monopolistic practices (Hine and Ellis 2001).

4.7.2.2 Contractors

The contractor is one of the major players in the supply chain of dates (Khushk *et al.*, 2006). There were two types of contractors in Dera Ismail Khan, local residents and those coming from Sindh. The contract of a date orchard started just before the pollination which was done by the contractors. Local contractors often sell dates and *Chuhara* to the wholesale market where auction of dates and *Chuhara* was done through commission agents. The contractors coming from Sukkur were reported to sale the dates in Sukkur market or export it to other countries mostly to India.

4.7.2.3 Commission Agents

Commission agents performed their activities on commission basis while selling the produce brought by producers or contractors in the wholesale market of Dera Ismail Khan and terminal market of Sukkur (Sindh). They charged 10-11% commission.

4.7.2.4 Wholesalers

The wholesalers buy and sell large quantities of dates. They usually buy dates from wholesale market or sell their own produce in the main bazaars and other locations of the district. Most of them faced the problem of fresh dates shortage especially of Dhakki variety, and sell mostly *Chuhara* or fresh dates of other provinces especially that of Sindh. According to a wholesaler at Topanwala Bazaar *“availability of fresh dates in the area is continuously decreasing and we buy fresh dates from other provinces to fill the gap between demand and supply”*.

4.7.2.5 Retailers and Hawkers

Retailers and hawkers buy and sell small amount of dates. They usually buy dates from wholesale market. Hawkers move from street to street to offer dates for sale.

4.7.2.6 Markets

i) Wholesale Market

The wholesale market was found to be the main assembly centre for fruits and vegetables surplus of surrounding areas. The growers and contractor sell their produce in this market giving 11% commission on sale revenue. In wholesale market, major players were contractors, commission agents, wholesalers, and retailers. Wholesalers and retailers were the main buyers here.

ii) Main Bazaars

The main bazaars in the District were in Dhakki, Panyala and Daraban. Wholesalers and retailers were found to sale dates there. Consumers generally buy dates from main bazaars. Market chain of dates in Dera Ismail Khan is presented in figure 4.7.

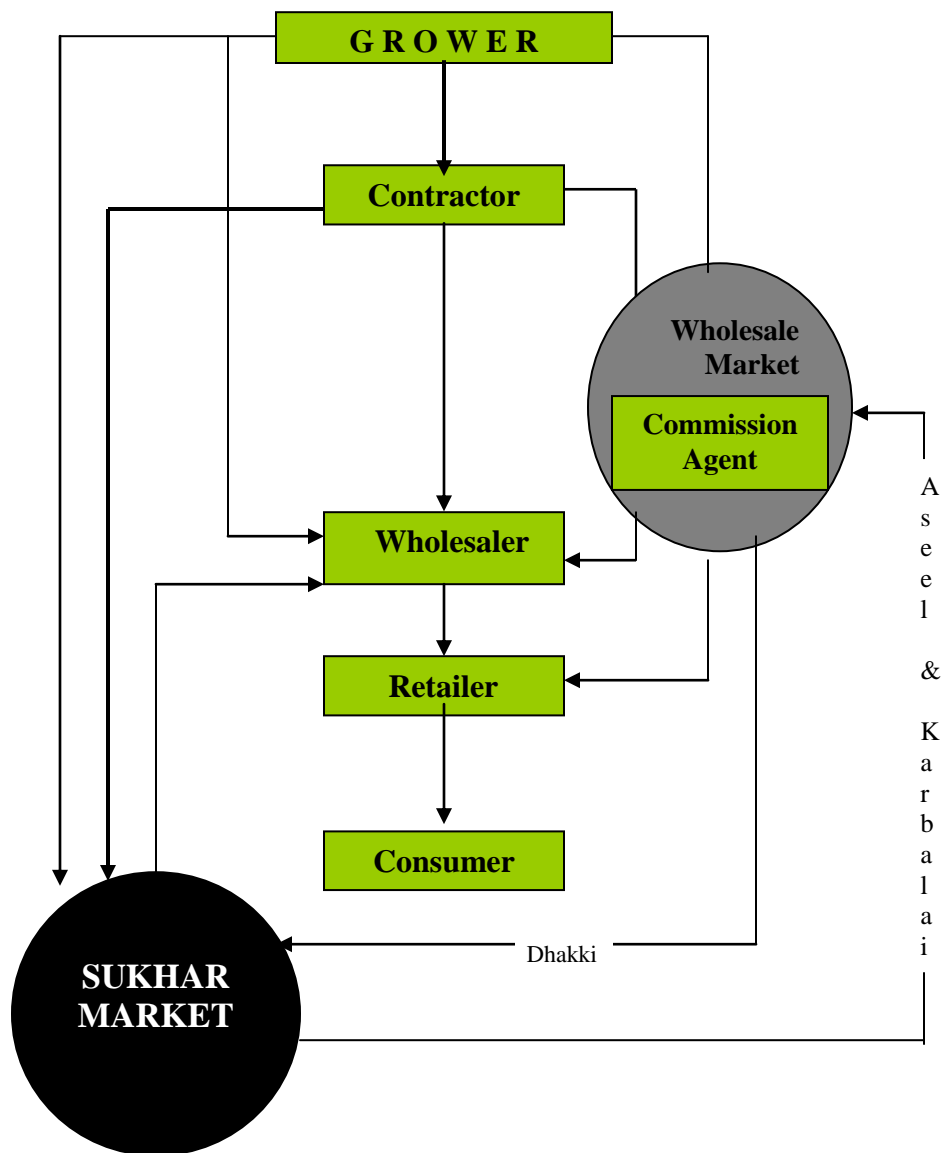


Fig. 4.25: Market chain of dates in Dera Ismail Khan

4.7.3 BALOCHISTAN

Balochistan has the highest cultivated area under date palm (Govt. of Pakistan, 2009). Mekran division is considered as a hub of date production. The climatic and geographical location of this region is most suitable for the growth of date palm (SMEDA, 2009). As Mekran does not fall into the southwest monsoon ranges, (Rahim, 2003) therefore, unlike the other date producing areas of Pakistan, there is no serious damage to this crop because of monsoon rains. In spite of this natural advantage, the growers in the province faced many problems like lack of finance, lack of processing facilities, lack of road facilities in the rural areas and unawareness about production technology. The farmers usually sell the dates in nearby market. The contract system was not reported by the respondents. Many farmers were reported to sell the dates to some processing companies of Sukkur and Karachi and demand increases when production of dates in Sindh decreases due to monsoon rains.

An Agricultural Officer at Turbat during a telephonic interview said,

“Farmers of this area (Turbat) are very poor and cannot afford fertilizers and modern production technologies. The performance of agricultural department is adversely affected due to the lack of funds by the government”.

He further stated,

“There are about eight date processing plants in Balochistan but almost all of these are not working properly. There is an urgent need for the proper working of these plants which is possible through public and private sector partnership”.

The illegal trade of dates between Iran and Balochistan was also reported.

4.7.4 SOUTH PUNJAB

The South Punjab comprises divisions of Dera Ghazi Khan, Multan and Bahawalpur. For the present study two districts of Dera Ghazi Khan namely Dera Ghazi Khan and Muzaffargarh were surveyed. The majority of the date palm trees in South

Punjab were found to be in scattered pattern with little attention paid by the growers and government regarding production technology and marketing. Most of the trees were propagated through seed and well developed orchards were few in number; but in spite of all this the total production of these areas is sufficient as dates were not only found to be sell in this region but also a large quantity of dates were supplied to other regions especially to Tank, Bannu, Ramuk (Khyber Pakhtunkhwa) and Rawalpindi (Punjab). The pollens of date palm were also supplied to Sindh. The marketing chain can be classified into two categories;

- i) dates of other provinces (Sindh and Balochistan)
- ii) local varieties

In general, the dates of Sindh and Balochistan were brought by the traders and/or wholesalers to “*Ghala Mandi*” of Multan from where these dates are supplied to other surrounding areas like Muzaffargarh, Khanewal etc while these dates reached directly to fruits and vegetable market of Dera Ghazi Khan from Sindh brought mainly by the traders.

The stakeholders in supply chain of dates in South Punjab were the following

4.7.4.1 Farmers

Majority of the farmers considered the date palm as a wild tree and a source of extra income. In most of the areas of South Punjab, farmers harvest and market the dates themselves. In some areas, small farmers hired skilled labours to harvest the trees and farmers’ share in this case was 50%. They usually sun dried the dates and some time use it as a food with bread, especially during the off season while large farmers some times gave the contract of their trees. Contractor paid an amount of Rs. 100-800 per tree in two or three installments; first at the time of contract, second at the time of half harvesting and third after complete harvesting. If a contractor is not a local person, he would pay the amount before complete harvesting.

4.7.4.2 Contractors

The role of contractors was more prominent in low date producing areas of south Punjab where local people could not climb on tree or date trees had low income returns. The contractors harvest the dates in Doka (immature) or Pind (fully repined) stage. They

generally brought the fully ripened dates in the local market and Doka, after some treatments, were supplied to other regions especially to Taank, Ramuk, Bannu and Rawalpindi. The local herdsmen were also found to be contractors of especially inferior quality dates to feed their animals.

4.7.4.3 Commission agents

Commission agent received 6.25% from the seller and about 1% from the buyer to provide his services in the local markets.

4.7.4.4 Skilled labours

During the harvesting season (July-August) some people who know how to climb on a date tree move from field to field on a cycle and asked the farmers about the harvesting in the condition that they would receive the half of the total produce harvested. The small farmers usually agreed with them. After harvesting these labours then sell their dates in nearby fruits and vegetable market. However this trend was confined to only some areas.

4.7.4.5 Wholesalers

Usually the wholesalers of Muzaffargarh and Layyah reached Multan to buy dates of Sindh and Balochistan and sell on wholesale in their respective areas.

4.7.4.6 *Beopari*

They usually buy dates from market where they found a low price of the commodity and sell where prices were relatively high. They brought dates from Sindh and Balochistan to Multan or from Multan to other surrounding areas. They also supply pollens of date palm to Sindh.

4.7.4.7 Retailers and Hawkers

The retailers in this region may be a contractor or a member of farm family who sell the dates in different places. The hawkers sell the dates either on a cycle or put a basket full of dates on their head and move from one location to other.

4.7.5 FAISALABAD

Faisalabad is third largest city of Pakistan as far as population and industrial growth is concerned and is located in central Punjab (City district government Faisalabad, 2010). Faisalabad is not included in the major date producing areas. The dates

of other regions mostly Sindh and Balochistan satisfy the demand of the consumers. During the survey, the “*Gol Kiryana Market*” was found to be the main date market where wholesalers sell the dates. The main buyers in this market were retailers and street hawkers. The varieties found there were Aseel and Karbalain of Sindh, Begum Jhangi of Balochistan and some dried varieties of Iran. Aseel, Karbalain and *Chuharas* reached the market from Sukkur. The wholesalers reached Sukkur market to buy Aseel, Karbalain and *Chuharas* while they purchase Begum Jhangi and dates of Iran from Quetta mostly through traders. They also had contact with the contractors and farmers of Dera Ismail Khan to get the *Chuharas* of Dhakki variety which was reported to be best in terms of popularity as compared to *Chuharas* of other varieties of Pakistan. Most of the wholesalers claimed that Iranian dates are best marketed in the area. According to a wholesaler Abdul Sattar,

“The demand and availability of Iranian dates is more as compared to Pakistani dates because these are processed and have long shelf life”.

The Aseel were found to be the second best variety in terms of marketing and ranked first among Pakistani dates. The dates were reported to be available in this market throughout the year. The other products of date palm fruit were dates filled with almond, date jams, date syrup and date *Halwa*, which were brought by wholesalers mainly from Dera Ismail Khan. The hawkers buy dates from “*Gol Kiryana Market*” and move street to street to sell these dates. Retailers sell the dates in their shops. Relatively small business of dates in “*Ghala Mandi*” and “fruits and vegetables market” were also reported where auction of dates were carried out through commission agents. There were also shops of wholesalers there. The main buyers found there were retailers and hawkers. The overall supply chain of dates in Pakistan is presented in figure 4.8

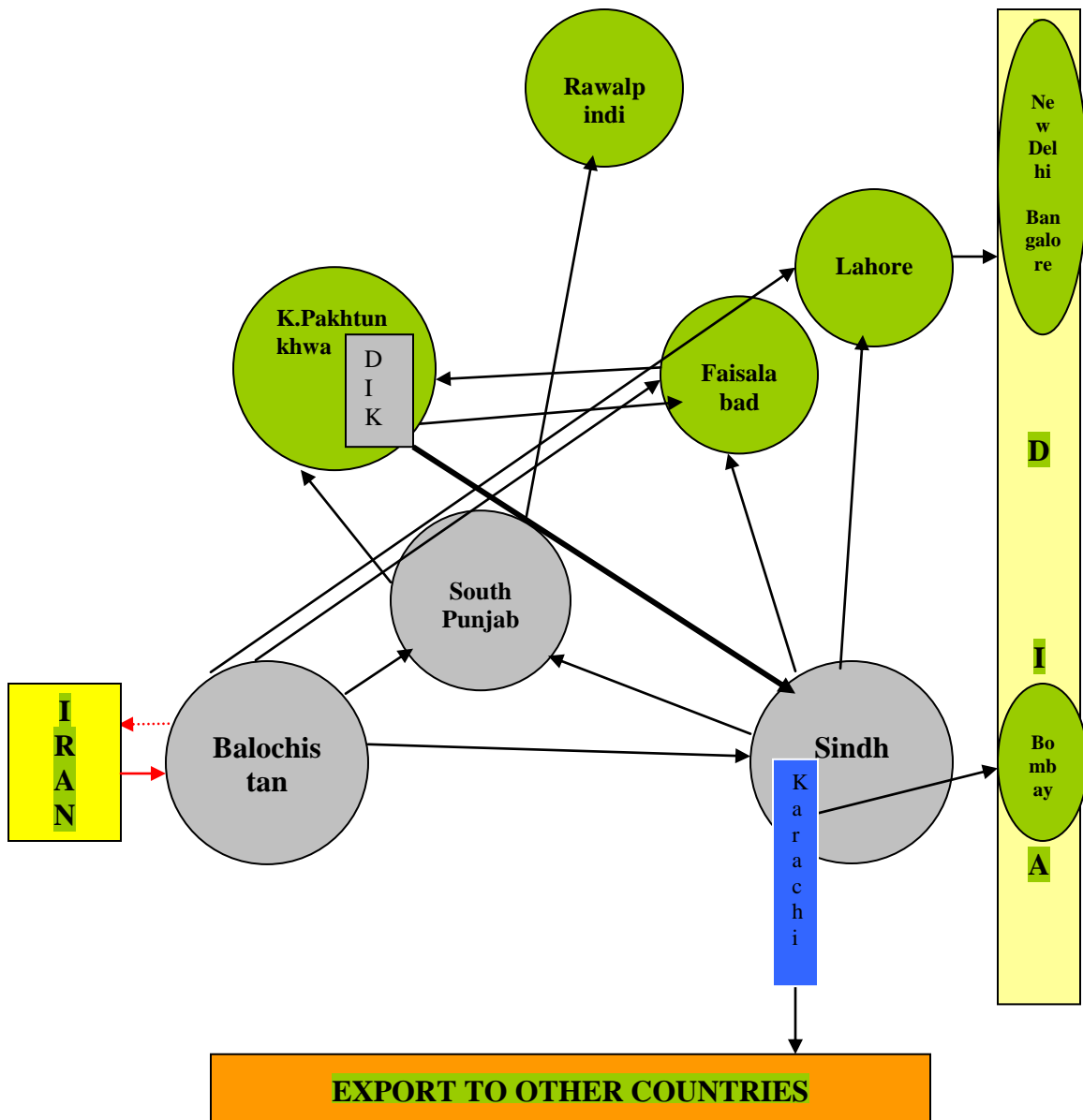


Fig. 4.26: supply chain of dates in Pakistan

CHAPTER 5

SUMMARY

Date palm is one of the most important trees in semi arid and dry areas of the world and become a part of the cultural life of the people in these areas. The tree is capable to provide a broad range of products and services and considered as a natural renewable resource. As fruits of date palm (dates) are rich in carbohydrates, vitamins and minerals, they have immense importance as a healthy food as well as a desert fruit providing a wide range of essential nutrients. The tree provides food, fuel, shelter and is used in manufacturing of different handicrafts. The present study was conducted to study the date palm market chain and its role in food security and livelihoods of farmers in the South Punjab. Within the D.G Khan District one tehsil (D.G Khan) was selected purposively. Tehsil Dera Ghazi Khan comprises 41 union councils (7 urban and 34 rural union councils). Out of 34 rural union councils, 4 union councils were selected randomly and from each selected union council, 3 villages were selected at random. A list of growers was prepared in each selected villages with the participation of local residents and 10 respondents from each village were selected through simple random sampling technique thereby making a sample size of 120 respondents. The growers having at least 20 date trees in their fields were considered as respondents. Structured interview schedule was prepared to collect quantitative data. The interview schedule was pre-tested to 15 farmers before data collection and necessary amendments were made. The quantitative data were analyzed using the software Statistical Package for Social Sciences (SPSS). The qualitative data were carried out by key informants and focus group interview. The respondents were selected through snow ball and convenient sampling technique. The main purpose was to study the supply chain of date palm products by identifying the stakeholders and institutions involved in the marketing chain of dates and other products of date palm tree in Pakistan. The areas surveyed during the study were districts of Sukkur, Dera Ismail Khan, Dera Ghazi Khan, Muzaffargarh, and Faisalabad. As Faisalabad is not included in the list of major date producing regions, it was selected to study the marketing of dates in areas where dates are not produced in sufficient quantities. Open ended mail questionnaire and telephonic interview was conducted to

collect data from respondents of Balochistan province. The qualitative data were analyzed using content analysis technique.

Findings

1. Half (50%) of the respondents were middle aged followed by young (26.7%) and old (23.3%). More than half (59.2%) of the respondents were illiterate. About 18% of the respondents consisted of 7 household members, 14.2% consisted of 5 members, and 12.5% consisted of 4 family members. An overwhelming majority (97.5%) of the respondents was owner and only 2.5% were tenant. More than half (57.5%) of the respondents had a land upto 5 acres while 32.5% had 6-15 acres.
2. Wheat was grown by all the respondents. Rice was grown by 97.5% of the respondents. An overwhelming majority of the respondent had scattered date palm trees. About 44% of the respondents had 20-40 date palm trees, 22.5% had 61-80 trees. About 40% of the respondents had 100,001-150,000 Rs annual income.
3. An overwhelming majority (96.7%) of the respondents were unaware about the exact name of the date varieties grown in their fields and only few, who had well developed orchards, had improved varieties
4. There was a wide range of date palm by-products like mats, bread dishes, manual fans, ropes, bed frames, hats etc. in the study area. Most of the products obtained from date palm were prepared by women at their homes in rural areas which provide extra income besides the fruit. These products were either used within household or marketed.
5. All (100%) the respondents used date palm as a food while 20% of the respondents fed dates to their animals. About 76% of the respondents prepared bed frames, 72.5% of the respondents prepared mats while 69.1%, 67.5%, 59.1% and 50.8% of the respondents prepared bread dishes, manual fans, ropes and domestic container respectively. About 85% of the respondents sell their dates while 8.33% of the respondents sell premature dates to livestock rears. 45%, 33.3%, 33.3%, 30.88%, 23.33%,

5.8% and 5% of the respondent sell bed frames, mats, manual fans, bread dishes, ropes, baskets and domestic containers respectively.

6. An overwhelming majority of the respondents said that other crops were more profitable than date palm for them. According to a great majority of the farmers, “life with good financial status and less dependence on others is a decent living”.
7. The farmers sell their dates either at fruits and vegetables market of D.G Khan or Tehsil Taunsa Sharif through commission agents or at main bazaar of Dera Ghazi Khan City. However many farmers sell the dates at nearby assembly markets. The farmers who sell their dates in main bazaar had no proper place for marketing. They often sit on footpaths or such other places to offer dates for sale.
8. About half of the respondents had a suitable market 11-20 km away from their fields while 25.8% and 24.2% had 1-10km and 41-50 km market distances. About 56% of the respondent could preserve their dates for a period of 1-2 months, 17.5%, 10.8%,9.2% and 6.7% of the respondents preserved dates for 1-2 week, more than 4 months, 2-3 months and 3-4 months respectively.
9. An overwhelming majority (93.3%) of the respondents sun dried their dates and only 18.3% chemically treat the dates in order to preserve them. About 37% of the respondents had an average yield of 41-50 kg per tree, about 22%, 20.8%,11.7%, 3.3% and 5% had an average yield of 30-40, 51-60, 61-70, more than 80 and 71-80 kg per tree
10. An overwhelming majority of the farmers were unaware about production technology of the date palm. According to an overwhelming majority (98.3%) of the respondent the agricultural extension staff never contacts them.
11. Farmers were found to face many difficulties in marketing their own produce in all parts of Pakistan. The commission agents are dominant in marketing activities especially in Sukkur. The loan extended by

commission agents and contractors bound farmers to sale dates to/through them which results in low farmer's profit than the potential.

Suggestions

1. There is a need to provide improved varieties, credit facilities and training opportunities to the farmers in the South Punjab
2. Improvement in the market infrastructure are necessary to increase the effectiveness of marketing
3. It is necessary to provide processing facilities by installing dates processing plants especially in Balochistan and Dera Ismail Khan.
4. In Sindh and Dera Ismail Khan, majority of the farmers sell the harvesting rights of their date orchards to the pre-harvest contractors. It seems difficult for the growers to sale their own produce due to lack of enough resources and marketing facilities. Government should provide credit facilities to the growers and reduce the number of intermediaries between producer and consumers in these areas.
5. Many farmers and contractors of Sindh and Dera Ismail Khan sell the dates in Sukhar (Sindh) market where they faced the problems like uncertainty in prices of dates during the auction and dependence on the commission agents. There should be fixed prices of this commodity and minimum commission on sale revenue to ensure farmers' profit.
6. There is a need to train extension staff and farmers about the date palm production and processing by using different extension strategies.

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INTERVIEW SCHEDULE

A study of date palm market chain and its role in food security and livelihoods of farmers in the South Punjab

District ----- Tehsil ----- U.C -----

Village -----

Date of Interview -----

Demographic characteristics

1. Name -----

2. Age

- a) Young (up to 30)
- b) Middle aged (> 30-50)
- c) Old (> 50)

3. Literacy level

- a) Illiterate
- b) Primary
- c) Middle
- d) Matric and above

4. Total Family size -----

5. Caste/ Tribe -----

6. Type of tenure

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

7. Total area of the land (Acres)

- a) Up to 5
- b) 6-15
- c) 16-25
- d) > 25

8. Annual income

- a) Up to 100,000 Rs.
- b) 100,001-150,000 Rs.
- c) 150,001-200000
- d) 200001Rs and above

9. Which crops you grow (last 5 years)?

- e) Wheat Yes___ No___
- f) Cotton Yes___ No___
- g) Sugarcane Yes___ No___
- h) Rice Yes___ No___
- i) Sorghum Yes___ No___
- j) Maize Yes___ No___
- k) Barseem Yes___ No___
- l) Any other (please specify)

10. Pattern of date palm cultivation?

- a) Orchard
- b) Scattered trees
- c) Intercropping

11. Total number of mature date trees?

- a) 20-40
- b) 41-60
- c) 61-80
- d) 81-100
- e) >100

12. Varieties of date palm you grow?

- a) Hillawi Yes____ No____
- b) Karbalain Yes____ No____
- c) Begum Jhangi Yes____ No____
- d) Dhakki Yes____ No____
- e) Khudrawi Yes____ No____
- f) Muzawati Yes____ No____
- g) Shamran Yes____ No____
- h) Aseel Yes____ No____
- i) Jaman Yes____ No____
- j) Don't know Yes____ No____
- k) Other (please specify)

Objective 1: To identify the role of date palm in livelihoods of farmers

13. What is your primary source of income

- Income from farming/ agriculture
- Income from date palm
- Dairying / livestock
- Agricultural labour
- Non farm labour
- Regular salaried jobs of present HH Members
- Trade or other business
- Remittances received from within country
- Remittances received from outside country
- others (specify)

14. What is your secondary source of income

- Income from farming/ agriculture
- Income from date palm
- Dairying / livestock
- Agricultural labour
- Non farm labour
- Regular salaried jobs of present HH members
- Trade or other business
- Remittances received from within country
- Remittances received from outside country
- others (specify)

15. What is your tertiary source of income

- Income from farming/ agriculture
 Income from date palm
 Dairying / livestock
 Agricultural labour
 Non farm labour
 Regular salaried jobs of present HH members
 Trade or other business
 Remittances received from within country
 Remittances received from outside country
 others (specify)

16. What is your usage pattern of date palm tree?

	Household		Commercial	
	Yes	%age	Yes	%age
a) Food	Yes___	No___	Yes___	No___
b) Fed to animals	Yes___	No___	Yes___	No___
c) Fuel	Yes___	No___	Yes___	No___
d) Making huts	Yes___	No___	Yes___	No___
e) Mats	Yes___	No___	Yes___	No___
f) Manual fans	Yes___	No___	Yes___	No___
g) Bread dishes	Yes___	No___	Yes___	No___
h) Baskets	Yes___	No___	Yes___	No___
i) Containers for domestic use	Yes___	No___	Yes___	No___
j) Pillars for houses/shelters	Yes___	No___	Yes___	No___
k) Roofing of houses	Yes___	No___	Yes___	No___
l) Ropes	Yes___	No___	Yes___	No___
m) Bed frames	Yes___	No___	Yes___	No___
n) Any other (Please specify)				

17. What are commercial uses of date palm?

	Percentage	Rate (per kg)	Total Rs.
Chuhara			
Premature selling			
Fresh			

18. Is date palm cultivation is more profitable than the following crops?

	Yes	No
Wheat		
Cotton		
Sugarcane		
Mango		

Objective 2: To study the supply chain of date palm products by identifying the stakeholders and institutions involved in the marketing chain of dates and other products of date palm tree

19. Please describe how and to whom you sell dates?

20. If you give the contract of date palm trees then what is the reason?

21. Distance from suitable date market

- a) At farm gate
- b) 1-10 km
- c) 11-20 km
- d) 21-30 km
- e) 31-40 km
- f) 41-50 km
- g) More than 50 km

22. How long you can preserve dates for consumption and marketing?

- a) 1-2 week
- b) 1-2 months
- c) 2-3 months
- d) 3-4 month
- e) More than 4 months

Objective 3: To assess the level of awareness among date palm growers regarding date palm production technology

23. Do you know about the following?

A) Varieties

Awareness

- | | | |
|-----------------|--------|-------|
| a) Hillawi | Yes___ | No___ |
| b) Karbalain | Yes___ | No___ |
| c) Begum Jhangi | Yes___ | No___ |
| d) Dhakki | Yes___ | No___ |
| e) Khudrawi | Yes___ | No___ |
| f) Shamran | Yes___ | No___ |
| g) Aseel | Yes___ | No___ |
| h) Jaman | Yes___ | No___ |

B) Recommended time of irrigation

- | | | |
|-----------------------------|--------|-------|
| a) Just after transplanting | Yes___ | No___ |
| b) Summer (10-15 days | Yes___ | No___ |
| c) Winter (20-25) | Yes___ | No___ |

C) Recommended time of fertilizer application

- | | | |
|----------------------|--------|-------|
| 20 kg FYM (December) | Yes___ | No___ |
|----------------------|--------|-------|

Chemical fertilizer

- | | | |
|--------------------------------|--------|-------|
| a) 1000g DAP (December) | Yes___ | No___ |
| b) 1000g SOP (December) | Yes___ | No___ |
| c) 750 g Urea (Feb. and April) | Yes___ | No___ |

D) Recommended time of sucker transplanting?

- | | | |
|----------------|--------|-------|
| a) Aug-October | Yes___ | No___ |
| b) Feb-March | Yes___ | No___ |

E) Insect/ Pests and Diseases

- | | | |
|--------------------|--------|-------|
| a) Aphids | Yes___ | No___ |
| b) Top borer | Yes___ | No___ |
| c) Scales | Yes___ | No___ |
| d) Red palm weevil | Yes___ | No___ |

24. What is the method of dates preservation?

- | | | |
|-------------------------------|--------|-------|
| a) Sun dried | Yes___ | No___ |
| b) Processing | Yes___ | No___ |
| c) Chemical treatment | Yes___ | No___ |
| d) Any other (please specify) | | |

25. Yield of dates (kg/tree)?

- e) 30-40
- f) 41-50
- g) 51-60
- h) 61-70
- i) 71-80
- j) >80

30. Please suggest what measures should be taken by the government to improve date palm cultivation and marketing. Please give numbers 1,2,3,4,5 according to following scale

1= less important, 2=important, 3= average, 4= very important, 5= most important

	<u>RANK</u>				
Provision of improved varieties	1	2	3	4	5
Provision of credit facilities	1	2	3	4	5
Improve market infrastructure	1	2	3	4	5
Awareness about production technology	1	2	3	4	5
Storage facilities	1	2	3	4	5
Processing facilities	1	2	3	4	5
Availability of literature on date palm	1	2	3	4	5
Nursery should be built at village level	1	2	3	4	5
Others (please specify)					

