

*Participatory
Rapid Horticulture
Appraisal of Sindh
Banana, Dates, Guava, Mango, Chillies*



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Agribusiness Development & Diversification Project (ADDP)



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Acronyms

ADDP	Agribusiness Development & Diversification Project
ARI	Agricultural Research Institute
ASF	Agribusiness Support Fund
BBTD	Banana Bunchy Top disease (BBTV)
BDSP	Business Development Service Provider
CGA	Chillies Growers' Association
DPRI	Dates Processing Research Institute
FBS	Federal Bureau of Statistics
FFS	Farmers Field School
FGDs	Focus Group Discussions
FYM	Farm yard manure
GAP	Good Agricultural Practices
GMP	Genetically Modified Plant
Ha	Hectares
IPM	Integrated Pest Management
ISO	International Standard Organization
KM	Kilometers
LOC	Letter of Credit
NGOs	Non government organizations
PARC	Pakistan Agriculture Research Council
PO	Post Office
POL	Petrol, oil and lubricants
PCSIR	Pakistan Council of Scientific & Industrial Research
NIA	National Institute of Agriculture
PRHA	Participatory Rapid Horticulture Appraisal
R&D	Research and Development
SAFWCO	Sindh Agricultural & Forestry Workers Coordinating Organization
SALU	Shah Abdul Latif University
SRSP	Sindh Rural Support Program
SWOT	Strengths, Weaknesses, Opportunities and Threats
TBT	Technical Bearers Threat

Executive Summary

The Horticulture sector plays a crucial role in the overall employment and income generation of the farming communities in Sindh province of Pakistan. This sector has the potential to enter into the larger market economy, and is emerging as a major income generator. This will be realized, provided the sector is guided to conform to quality standards and employ efficient technologies for utilizing resources and effectively responding to needs of the market.

It was argued that the local producers are not adequately meeting the needs of the market. The need for creating competitive advantage through value addition, backward and forward linkage with the wider markets and the need for increased capacity building of the producers and service providers was rationalized as the working strategy. Taking this framework, the study focused on viewing the competitive advantage of the subsector through value addition. Study focused on five crops viz: banana, dates, mango, guava and chillies. This was done through interviews with relevant value chain members, stakeholders, the market actors and the service providers. During the process the central question was:

Under which alternative market systems (local versus export, traditional versus more modern technologies) should these crops value chain members operate to increase value-addition and increase competitive advantage?

The assessment team identified the following related to these five crops in Sind Province of Pakistan:

- The banana, dates, mango, and chillies are exported to various countries.
- The area and production of all these crops are being increased at a rate of 5 to 8% every year
- The total employment of about 100,000 are directly being generated for various activities of these crops
- Around 25% women are involved directly in these crops
- These crops are catering to the needs of the country and are also exporting to various countries.
- The producers of these crops are scattered in almost all the districts of the province, whereas the major markets of these crops are in Karachi, Hyderabad, Sukkur, and Kunri – Umerkot District.
- Lack of market information to the growers of these crops is a major constraint to get fair prices to the farmers
- Lack of appropriate agricultural extension services, producers are still looking for the new technologies in production practices, and marketing to be adopted
- The local producers feel that they lack knowledge and skills in producing quality of various crops.
- Almost 100% of the local producers expressed their desire and willingness to receive technical assistance and develop their capacities on improved farming techniques and increase their profitability
- The local producers believe that linkage with forward and backward market can significantly enhance their competitive advantage
- Market expansion and value addition is considered to be the critical factor for the growth of the these crops
- The local producers perceive that cold storage facilities for banana, dates, mango and guava, would significantly improve their profitability for preserving during peak season when the price is low
- Local processing of mango (mango juice, chatni), banana (banana juice and dry banana pieces), and guava (guava juice) can significantly increase the demand for fresh mango and can attract thousands of farmers to cultivate mangos and increase their livelihood
- Government policy for subsidizing the inputs particularly fertilizer and pesticides for these crops will

save money to the growers.

The following interventions were suggested by the assessment team:

Capacity Development on Improved Production Process: Improve farmer's knowledge and capacity on improved and scientific cultivation process such as soil testing, pest control, water management, harvesting and post harvesting handling, etc.

Value Addition of Crops: To provide opportunities to the farmers to obtain relatively better price through storage of banana, dates, mango, and guava during peak season when the price is low, as well as increase demand of these fruits through setting up processing plants (juice, etc.)

Backward and Forward Linkage: Coordinating of markets from production to processors and from processors to final consumer. The effective linkages are possible with the various educational institutes (agriculture university), research institutes, and industries.

Strengthening and Developing Effective Business Service Market: Developing appropriate business services to cater to the needs of the Value Chain members for increased productivity and profitability, i.e., packaging services - wooden crate, post-harvest technology, dehydration units, cultivation equipment services, pest control services, etc.

Mainstreaming Gender in Banana, Dates, Mango, Guava and Chillies Production and Processing: Women represent a significant portion of those engaged in both production and processing of these crops and products, but they do not have adequate access to knowledge, information, market linkage, access to financial services for making their ventures profitable.

Infrastructure Development: The farmers' profitability decreases significantly due to lack of appropriate feeder road linking the farms with main access road and physical market places. Infrastructure Development can decrease post harvest product loss and increase farmers profit from the cultivation of these crops

Energizing the Associations: The associations of farmer is an outcome of natural demand for knowledge and experience sharing, further strengthening of these associations can increase various service provisions to the farmers and at the same time they can collectively bargain their interest with the traders groups and policy makers.

Policy Advocacy: Support to favorable policy can encourage engagement by private sector investors in value addition of agriculture. Appropriate taxation, support to local industry, creating provisions for smooth supply of utilities (mainly power), refining the regulatory framework to create an enabling environment for increased private sector investment in agricultural sector can increase the profitability of the farmers.

Agribusiness Support Fund may focus and facilitate the opportunities to intervene in the above areas to increase the competitive advantage and develop export potential as well as improve the economic benefits to farmers and agribusiness enterprises engaged in the production of these five crops studied by the team.

1. Background

Sindh is the second largest province of Pakistan on the basis of population and also on the basis of its contribution to agricultural progress of the country. With population of 40 million, it represents 23% of the total population of the country. It ranks third in area covering 140,935 square kilometers (14.09 million hectares) or 18% of the country's geographical area. About 40% of the area of Sindh is arable land and 5% is rangelands. Total cultivated area of Sindh is 5.61 million hectares and net area sown is 2.64 million hectares. The total cropped area is 3.52 million hectares of which 0.88 million hectares are sown more than once (Development Statistics of Sindh, 2006).

Sindh is situated along the lower banks of the river Indus, forming a major portion of the Great Indus Plain. The length of Sindh from south to north is about 580 KM, and breadth is 275-440 km from east to west, narrow in north and broad at the base. It lies between 23-29-north latitude and 67-70 parallel east longitudes. It is surrounded by land on upper side, coastal strips of about 240 km, in the southwest along the Arabian Sea. In the south, it borders with the Rann of Katchh and the Katchh state of India, the eastern boundary extends towards Rajistan, India, while the Punjab and Balochistan lie to its north and west respectively.

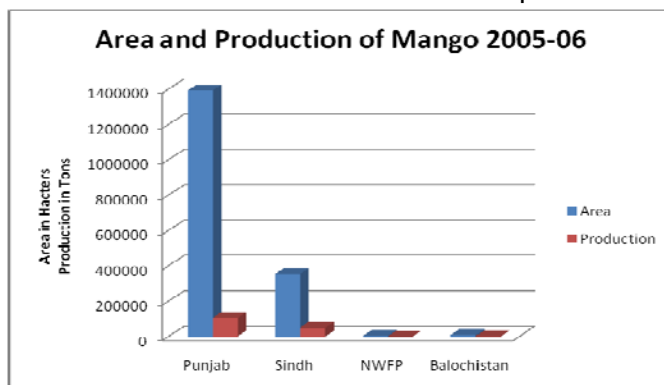
Agricultural progress of Sindh province is linked with the supply of irrigation water from the river Indus. It comprises of three barrages viz. Sukkur, Guddu, and Kotri with gross command area of about 6.65 million hectares. Arid zones of Sindh include Thar (Desert) region (Tharparkar & Umerkot) and Nara region (Sanghar, Khairpur, Ghotki and Sukkur) in the east, and Katchho and Kohistan regions (Dadu and Thatta) in the west.



The overall climate of the province is arid with scarce monsoon rains in the rotation of every 4-5 years, leaving canal irrigation as the only source of irrigation for the province. May to July is the hottest months (above 40 Celsius) with occasional frost. The soil in the Indus flood plain area is alluvial being predominantly permeable sand and silt loam particularly near to the river with increasing clay fraction away from the river. A significant portion of the soils is affected by salinity and water logging problems.

Sindh grows a variety of field and horticultural crops. Wheat, cotton, rice and sugarcane are the major field crops, which constitute 69% of the total cropped area, while mango, banana and Chillies Date and Guava are the major horticultural crops.

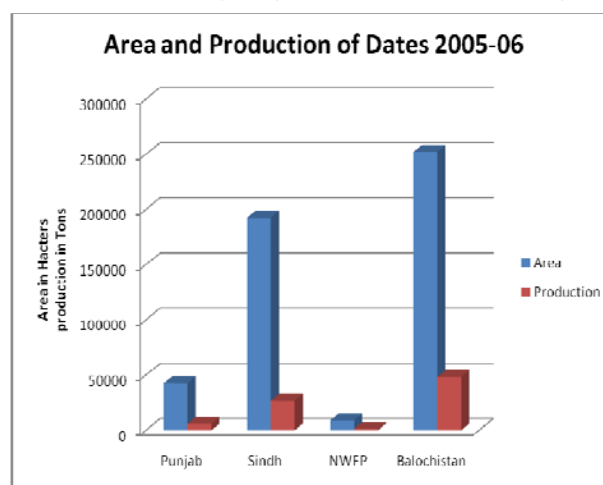
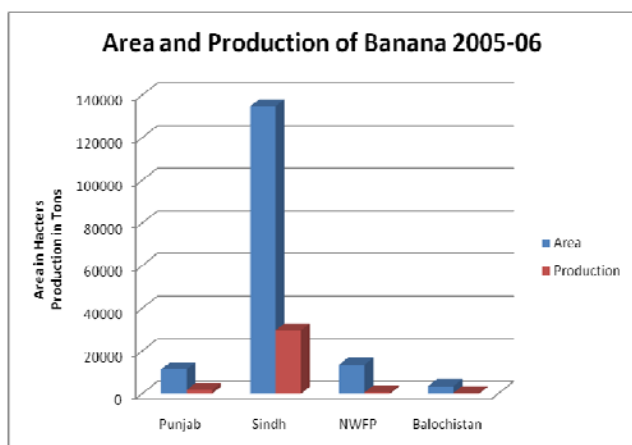
Mango is being cultivated on 104,879 ha in Punjab, 49,983 ha in Sindh, 305 ha in NWFP and 1,403 ha in Baluchistan. Whereas production of mango has been 1,391,786 tonnes in Punjab, 352,424 tonnes in Sindh, 3,218 tonnes in NWFP and 6,479 tonnes in Baluchistan. So far as the bananas are concerned, 1,754 ha are being cultivated in Punjab, 29,693 ha in Sindh, 679 ha in NWFP and 386 ha in Baluchistan. The production of bananas in Punjab is 11,401 tonnes, in Sindh 134,743 tonnes, 13,702 tonnes in NWFP and 3,631 tonnes in Baluchistan during 2005-06¹.



Dates are being grown on 5,797 ha in Punjab, 26,681 ha in Sindh, 1,377 ha in NWFP and 48,136 ha in Baluchistan. On the other hand production of dates in Punjab during 2005-06 were 42,580 tonnes, 192,810 tonnes in Sindh, 8,869 tonnes in NWFP and 252,317 in Baluchistan.

Chillies are grown on 5,223 ha in Punjab, 4,0449 ha in Sindh, 719 ha in NWFP and 2,333 ha in Baluchistan. The production of chillies in Punjab is 8546 tonnes, 77,716 tonnes in Sindh, 840 tonnes in NWFP and 3372 tonnes in Baluchistan during the year 2004-05.

Guava is produced on 49000 ha in Punjab, 8100 ha in Sindh, 3600 ha in NWFP and 600 ha in Baluchistan. The production of it was 446,000 tones in Punjab, 60200 in Sindh, 43200 in NWFP and 2800 in Baluchistan during 2005-06²



Banana are grown 1,754 ha in Punjab, 29,693 ha in Sindh, 679 ha in NWFP and 386 ha in Baluchistan. The production of banana in Punjab is 11,401 tonnes, 134,743 tonnes in Sindh, 13,720 tonnes in NWFP and 3,631 tonnes in Baluchistan during the year 2005-06.

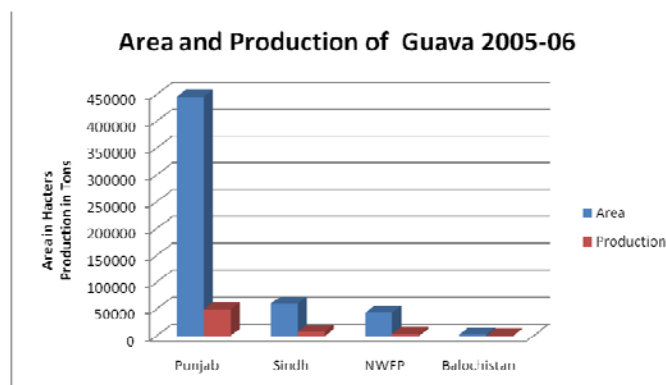
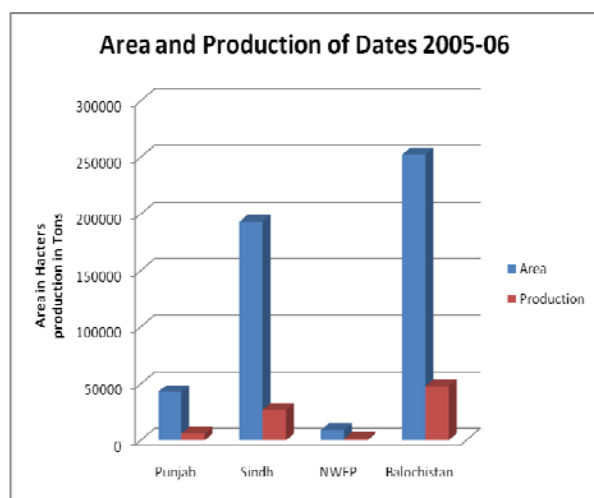
Crop yields are generally low which have remained either stagnant or increased at slow rates. Availability of quality seed and planting material of desired crop varieties continues to be a problem of major concern for Sindh agriculture. Use of crop inputs such as fertilizer, pesticides etc has increased considerably without corresponding increase in yield levels. Supply of sub-standard and

¹ Source: Ministry of Food, Agriculture and Livestock, Government of Pakistan, 2005-06

² Source: Ministry of Food, Agriculture and Livestock, Government of Pakistan, 2005-06

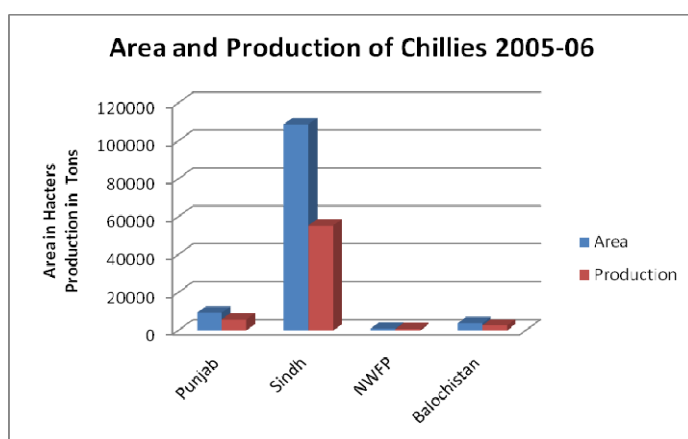
adulterated pesticides and fertilizers is also affecting the crop yields and the cost of production. There is increasing degradation of the resource base i.e. soil, and current farming practices do not adequately address the issue of sustainability of crop production systems. This is besides the high cost of inputs and non-secure market prices as main hurdles in the development of agriculture. On comparative basis, crop yields in Sindh are generally better than the other provinces, yet there is large unexploited yield gap that requires the attention of all concerned with the progress of agriculture sector, improvement in over all economy, and net profit of the growers.

The economic level of the farming community is below the poverty line hence, limiting the development of agriculture. Farm mechanization is mostly limited to the use of



tractors and wheat threshers. Laser levelers are a recent introduction with great potential for enhancing yield levels and better use of irrigation water. Current water scarcity problem demands the adoption of proper water management practices for its efficient use.

The report reviews the status of agriculture in Sindh with special reference to irrigated agriculture and attempts to identify the issues and possible measures for improving the banana, dates, guava, mango and chillies crops situation. For the most part, it refers to these field crops.



2. Introduction

This Participatory Rapid Horticulture Appraisal study was conducted by Agribusiness Support Fund (ASF) in collaboration with the members from public and private sector institutions, stakeholders and growers of the area. One major effort of the ASF is to undertake assessments of chosen sub-sector so as to better target relevant support. The strategy for doing so is to increase competitiveness, performance, and growth of the private sector agribusinesses, which is expected to contribute to the improvement in economic and social conditions. ASF intends to address the issue of market imperfections for the selected products by identifying and working with service providers who are currently offering or have potential to offer commercial services to agribusinesses. ASF's role is to assist the businesses as well as the service providers in developing their products and services, by providing technical assistance in their product and market development.

The approach adopted is an attempt to combine the strengths of sub-sector analysis with the promotion of commercially viable solutions to sub-sector constraints. Sub-sector analysis can identify constraints, which limit agribusiness growth and income potential and commercially viable solutions can result in solutions that are sustainable in the long run and that do not distort local markets.

2.1 Scope of the study

The scope of the study is limited to 5 horticulture crops (Mango, Dates, Banana, Guava and Chillies) under the broad domain of Participatory Rapid Horticulture Appraisal (PRHA). For this study, the sub-sector is defined as clusters of products that follow a particular supply chain from the production to finished/processed goods to the end consumer. For example, the Inputs (seed, fertilizer, pesticide), farming, harvesting, post-harvesting, and marketing, etc. The study identified key constraints and opportunities of the supply chain actors in all the 5 horticulture crops as well as the dynamics of the value chain to identify the competitive advantage of the actors to increase their productivity and profitability.

2.2 Objective

The objective of this assignment was to undertake value chain studies of mango, dates, banana, guava and chillies in Sindh province and provide a comprehensive understanding of the entire value chain of all the 5 commodities. The primary objectives of the study are to identify the constraints of the sub-sector, understand the business service provisions in developing the value chain, and to guide Agribusiness Support Fund (ASF) in providing value-added support to the sub-sector for a more vibrant market environment. More specifically the study looked into the following broad areas:



i. Value Chain

- Develop a product specific value chain map; identify the major players in the value chain
- Identify the constraints faced by the value chain members
- Identify the competitive advantages/disadvantages of the value chain players
- Identify product specific strengths, weaknesses, opportunities and threats (SWOT) of the selected commodities

ii. Market Conditions

- Identify the current market condition – market size, players, demand supply gap, pricing trends, import and exports and distribution network
- Identify sector prospects and barriers to growth

iii. Business Development Services

- Identify business development services (BDS) needed by the sub-sector
- Identify existing service providers and assess the services being provided by them
- Identify potential service providers and assess their ability and willingness to provide the needed services

iv. Supply Chain

- Develop product specific supply chain maps
- Identify major players of the supply chain
- Identify the interrelation of the actors



2.3 Methodology

For the study a combination of field survey and literature review were conducted. The primary information served as the critical framework for analysis while the secondary information provided important inputs for understanding the context and rationality behind the status of sub-sector. This combination has provided rich context bound information that lead to explaining the situation more concretely. As a result, it was thought that a simple data-collecting instrument would neither reveal the true picture of the value addition and the dynamics nor would it demonstrate the true benefits of such services. On the other hand, it was also felt that the observation would also be difficult particularly with the limited time frame. As a result, both qualitative and quantitative investigation using projective technique was used. This has resulted in providing meaningful insights into how the producers, traders,

and service providers perceive various issues and deal with specific business situations. This technique was chosen since in addition to quantitative information, it would enable the respondent to "project" subjective beliefs and feelings to a third party, or into a task situation. A structured format, therefore, was not used.

Six teams were constituted, one for each crop and one to supervise all the teams in their respective areas (List of team members presented in **Annex-1**). The team members were from Agriculture Research and Extension, Agriculture University Tandojam, Pakistan Agriculture Research Center (PARC), PCSIR, Agribusiness Development Project, NGOs, Producers, Exporters and traders. The area samples were selected on the basis of crop dominance. The teams visited the crop dominated areas in Sindh province to collect information on the grass root level.

Cluster Sampling techniques were used for collection of information. Furthermore, the clusters were identified based upon the closeness and remoteness of the producers or traders from the large markets and high producing area. A combination of small, medium and large stakeholders of the value chain was selected to understand the true dynamics of the sub-sector. Along with the survey, five focus group discussions (FGDs) were conducted with 15-20 participants in each session for in-depth understanding on selected key issues of production, marketing, trading, processing, as well as constraints/ opportunities and potential interventions to remove the constraints and take advantage of the opportunities.



2.4 Information Gathering

The data collecting techniques used are given below.

1. Key informant interviews - Key informants were identified and, using a standardized guide, interviewed in the target areas. The key informants provided a variety of information ranging from general socio-economic to specifics related to the sub-sector
2. Focus Group Discussion (FGDs) – 5 FGDs were conducted to get the information
3. Validation workshop – The workshop was organized to achieve four primary objectives,
 - i) To understand the dynamics of the sub-sector,
 - ii) Present the work that was undertaken and seek clarification on critical issues,
 - iii) Validate the findings and,
 - vi) Explore ideas for interventions that address constraints and aide in the

development of the value chain.

The assessment team interviewed different players of the value and supply chain including growers, exporters, traders, commission agents and other public and private sector institutions and went through the available secondary data to develop quick mapping of value chain. The chapters 3 to 7 discuss the participatory rapid horticulture appraisal of banana, dates, mango, guava and chillies crops.



3. Banana Crop

3.1 An Introduction

Banana is of the oldest fruit and is commercial as well as staple food in some tropical regions. Banana belongs to the genus *Musa* of the monocot family *Musaceae*. Banana is a nutritious fruit and leads all other fruits in food value. It is rich in energy values and tissue building elements as compared to most horticultural products. It carries carbohydrates, minerals and vitamins. Five fingers of banana along with one glass of milk are said to be complete diet. Banana produces 3 to 7 hundred mounds (40 kg) of edible matter per acre, which is higher than average yield of any food crop. It is therefore, expected that extended cultivation of banana can help in food security. The economic importance of banana over other fruits lies in the fact that its cultivation is a regular source of income to the growers. Consumer considers it a cheap and delicious fruit.



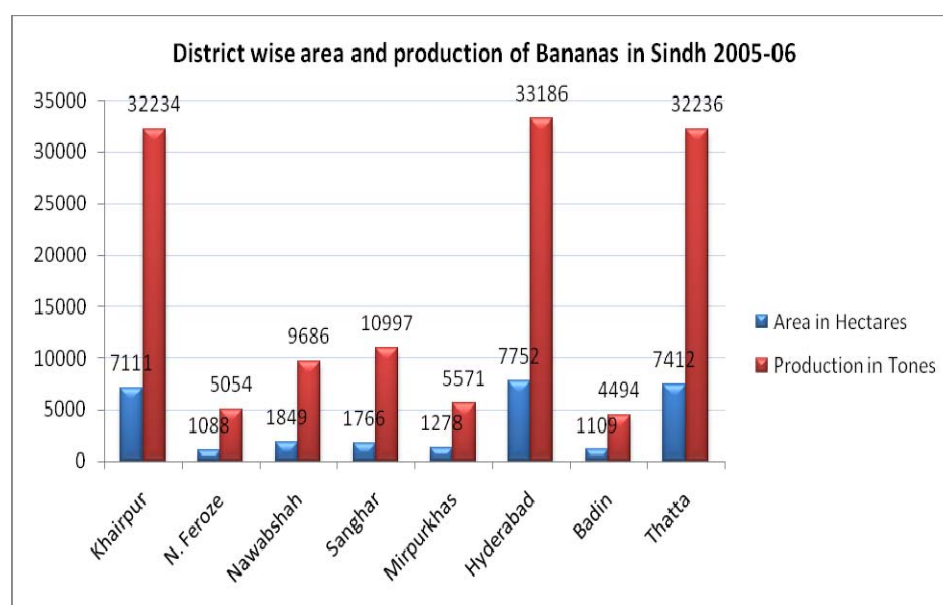
In Pakistan, banana cultivation was started after independence, and soon after its success in Sindh, banana emerged as an important fruit crop. Table 3.1 indicates that Sindh province is a major banana producing area of Pakistan as it contributes about 85 to 92 percent in banana acreage and about 90% in production. The average area devoted to banana in Sindh was 32.2 thousand hectares with the production of 126 thousand tones during 2006-07 (MINFAL Government of Pakistan, 2006-07). In Sindh province banana is mainly cultivated in Khairpur, Hyderabad, Thatta, Nawabshah, Naushahro

Feroz, Sanghar, Mirpurkhas and Badin districts.

Table 3.1: Area and Production of Banana in Pakistan and Sindh during 2001 to 2006-07

Year	Area (000 ha)			Production (000 tons)		
	Pakistan	Sindh	% Share of Sindh	Pakistan	Sindh	% Share of Sindh
2000-01	30.3	26.3	86.8	139.4	101.7	72.9
2001-02	31.2	27.3	87.5	149.7	113.5	75.8
2002-03	29.7	25.4	85.5	142.9	112.9	79.0
2003-04	31.6	27.5	87.0	154.0	125.7	81.6
2004-05	33.1	29.0	87.6	158.0	129.6	82.0
2005-06	32.5	29.7	91.4	163.5	134.8	82.4
2006-07	34.9	32.2	92.3	150.5	126.3	83.9

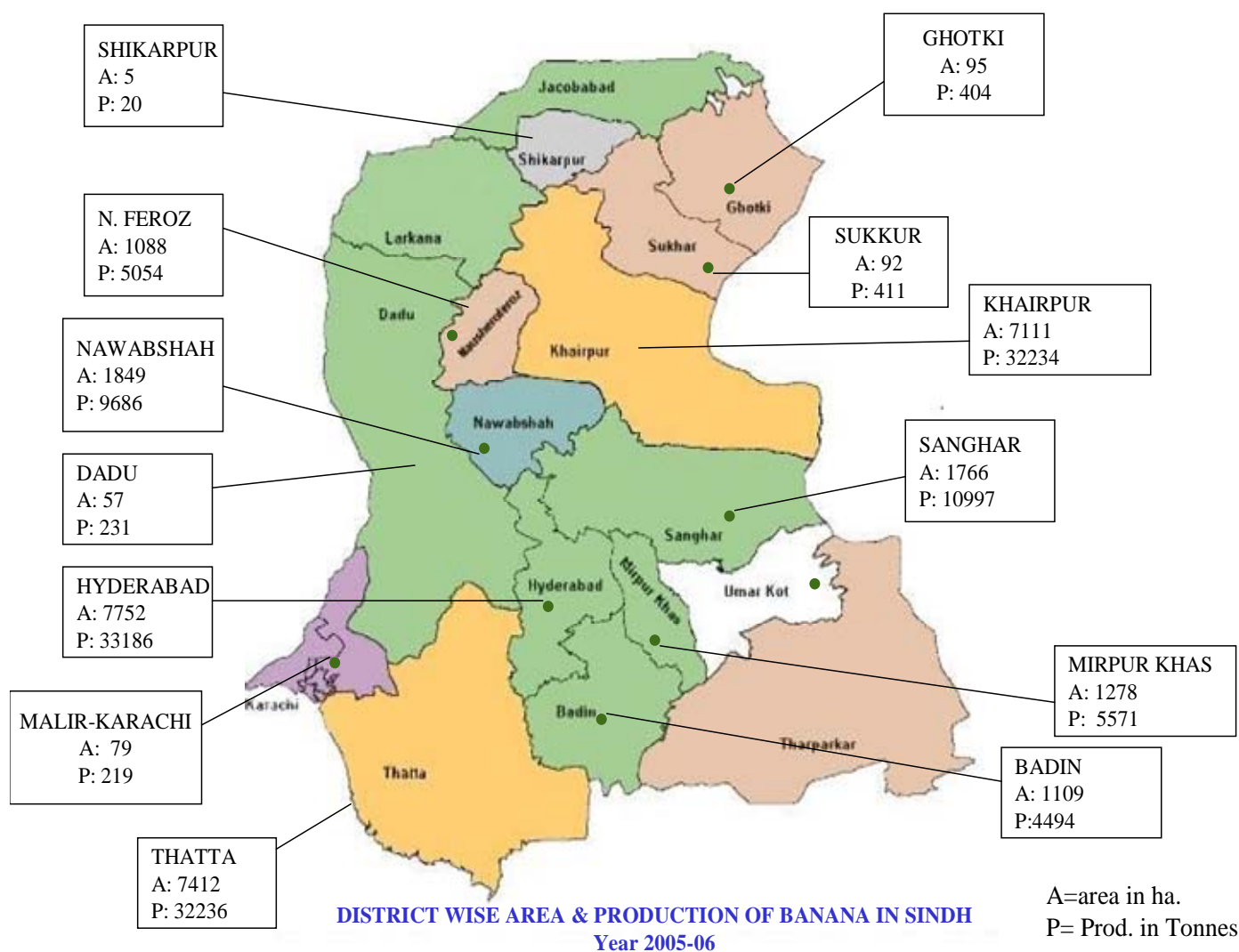
Source: Ministry of Food, Agriculture and Livestock Government of Pakistan, (2006-07)



3.2 Area and Production of Banana in Sindh

Fig. 3.1 indicates the Banana area and production in various districts of Sindh province of Pakistan. The data have been gathered from the Ministry of Food, Agriculture & Livestock, Government of Pakistan.

Fig. 3.1 AREA AND PRODUCTION MAP OF BANANA IN SINDH



Banana has great potential to earn the foreign exchange. While discussing with various stakeholders, it has been reported that during the four months peak season about fifty to sixty trucks (250 mds/truck) per day of banana was exported to Afghanistan and about four to five trucks/day to Iran. Further detailed survey is needed in this area.

3.3 Production Cost of Banana

Planting of banana orchard is an economic and resource allocation decision not only to plant suckers on a piece of land, but also for continuous care and application of inputs round the year. At the initial stage, the main cost includes: land development, labor utilization and input application at the time of planting. Land development includes plowing, planking, leveling and layout of the orchards. Initial cost also include land leasing, as majority of banana producers cultivated banana on lands owned by themselves, so it has been calculated as an opportunity cost.



Table 3.2 presents total cost of production of banana.

Table 3.2: Average Cost of Production of Banana

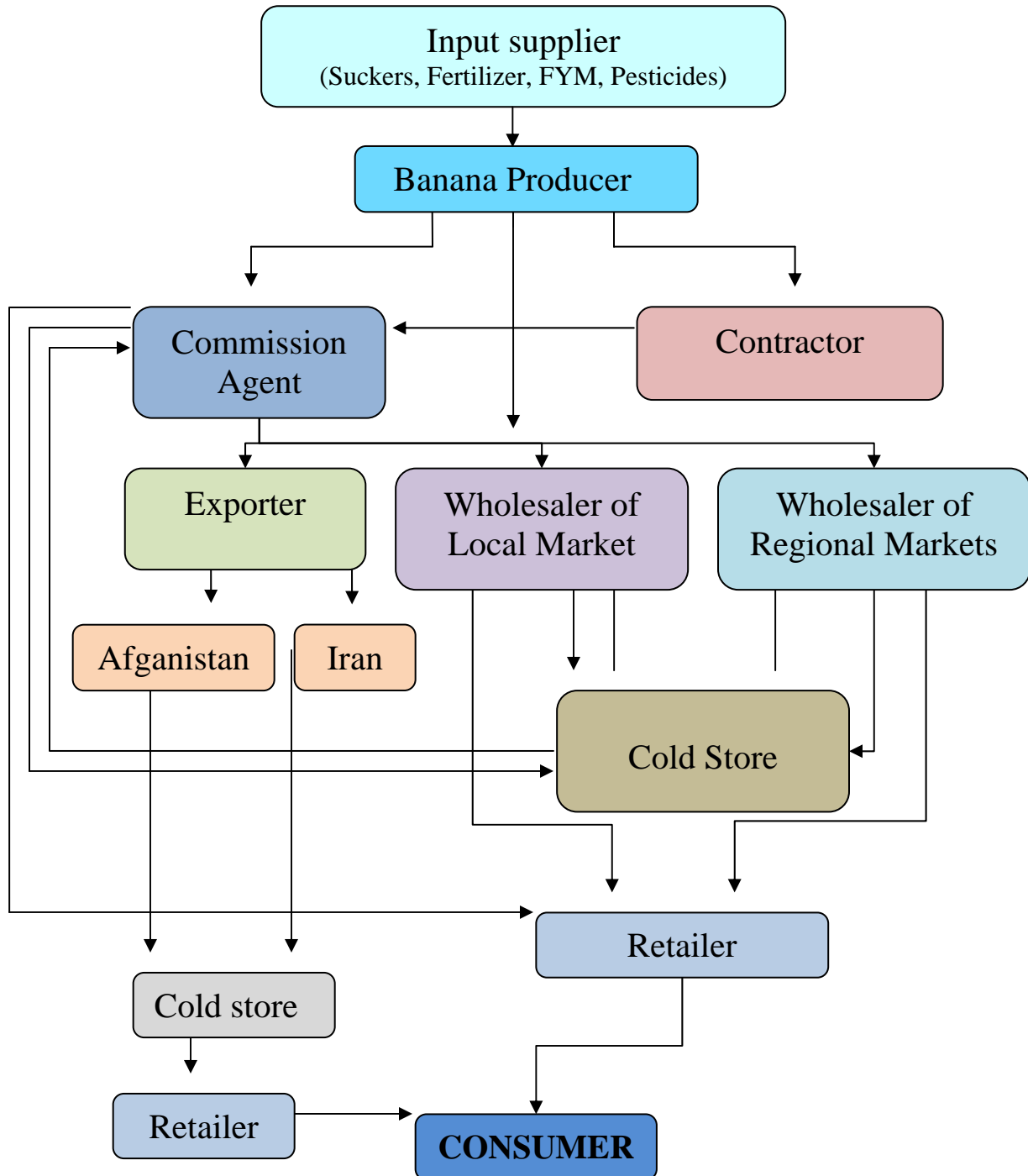
Cost Component	Amount (Rs./acre)
Revenue tax by the government	700
Rent of land per year	10,000
Land Preparation	4,800
Suckers (Total 200 suckers, Rs.4 per sucker, + labor charges)	8,000
Plantation	600
Pruning and Cleaning	2,400
Irrigation charges	6,000
Fertilizer	17,200
Farm Yard Manure	8,100
Interculturing 2 three times in the field.	3,600
Harvesting	2,500
Loading, and unloading cost	2,400
Total Cost of Production	66,300
Yield reported (maunds)	300 – 500
Average yield (maunds)	375
Average price / maund	300
Average net return per acre	46,200

Source: Survey data, April 10-12, 2008

3.4 Banana Value Chain

The banana value chain refers to the outlets or routes through which banana pass to reach the final consumers. The existing banana value chain is presented Figures 3.2.

Fig. 3.2: Banana Value Chain in Sindh



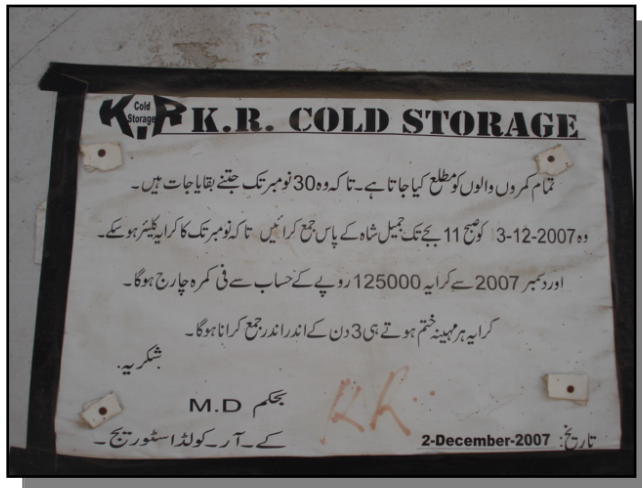
The brief description of the value chain is presented below:

Producer

Banana cultivation is carried out by a large number of growers who are geographically described in various locations in Sindh, particularly, Thatta, Hyderabad, Nawabshah and Khairpur districts. Banana producer is a primary functionary involved in crop production on his own land or a piece of land obtained on rent. Majority of banana producers sold the harvesting rights to their orchard to contractor. The majority of contract agreement in between producer and contractor take place in February. The period of contract is usually one year from March to February.

Contractor

The contractor performs key role in banana marketing. It can be described as merchant middlemen buying the banana produce from producers and selling in the market. The contractor is local man who belongs to the farming community and possesses enough knowledge about market conditions. During contracting of a farm the contractor estimates its yield and considers expected costs to be incurred for supervision, labour, transportation and marketing, and pre-harvest and post-harvest losses.



Commission agent

Commission agents act between sellers and buyers. The main function of the commission agents is to bring buyers and sellers together. They maintain contacts with inter-regional wholesale markets and possess comprehensive and accurate information. The commission agent is the principal agency around which all marketing activities rotate. They perform their activities on a commission basis. They don't accept any title of goods, while simply selling the produce brought by

producers and contractors. They have their shops in markets having telephone and other facilities.

Wholesalers

Wholesalers buy and sell large quantities of farm products. Usually sell in wholesale and regional markets and export to Afghanistan and Iran markets. Wholesaler deals in the inter-regional markets and supply produce to processing industries, exporters and retailers according their demand. A wholesaler is a major agency in marketing of agricultural products, having good contacts with commission agents in wholesale markets and retailers in the local markets/ area. Wholesalers mostly purchase the product from commission agents on credit and return the same after selling the product.

Retailer

All market activities come to an end with the retailers. They buy and sell small quantities of product according to the demand of consumers in the area. They maintain direct contact with consumers and make transactions. Retailers have two types of selling; few have their small shops in consumption areas others are hawkers having wooden carts.

3.5 Constraints and Suggestions

During the individual meetings, focus group discussions and one-day stakeholder workshop made it possible to identify the constraints and suggestions at each level of value chain of banana crop. Pre and post harvest constraints were identified and grouped together are presented below:



Pre-Harvest Constraints and Suggestions

Problem	Solution	Existing Facilities
Banana Bunchy Top disease (BBTD)	<ul style="list-style-type: none"> • Availability of disease free plants • Proper crop management • Capacity building of banana growers • Introduction of new varieties 	<ul style="list-style-type: none"> • Tissue culture lab is working at ARI and NIA Tandojam. • Only one variety Basari is available
Non-availability of diseased free plants	<ul style="list-style-type: none"> • Setting up tissue culture labs for propagation of disease free plants intensively 	<ul style="list-style-type: none"> • No disease free plants are available
High cost of sucker, due to transportation from distant areas	<ul style="list-style-type: none"> • Setting up tissue culture labs for propagation of disease free plants intensively 	<ul style="list-style-type: none"> • No disease free plants are available
Non-availability of new improved varieties	<ul style="list-style-type: none"> • R&D is required for introducing of new varieties 	<ul style="list-style-type: none"> • No R & D work
High price of Chemical fertilizers	<ul style="list-style-type: none"> • Subsidy is required for banana growers 	<ul style="list-style-type: none"> • ADDP is working on provincial and national horticultural policy
Shortage of irrigation water	<ul style="list-style-type: none"> • Laser leveling for land to use irrigation water properly 	<ul style="list-style-type: none"> • Laser leveling is being done on small scale by the farm machinery institute Tandojam
Inefficient banana production technology	<ul style="list-style-type: none"> • Need improvement of banana production technology. • Need capacity building of the growers, farm managers & labor regarding planting, irrigation, fertilization, harvesting, handling 	-

	and packing	
Lack of institutional credit facilities for growers and market traders	<ul style="list-style-type: none"> • Soft loan for banana growers/market traders 	-
Contractors do not care about quality produce and management of crop	<ul style="list-style-type: none"> • Discourage of contracting system 	<ul style="list-style-type: none"> • About 90 % growers contract out their farm on yearly basis

Post-Harvest Constraints and Suggestions

Problem	Solution	Existing Facilities
Fruit injured due to poor harvesting operation	Capacity building of labor is required	-
Intensive labor utilization in post harvest operations	Introduction of improved harvesting technology	100 percent labor involved in harvesting operations
Non-availability of cold storage in the producing area	Establishment of cold storages in the producing areas	Cold storages are available in Hyderabad and Sukkur only.
Absence of processing industries to prepare value added products such as banana pulp, powder, slice & chips	Exploring export and domestic markets for banana products	Processing at very low level
High transportation cost	Relief on petrol, oil and lubricants (POL)	-
High tax of border crossing to Afghanistan and Iran	Relief on export duty for banana	Heavy duty on exporting banana
No proper grading and packing facilities	Capacity building of the labor regarding grading and packing	No grading and proper packing
Bad debt of banana export	Payment must be done in a safe mode through banks like opening of Letter of Credit (LCC)	No procedure is being adopted
Poor marketing intelligence	Need market linkages at national and international level	Poor market linkages
Losses during cold storage due to long hours of electricity failure	Ensure alternate energy system	No arrangement of alternate arrangement

3.6 SWOT Analysis

Strengths, weaknesses, opportunities and threat analysis have been conducted in banana crop in Sindh:

1. Strengths

- Sindh province's monopoly crop, producing about 84% of total banana of the county
- There is sufficient production to meet the domestic demand and to earn foreign exchange through export of value added products.
- Availability of natural resources such as fertile land and suitable weather conditions
- Rich edible values and highly demand crop



2. Weaknesses

- Only one variety Basarai is cultivated since last 40 years, resulting in low production and many other problems
- There is irregular & inconsistent supply of quality banana fruit due to attack of BBTv
- Short shelf life and inadequate post harvest facilities
- Non-availability of cold storage in the producing area
- Lack of knowledge and skills of improved technology among growers
- Contractor involvement in the production process, resulting poor management practices and increases of BBTv incidences in banana fields
- Shortage of irrigation leading to permanent wilting results in low banana yield
- Banana plant is heavy consumer of plant food nutrients, especially potash and nitrogen. Due to increases in prices of fertilizer, grower reduced the nutrients supply that results in low yield

3. Opportunities

- Potential in domestic and export trade to Afghanistan, Iran and Middle East.
- Potential of establishing processing industry for value added products of banana including: Banana powder, baby feed etc.

4. Threats

- Sever attack of BBTv

- Growers usually obtain parent planting material from the fellow farmers involving high risk of BBTv attack.
- Shortage of irrigation water
- Increasing input costs
- Low yielding variety



3.7 Recommendations

The relevant stakeholders during the workshop, individual meetings and focus group discussions recommended that:

- Crop Insurance for banana crop
- Production of plants through tissue culture

techniques by establishing tissue culture laboratories in major banana producing areas in Sindh

- Establishment of cold storages in the banana producing areas/markets on need basis
- Subsidy on chemical fertilizers
- Special attention of PHDEB is required for export of banana to Afghanistan and Iran
- Capacity building of growers through practical trainings and learning visits
- Research on producing high yielding varieties
- Research on improvement of shelf life of banana
- Media campaign to introduce value added banana products
- Exploring new banana markets
- Encourage local traders of packing material to establish units in local markets and introduce improved packaging material

3.8 Proposed Interventions for Banana Crop

After deliberations, it has been observed that following potential interventions are possible under ASF program:

- Establishment of cold storage for Banana at Khairpur
- Establishment of cool chain for Banana at Karachi
- Establishment of cold storage at Uderolal district Matari
- Establishment of sucker production nursery including Lab, green house etc. at Othal, Hyderabad.
- Learning visits of banana traders to Dubai, Bahrain, Kuwait for exploring market of banana



3.9 Stakeholders' Intention in Various Interventions

The stakeholders showed interest in various interventions in banana crop in close coordination with ASF program:

Banana Stakeholders and Their Interest

S#	Name & Address	Occupation	Suggested Intervention
01	Mr. Shaahabuddin Jan Agro International, Trade and International (Pvt) Ltd, Ahmed Arcade, Room 301, 3 rd floor, DC-3, Block – 5, Main Clifton, Karachi- 75600 Pakistan Cell: 0300-203-3021	Exporter/ Processor	Banana Powder
02	Mr. Muhammad Afzal Khan and Mr. Muhammad Ali Khan, Fruit commission Agents, Shop No. 36 – 39, Block – B, New fruit Market Super highway Karachi. Cell No. 0321-242-2964	Exporter	Export of fresh banana and tissue culture laboratories.
03	Mr. Seeormal, Rajesh Traders Khairpur Anaj, Fruit and Vegetable Market Khairpur Cell: 0300-831-0416, Ph: 024-3553784 Fax: 0243551956	Wholesaler and exporter	Cold Storage
04	Mr. Shabir Ahmed Soomro, Anaj, Fruit and Vegetable Market Khairpur, Cell: 0300-313-5065	Wooden carton maker	Establishment of factory
05	Mr. Malik Abdul Gaffar, Malik Abdul Gaffar&Sons Banana Wholesaler, Anaj, fruit & vegetable Market Khairpur, Cell 0300-931-8801, Ph: 024-3714369 Fax: 0243554319	Exporter/ Wholesaler	Cold Storage
06	Ch. Mukhtiar Rajput, Officers colony, Lukman, Khairpur, Cell: 0301-397-3944	Grower	Tissue culture Lab
07	Mr. Hadi Bux Laghari, Technical Officer Asim Agriculture Farm, Tando Allahyar Cell: 0300-837-1442	Exporter	Dissemination of information among growers
08	Mr. Imdad Ali Nizamani, Managing Director, Asim Agriculture Farm, Tando Allahyar	Progressive Grower	Global GAP certification
09	Mr. Abdullah Abro, Village Sachoo Abro Union Council Oderolal Station, Taluka & District Matiari,	Grower	Cold Storage
10	Mr. Ibrahim Jahajo, Village Buhroon, P.O. Village Oderolal, Taluka & District Matiari Cell: 0346-385-1179	Grower	Packing material
11	Mr. Zahir Ahmed Morajo, P.O Village Oderolal, Taluka 7 District Matiari	Commission agent/Grower/ Contractor/Trader	Cold Storage
12	Mr. Ghulam Qadir Sipyo, P.O. Moosa Khatian Tandojam District Hyderabad	Grower	Export
13	Mr. Sajid Ahmed Rajput, Ahmed Hayat House Tandojam, District Hyderabad,	Grower	Export

3.10 Stakeholders Contacted

Stakeholders, location, number of events organized and interview conducted to gather the information on banana crop is presented in the following table:

S#	Stakeholders	Location	No. of Events
1	Group discussion	Oderolal district Matiari	1
2	Farmers	Hyderabad	14
		Khairpur	5
		Thatta	8
3	Contractors	Hyderabad	5
		Khairpur	3
		Thatta	4
4	Wholesaler	Hyderabad	4
		Khairpur	4
		Thatta	2
5	Commission agent	Hyderabad	3
		Khairpur	4
		Thatta	1
6	Input Suppliers (Chemical fertilizer, Pesticides, Suckers, FYM)	Hyderabad	6
		Khairpur	2
		Thatta	3
7	Exporters	Hyderabad	2
		Khairpur	4
8	Cold storage	Hyderabad	3
9	Supplier of packing material	Hyderabad	2
10	Researchers	ARI Tandojam	6
		Sindh Agriculture University, Tandojam	4

4. Dates Crop

4.1 Introduction

Date palm cultivation in Pakistan is 81,991 hectares whereas in Sindh 26,681 hectares which stands 32% of Pakistan. Out of which the area under cultivation in Khairpur is about 22,310 hectares. The area is being increased day by day, therefore Khairpur district is known as Queen of Date palm in Pakistan. Khairpur, Kingri and Kot Diji (3K) are three major Date palm growing talukas/tehsils of the district. This district provides economic source to hundreds of thousands families and labor force every year to earn money for their livelihood. The labor force comes from all of the provinces of the country especially from Baluchistan.

The most of the population of District Khairpur depend upon the cultivation of Date palm, contracting and laboring on seasonal basis. About 80% income of peoples depend on the direct and byproducts of date palms. The byproducts include:

- date pickle (oil),
- date pickle (vinegar),
- palm stem is used as timbered,
- fibrous material, ropes are made,
- date fronds are used for fuel, roofing, fencing,
- leaves are used for hand fans
- stalk shaft are used to prepare beds, chairs, crediles, birds cages mats, baskets and hats.
- growing tip the growing point of crown is sweet, people cut down wild date tree and extracted the succulent growing point for eating purpose



The major problems of the date palm is the contract system due to this total mismanagement is seen in the orchards after harvesting the fruits and also unawareness about the pre and post harvest technology is noted. Wrong layout and management practices at wrong time and unawareness about insect pest and diseases lead to misuse of insecticide/fungicide. It is very serious now that contractors apply the Methamidophos, Cypermethrin and other pesticides direct to the fruit to avoid it's shedding, which is wrong practice and threat to the environment & health. In the date palm orchard, major problem of insect pests as lesser date moth (fruit borer), and red palm weevil. Similarly many diseases like bayoud disease and dead heart disease has been observed. Because of mismanagement and unawareness of insect pest and diseases result in decline yields of date palms sometimes date palms collapses or dries whole of the plant, Agriculture Department, Government of Sindh established a Research Station on Date palm at the center of Date palm cultivation area of the district which has historical value in Sindh province.

The production and marketing of dates facing obstacles like monsoon rains during the production season, pest attack to the plant and product, non-productive R&D, lack of interest in low and medium size date marketer due to unavailability of lending at rational rate of interest. There is need to have some sort of commercial base with modern means of facilitation to low and medium scale date producer and marketer. Research based production is required to promote the date products at national and international level.

Khairpur market is the largest date palm wholesale market after Sukkur in Pakistan. The District is located at 25-50 latitude and 69-01 longitude in a southern part of the country at a distance of 450 km to North of Karachi.

The dates become the most important commercial dried fruit in the world market. Major producers are: Egypt, Iran, Saudi Arabia, Pakistan, UAE, Algeria, Sudan, Libya, China and Tunisia.

Pakistan stands at 4th position among dates producing countries of the world, whereas average yield (tons per hectare) stands at its 10th position. Therefore, attention is needed towards its production technology for enhanced average yield per hectare.

The major varieties of dates, which are grown in Khairpur District, are: Aseel, Karbalain, Fasli, Hazmo, Dedhi, Patasho, Kurh, Basro, Mithri, Thothar, Otakin, Bhidre, Pathri, Gajar, Kore, Begin, Kupro, Rukan and Nar.



4.2 Area and Production of Dates in Sindh

Fig. 4.1 indicates the Dates area and production in various districts of Sindh province of Pakistan. The data have been gathered from the Ministry of Food, Agriculture & Livestock, Government of Pakistan.

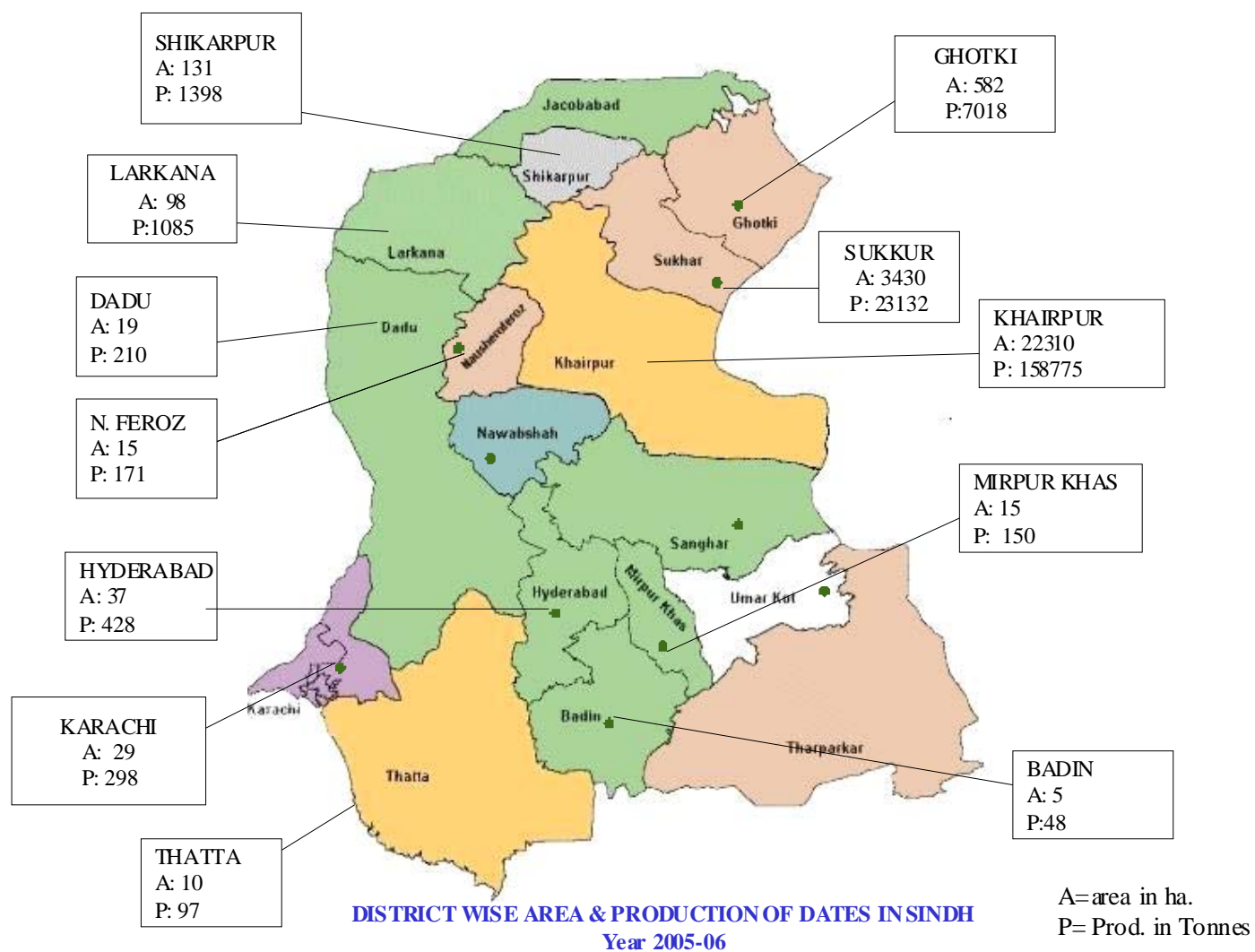


Fig. 4.1 District Wise Area and Production of Dates in Sindh

4.3 Export Profile of Dates

The fresh and dry dates are exported to various countries from Pakistan. Data is presented in table 4.2.



Table 4.2: Export of Fresh Dates from Pakistan

Details	July-June 2002-03	July-June 2003-04	July-June 2004-05
Fresh Dates			
Production	3,353,000	2,645,000	4,108,000
Value (US\$)	1,655,000	1,284,000	2,037,000
Dried Dates			
Production	67,791,000	62,784,000	79,946,000
Value (US\$)	23,449,000	21,449,000	27,714,000

Source: Export Promotion Bureau of Pakistan, 2008

4.4 Production Cost of Dates

The cost of production and physical productivity (per acre) and benefits have been calculated by interviewing several growers in Khairpur district. It is presented in tables 4.3 and 4.4.

Table 4.3: Production Cost and Physical Productivity

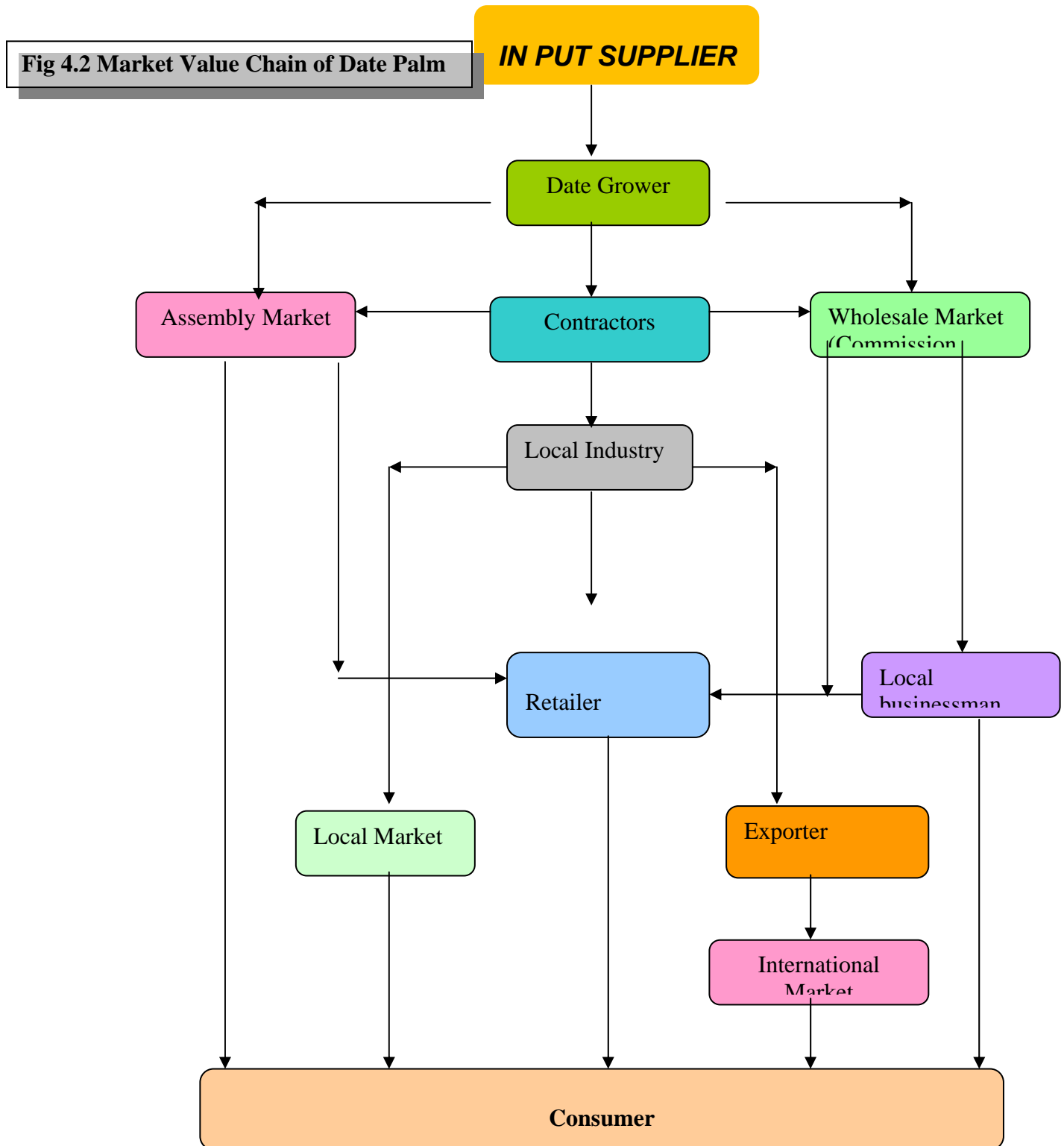
Cost Component	Amount (Rs./Acres)
Land Preparation	700
Leveling	1,050
Ploughing	350
Pits making	1,200
Farm Yard Manure	1,600
Sucker detaching	1,600
Layout and Plantation	2,000
Fertilizer DAP	3,000
Fertilizer Urea	600
Interculturing/Earthing	800
Protection ruling	800
Pruning of Date trees	800
Pollen & Pollination charges (Rs. 150/plant)	12,000
Manual cleaning of bunches(Rs 20/plant)	1,600
Picking of ripened fruit (Rs 10/plant x 3 times)	2,400
Fruit Harvesting (Rs 10/plant)	800
Transportation charges upto processing unit	4,000
Ringulet chemical	8,400
Fire woods (Preparation of Dry Dates)	2,000
Mats	2,500
Labor charges (Preparation of Dry dates)	2,700
Wooden Crates	1,500
Transportation of Dry dates to market	1,000
Labour charged (loading, unloading)	600
Revenue charges	1,050
	55,050

Benefit Analysis of Date Production (Per Acre)

Commodity	Rate Rs./Kg	Amount (Rs.)
Sale of Chhohara 2,080 kg A grade	40.00	83,200
Sale of Chhohara 600 kg B grade	17.50	10,500
Dates (Dried) 720kg A grade	45.00	32,400
Total Income		132,100
Total Expenditure		44,500
Net Income		87,600

4.5 Market Value Chain of Date Palm

The dates value chain refers to the outlets or routes through which dates pass to reach the final consumers. The existing dates value chain is presented Figures 4.2.



4.6 Constraints / Issues

After deliberation with relevant individuals, focus group discussions and one-day stakeholder workshop, following constraints and issues were identified at each level of value chain of dates fruit:

Input Supplier Constraints

- High rates and non availability of fertilizer at the time of demand
- Adulteration in fertilizer and pesticides
- Imposed supply of other fertilizers by the manufacturers without demand.

Grower Constraints

- Suckers are not available in required quality and quantity at required time
- High cost of suckers at the time of planting
- High cost of Agriculture inputs like pesticides and ringulate
- High cost of processing material for making *Chohara* i.e. Fire wood, matt, ringlet, goony bags, and wooden crates
- Low prices to producers by contractor and commission agents
- Fruit losses due to heavy rains during maturity time
- Late payment by contractors/commission agents
- High rate of mark-up by-commission agent
- Monopoly of commission agent in date palm (*Mandi*) market
- Unavailability of soft credit facility
- No insurance policy for date crop.



Contractor Constraints

- Non availability of soft credit
- Growers do not honor the agreement
- Fruit losses due to rains
- Non-availability of improved and efficient harvesting technology.

Commission Agent Constraints

- Unavailability of cold storage
- Poor market Intelligence system

- Uniform date fruit not producing by growers
- Non-existence of commercial bank in the market premises
- Poor market Infrastructure
- Export processing zone established but not functional
- Unfriendly government export policy
- No access to other international markets except India and Bangladesh
- Unavailability of dry port for cargo service
- Unavailability of post harvest management on scientific basis.



Processor/Exporter Constraints

- Non availability of Cool chain facility
- High rate and irregular supply of electricity
- Non- availability of specialized grading and washing machinery
- Lack of soft credit facility from commercial banks for establishment of new processing industries
- Non-availability of local packing industry.

4.7 SWOT Analysis

Strengths, weaknesses, opportunities and threat analysis has been made in dates fruit of Sindh

1. Strengths

- Climate favorable
- Commercial varieties are available
- Availability of indigenous and improved production and post harvest management knowledge
- Area under dates are increasing
- Supply chain service providers are available
- Public sector research and extension organizations exist
- Presence of active NGOs and mobilized community
- Offers value addition
- Drought tolerant

2. Weaknesses

- Non-availability of quality inputs on subsidized rates
- Poor market intelligence
- Non-availability of soft credit line
- Lack of technical know how
- Weak public sector research and extension organizations
- Weak national and international projection
- Poor coordination between stakeholders and role players
- Poor post harvest management and value addition techniques
- Unavailability of short duration varieties
- Non-existence of cooperative marketing system
- Adulteration in agriculture inputs
- No local packaging industry
- Unfriendly government export policies
- Non- availability of cool chain facility



3. Opportunities

- Potential of vertical & horizontal expansion exists
- Investment opportunities by private sector (cold storage, processing, drying & packaging industry etc.)
- Export can be increased through capacity building of growers, cottage industry & processors
- Variety development and rapid multiplication through bio-technology
- Group action of small farmers through cooperatives
- Soft credit by commercial Banks and financial institutions
- Export increase through organic certification, HACCP, ISO, Global GAP etc.

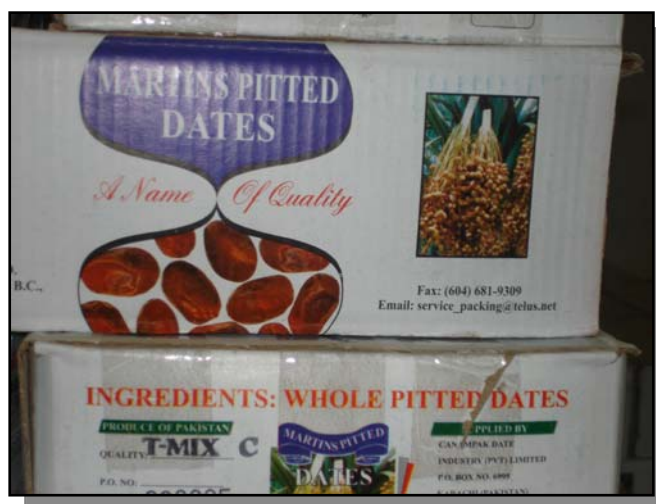
4. Threats

- Insect, pest and diseases
- Rains at the time of maturity
- Monoculture of Aseel variety
- India main importer of Pakistani *Chhohra*
- Non-hygienic practices from harvesting up to export
- Depletion of germ plasma
- Indiscriminate use of pesticides
- Intercropping of crops having high water requirements.

4.8 Recommendations

The pertinent stakeholders during the workshop, individual meetings and focus group discussions recommended that:

- Capacity building of growers, cottage industry personnel, processors and exporters
- Provision of true to type suckers through tissue culture technology on affordable rates
- Soft credit line for growers, cottage industry personnel processors and exporters
- Up gradation of date palm research station Kotdeji into full-fledged date palm research institute
- Cold storage facility in potential areas
- Quality agricultural inputs (Fertilizer, pesticide, ringlet) on subsidize rates
- Provision of boilers and driers on subsidies rates to the farming community
- Strengthening of existing Agriculture Extension Department
- Government should devise export friendly policies
- One window operation, soft credit facilities from financial institutions.



4.9 Proposed Interventions for Dates Fruit

Problems	Solutions	Existing Facilities
Non-availability of true to type planting material	Rapid multiplication of planting material through tissue culture.	Tissue culture laboratory in DPRI, SALU established.
Un-availability of quality agriculture inputs on reasonable rates	<ul style="list-style-type: none"> • Govt. may provide quality inputs on subsidized rates • Quality control system may be strengthen • Govt. should control the abrupt price hike of agriculture inputs 	<ul style="list-style-type: none"> • Provincial Agriculture Extension Department • District Govt. • Plant Protection Department
Pest attack/sudden death of date palm trees	<ul style="list-style-type: none"> • Agriculture Research & Extension Departments may be strengthened • Platform of NGOs may be used for awareness creation in farming community. • IPM approach through FFS may be encouraged 	<ul style="list-style-type: none"> • DPRS • Agriculture Extension Department • National IPM Program • NGOs
Lack of Pre and Post Harvesting technology	<ul style="list-style-type: none"> • R&D in pre and post harvest technologies • Capacity Building of Researchers 	<ul style="list-style-type: none"> • DPRS • DPRI • Agriculture Extension

	and Extension experts from international organizations <ul style="list-style-type: none"> • Effective transmission of existing pre and post harvesting technologies to the farming communities 	Department <ul style="list-style-type: none"> • NGOs
Non-availability of standardized technology & improved processing infrastructure	<ul style="list-style-type: none"> • R&D in Date processing • R&D in designing and fabrication of processing infrastructure i.e. Dryers, Tunnels, Graders, Boilers etc. 	<ul style="list-style-type: none"> • Cottage processing industry • Medium size date processing factories
Non-availability of short term soft credit	<ul style="list-style-type: none"> • Govt. may devise a policy for short term soft credit • NGOs may be encouraged for Micro Credit to dates growers. 	<ul style="list-style-type: none"> • Commercial Banks • NGOs
Un-availability of cool chain facilities	<ul style="list-style-type: none"> • Establishment of cool chain facilities in production and processing areas on public private basis. • Establishment of cool chain facilities in production and processing areas by private sector. 	--

4.10 Stakeholders Contacted

Number of various stakeholders met mostly in Khairpur district to gather information is presented in the following table:

Stake holder	Number of stakeholder Visited
Research scientists	7
Agriculture Extension Workers	9
NGO working on date palm at Khairpur	4
Input Supplier	12
Growers focal group Discussion	3
Individual Growers	43
Contractor	13
Commission Agents	23
Cottage industry personnel	9
Exporter	5
Processing Industry	1

5. Mango

5.1 Introduction

The Mango (*Mangifera indica*) belongs to genus *Mangifera* and family *Anacardiaceae*. The Mango, because of its great utility occupies a pre-eminent place amongst the fruit crops grown in Pakistan and is known as king of fruits. Mango is good in all stages of growth. Young and unripe fruits, because of their acidic taste, are utilized for culinary purposes as well as for preparing pickles, chutney and aam choor. Ripe fruits are utilized in preparing squash, nectar, jam, custard powder, baby food and coffee.

The natural spread of Mango is limited to the Indo-Malaysian region, stretching from India to the Philippines and New Guinea in the east. Evidence based on morphological, phytogeographical, cytological, anatomical and pollen studies indicate that genus had its origin in the continental region of Burma, Thailand, Indo-China and Malay Peninsula.

Despite an enormous wealth of Mango cultivars available in the country and ideal cultivar is lacking. Most of the present-day cultivars have been selected for characters like fruit size, quality and period of maturity.

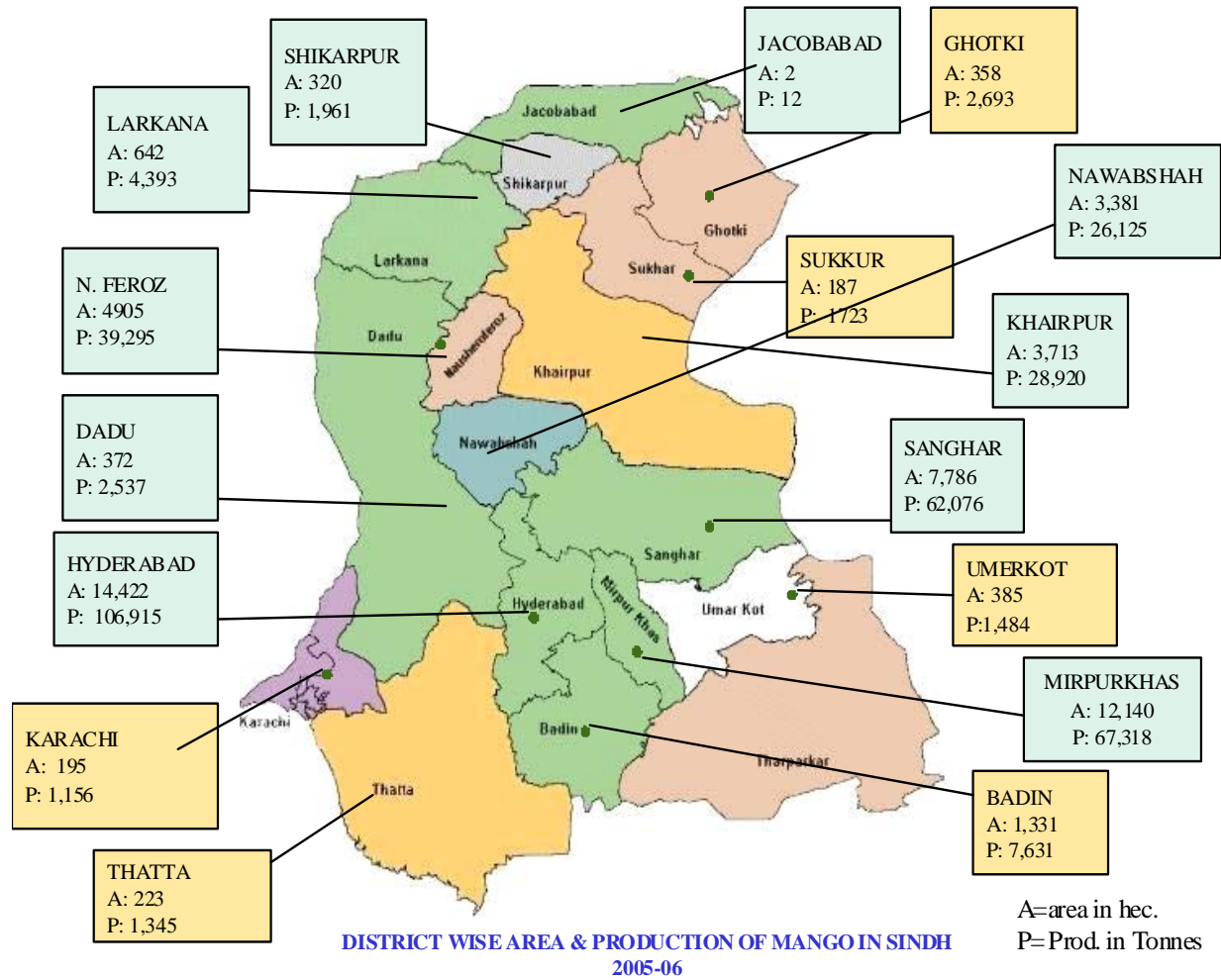
Most important characters like dwarfness, regularity of bearing and resistance to pest and diseases remain unselected. These characters are of vital importance for making the best use of our shrinking land, resources, reducing the cost of cultivation and for improving the productivity per unit area.

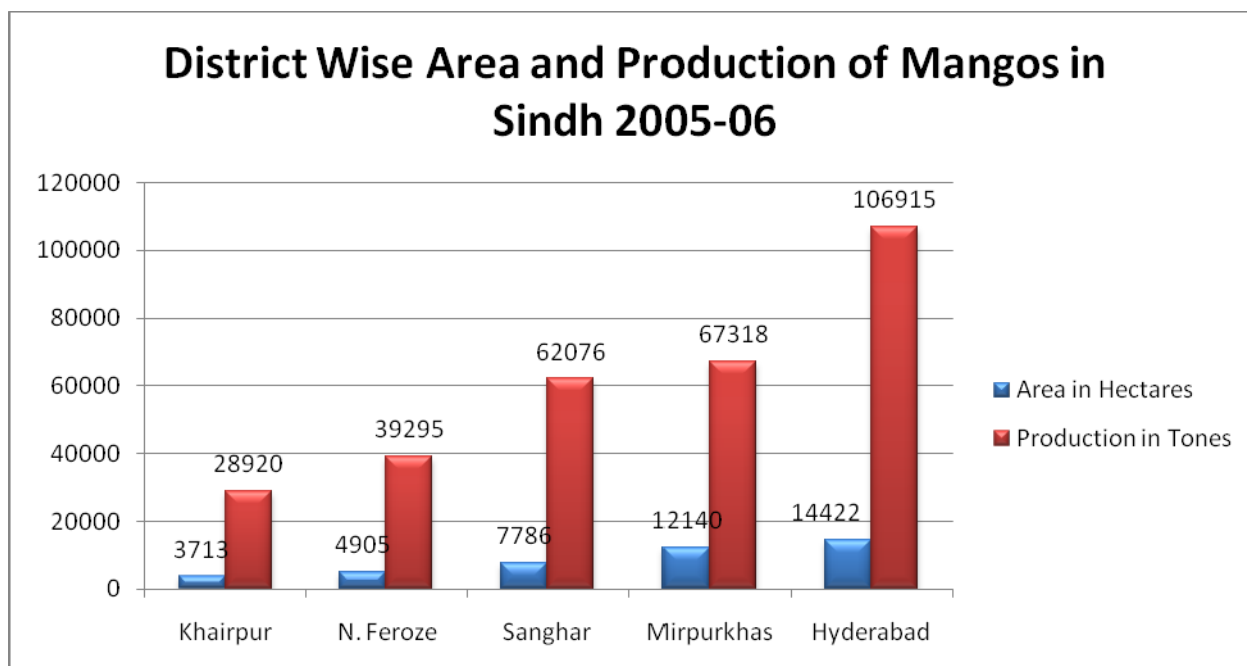
5.2 Area and Production of Mango in Sindh

Fig. 5.1 indicates the Mango area and production in various districts of Sindh province of Pakistan. The data have been gathered from the Ministry of Food, Agriculture & Livestock, Government of Pakistan, 2005-06.



Fig. 5.1 Area and Production Map of Mango in Sindh





5.3 Production Cost of Mango

The cost of production for mango crop was assessed through interviewing five growers in the field. Table 5.1 presents the cost of producing mango:

Activity	Amount Rs. per acre
Plowing 4 times	1,600
Levelling	400
Pruning	700
Farm Yard Manure	7,500
Fertilizer	3,750
Alternate Irrigation (tubewell)	1,000
Spray	4,000
Interculturing	900
Total	19,850

5.4 Mango Varieties

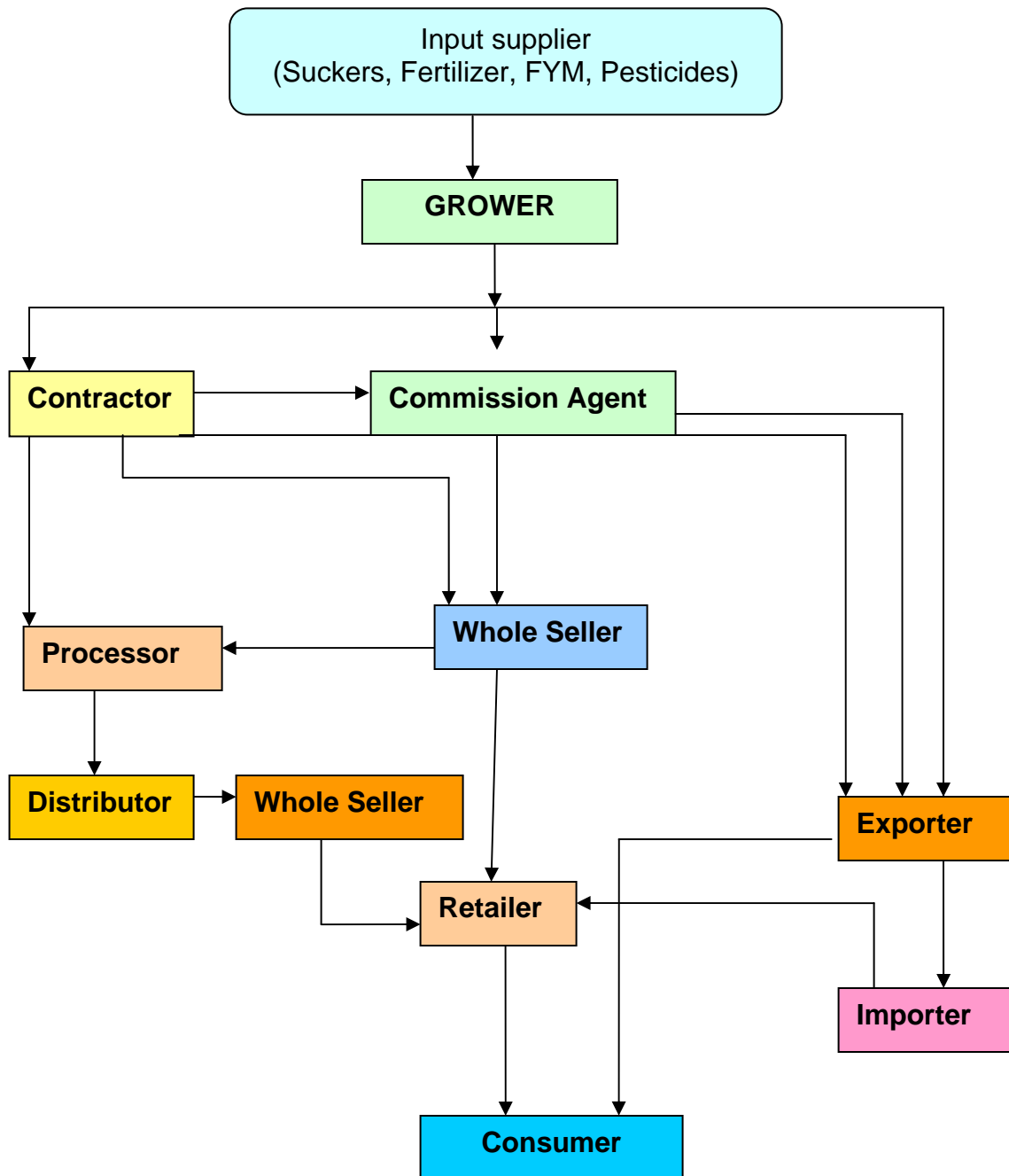
The commercial varieties of Sindh mango are:

- Almas
- Duseri
- Siroli
- Langra
- Sindhri
- Chaunsa
- Sawana rika
- Began pali
- Fajri
- Neelam
- Anwar ratol



5.5 Market Value Chain

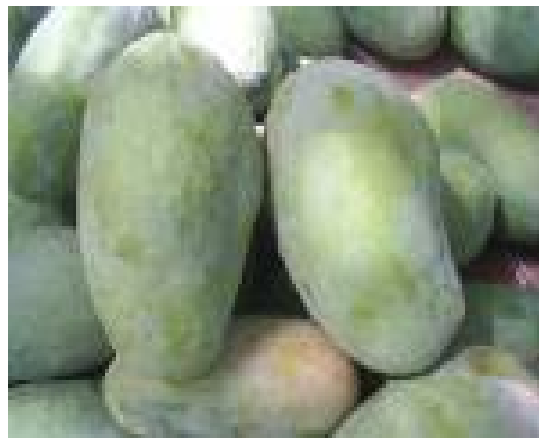
The mango value chain refers to the outlets or routes through which mango fruit pass to reach the final consumers. The existing mango value chain is presented Figures 5.2.



5.6 Constraints

After deliberation with relevant individuals, focus group discussions and one-day stakeholder workshop, following constraints and issues were identified in mango crop:

- Severe shortage of irrigation water
- High prices of inputs
- Poor nursery management.
- Inappropriate post harvest handling
- Farmers are not familiar with proper and timely farm activities
- Sudden decline disease is still problem
- About 95% orchards are leased out before flowering
- Lack of knowledge about post harvest technologies.



5.7 SWOT Analysis

Strengths, weaknesses, opportunities and threat analysis has been made in mango fruit of Sindh

1. Strengths

- Favorable climatic conditions for production of mango
- Mango orchards of Sindh are of larger size
- Proximity of mango orchard of Sindh to sea as well as airport
- The quality and shelf life of Sindhri variety is better
- In export market **sindhri** variety is preferred, as it has less content of sugar and fiber.

2. Weaknesses

- Poor nursery management
- Poor management practices
- Low/inconsistent yield/quality
- Limited time window
- Inappropriate post harvest handling
- Branding.

3. Opportunities

- Application of GAP
- Improvement in quality and quantity
- Promotion of mango based industry
- Introduction of new and improved mango varieties having longer shelf life
- Adoption of certification system (Global GAP)
- Training of farmers in orchard management.

4. Threats

- Severe shortage of irrigation water
- Pest infestation (fruit flies)
- Traceability
- Quality management (GAP, GMP)
- Quality Assurance (Global GAP, HACCP)
- Sap burn
- Quick decline
- T.B.T issues (packaging & labeling).



5.8 Recommendations

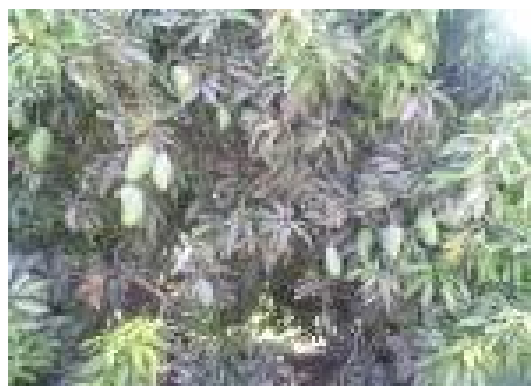
The relevant stakeholders during the workshop, individual meetings and focus group discussions recommended that:

- Clusters of Mango growers may be formed on Taluka level from 15 to 50 acres of orchards
- Financial assistance may be given to Mango growers for their input expenses
- Mango farmers may be trained for pre-harvest management practices to ensure quality and quantity as GAP
- Mango farmers may be facilitated for insect pest and disease management techniques
- Special trainings may be arranged for post-harvest technologies to the mango growers with FBS
- Mango fruit fly management/ control facility may be provided to the farmers at their orchards
- Linkages/ co-ordinations may be developed between growers and exporters
- Mango grower associations may be formed
- Orchard insurance policy procedure may be adopted
- Expand the time window by introducing high yielding, early maturing and having good keeping quality germ plasm.
- Certified nursery stock should be developed.

5.9 Proposed Interventions

After deliberations, it has been observed that following potential interventions are possible under ASF program:

- Organic farming be popularized
- Training for nursery men
- Availability of quality root stock/ scion
- Strengthening of production technology
- Training of farmers in pre and post harvest technology
- Introduction of modern harvesting tools
- Field heat removal
- Sorting, grading and on-farm packing
- On-farm storage



5.10 Stakeholder Contacted

Table 5.3 describes the names, and places where the team held meetings and focus group discussion with various stakeholders to collect the data.

S #	Name	Occupation	Education	Area in acres	Location
01	Bashir Ahmed Nizamani	Grower	Graduate	35	Talhar.
02	Sher Ali Shah	Grower & contractor.	Matric.	50	Tando Jam.
03	Akbar Ali Shah	Grower & Contractor.	Matric.	55	Tando Jam.
04	Roshan Ali Shah	Grower	Graduate.	50	Tando Qaisar.
04	Hanif Khanzada	Grower	Homeopathic Doctor	15	Tando Allahayar
05	Mehmood Nawaz Shah	Grower.	Graduate.	160	Tando Allahyar.
06	Hameed Baloch.	Grower	Masters.	35	Tando Adam.
07	Muhammad Anwar Goondal	Grower	Intermediate.	150	Sindhri. Mirpurkhas.
08	Muhammad Irfan Sheikh.	Grower.	Graduate.	87	Mirpurkhas.
09	Sher Mehmood Rajpoot	Grower	Matric.	18	Mirpurkhas.
10	Allah Bachayo Rajar.	Grower.	Graduate.	15	Mirpurkhas.
11	Karamat Ali	Nurseryman	Masters.	-	Mirpurkhas.

12	Ghafoor Lashari.	Nurseryman	Middle.	-	Mirpurkhas.
13	A. Rasheed Qureshi.	Commission agent.	-	-	Mirpurkhas.
14	Abrar Khan	Commission agent.	-	-	Mirpurkhas.
15	Haji Tayab.	Commission agent.	-	-	Mirpurkhas.
16	Masha Allah	Commission agent.	-	-	Hyderabad
17	Haji Saeed	Commission agent.	-	-	Hyderabad
18	Barkat Ali & Asghar Ali.	Commission agent.	-	-	Hyderabad
19	Shaukat Ali	Commission agent.	-	-	Hyderabad
20	Mohammad Din & M. Shareef.	Commission agent & Exporter.	-	-	Karachi.
21	Bilawal.	Commission agent & Exporter.	-	-	Karachi.
22	A.Q. Khan Durrani.	Exporter & Processor.	-	-	Karachi.
23	Mohammad Irfan Butt.	Exporter & supplier.	-	-	Karachi
24	Khalid Aijaz Qureshi.	Exporter.	-	-	Karachi
25	Khameso Khan	Contractor.	-	-	Karachi

6. Guava Fruit

6.1 Introduction

Guava is native of tropical America though widely grown in Pakistan and India, in the tropics and sub tropics. A very common fruit, popular among the rich and the poor due to its moderate price, nourishing value aroma and good taste. The fruit is rich in vitamin C and also having sufficient amounts of iron, phosphorus calcium and potassium. About 50% of Guava is grown Larkana district of Sindh province, whereas the rest is grown in other districts of Sindh.

Larkana district spread over an area of 1,890.23 square kilometers, with a land of 466,887 acres, lies in north latitudes 27-16°, with a roughly octagonal shape. The district bounded in north by Baluchistan Province, Shikarpur and Khairpur in the east while Dadu is situated in the south and the west is bounded by Khirthar range. Geographically, the district is divided into three parts viz. the kohistan tract, central canal irrigation tract and the eastern tract. The total population of Larkana is 1.1 million divided into four tehsils namely Ratodero 26%, Larkana 42%, Bakrani and Dokri 32%.

The entire area of this district is protected by bounds and is irrigated by a network of canals viz, the rice canal, dadu canal, warah canal, khirthar canal and saifullah magsi canal. The total irrigated area is 870,127 acres. The total area under forest is about 25,532 hectares.

The district has extreme climate in summer which is hot and moderate in winter. The mean maximum and minimum temperature in summer is approximately 51°C and 33°C while that of the winter season 21°C and 8°C respectively. The average annual rainfall is about 100 to 125 millimeters per year.

6.2 Varieties and Fruiting Trends of Guava

Following 12 varieties of guava are grown in Larkana:

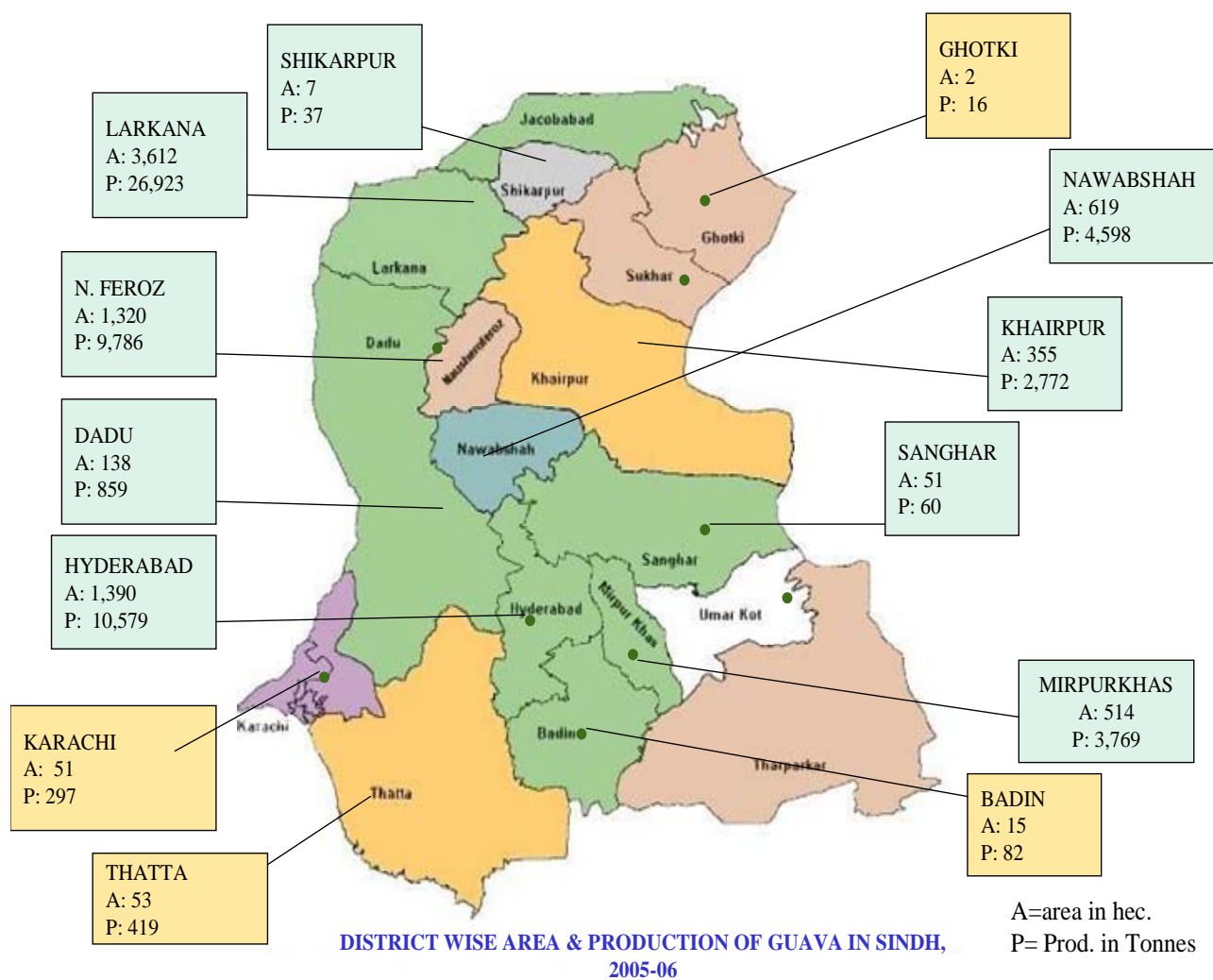
1. Thadarami
2. Ramzani
3. Riali
4. Benazir (golden guava)
5. Indian
6. Gulabi
7. Seedless
8. Karila
9. Malta, Gola, Shimla (Allahabadi)
10. local sindhi
11. Sufaida
12. Thai

Guava gives 2 times fruiting in a year, 1st from 15th of October to 15th of April (6 months spread of production), and 2nd from 5th of Jun to 5th of August (3 months spread of production). The guava produced from 15th of October to 11th of November is just for local consumption because of less early production, and the entire 2nd produce is locally consumed because of severe hot weather and less shelf life. While it is also pertinent to say that the 2nd produce is very much destroyed by fruit fly attack.

6.3 Area and Production of Guava in Sindh

Fig. 6.1 indicates the Guava area and production in various districts of Sindh province of Pakistan. The data have been gathered from the Ministry of Food, Agriculture & Livestock, Government of Pakistan.

Fig. 6.1 Area and Production of Guava various districts of Sindh province



6.4 Cost of Production

Table 6.1 presents total cost of production of Guava fruit.

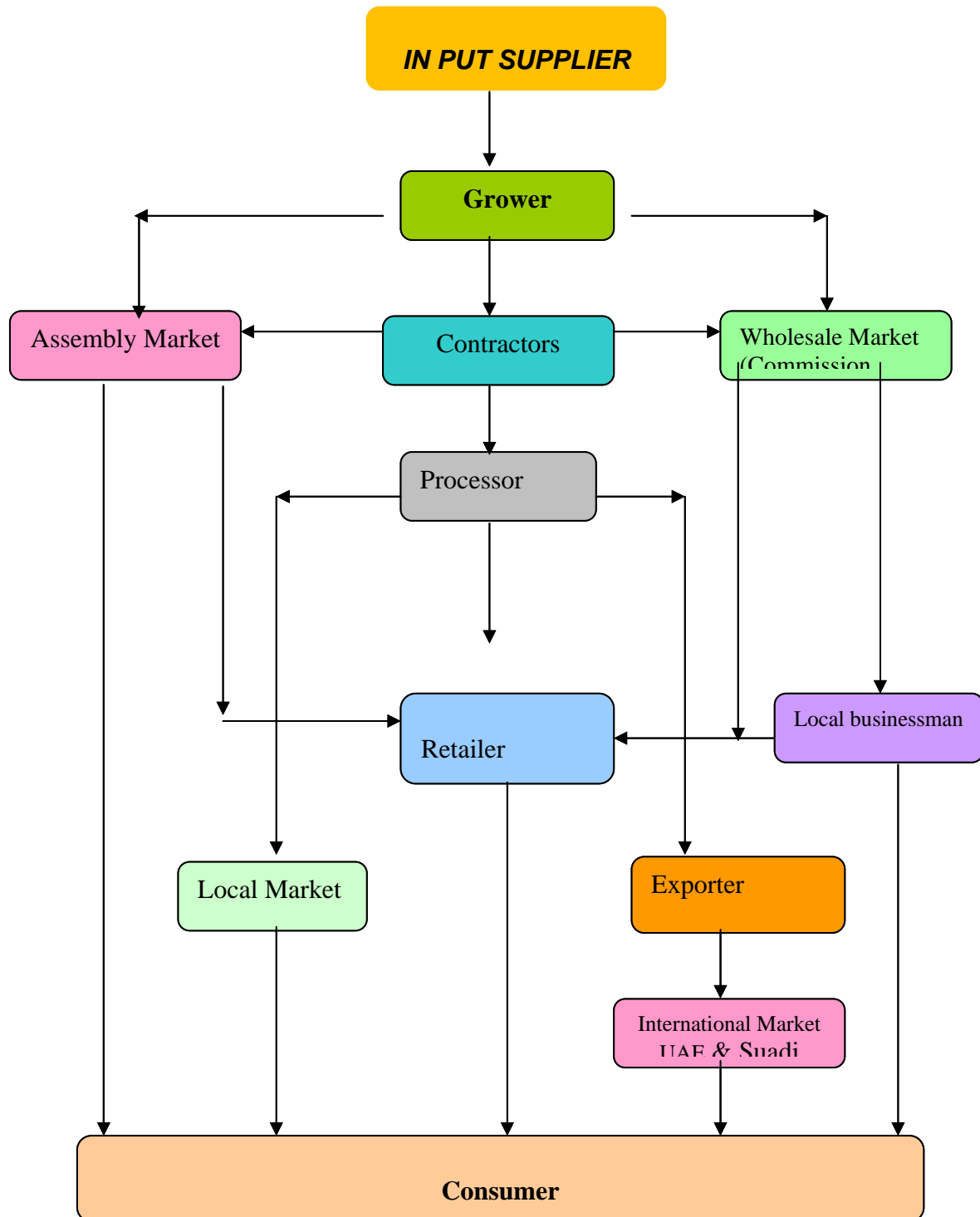
Table 6.1: Average Cost of Production of Guava

Cost Component	Amount (Rs./Acre)
Land Preparation	5,000
Nursery to Orchard Expenditures	12,250
Inputs	
DAP (1 Bag Per Acre)	2,800
Farm Yard Manure	1,000
Labor Charges	3,500
Pesticides	2,400
Harvesting	3,500
Packaging	8,000
Loading And Unloading	1,500
Transportation Upto Local Market	5,000
Total Expenditures	44,950



6.5 Market Value Chain

The guava value chain refers to the outlets or routes through which guava pass to reach the final consumers. The existing guava value chain is presented Figures 3.2.



6.6 Constraints

During the individual meetings, focus group discussions and one-day stakeholder workshop made it possible to identify the following constraints of guava crop:

- Fruit fly
- Non availability of disease free plants
- High cost of fertilizers and pesticides

6.7 SWOT Analysis

Strengths, weaknesses, opportunities and threat analysis have been conducted for guava fruit crop in Sindh:

1. Strengths

- Increasing trends in production
- Cooperative nature of the growers
- Interest in new varieties of guava plantation
- Huge range of byproducts in the market
- Huge guava export potential not explored yet (only 2% is exported now)
- Increase in returns can be achieved by improving packing
- Can be grown in high PH



2. Weaknesses

- Low shelf life
- Lack of certified nurseries
- Lack of certified fruit plants
- Severe attack of fruit fly
- Proper packaging is not available at reasonable price
- Ignorance in the growers regarding safe use of pesticides
- Ignorance in the growers regarding safe use of fertilizers
- Propagation of plants through seeds.

3. Opportunities

- Shelf life can be increased through research
- Research can introduce good quality of fruit
- By the control of fruit fly attack, summer crop can give good returns
- By the introduction of cool chain huge export potential can be explored
- Grading and packing can increase growers returns.

4. Threats

- PH of the soil is high
- Majority of the mature orchards are not pruned
- Anthracnose disease can destroy old orchards.

6.8 Recommendations

The relevant stakeholders during the workshop, individual meetings and focus group discussions recommended that:

- Cool water treatment to reduce farm heat from Guava
- Introduction of surface microbe removal chemicals
- Fruit fly traps at reasonable price
- Enabling environment for investment in corrugated cartons
- Certified improved varieties
- Ban on DAP fertilizer because of high PH of the soil.



6.9 Proposed Interventions

After deliberations, it has been observed that following potential interventions are possible under ASF program:

- Skill development training regarding Guava picking and its packing
- Capacity building in pruning techniques and equipments
- Processing plant
- CA house
- Strengthening and capacity building of Guava Research Station
- Nursery proposal
- Private extension services
- Processing industry for Guava

6.10 Stakeholders Contacted

The stakeholders were interviewed by the team through individual meetings and focus group discussions are listed below to gather the information on Guava:

S#	Stakeholder	Place	Number of Persons
1	Growers	Larkana	30
2	Contractors	Larkana	06
3	Pesticide and Fertilizer suppliers	Larkana	08
4	Commission Agents	Larkana	04
5	Exporter	Karachi (through telephone)	01
6	Nursery Owner	Larakan	01

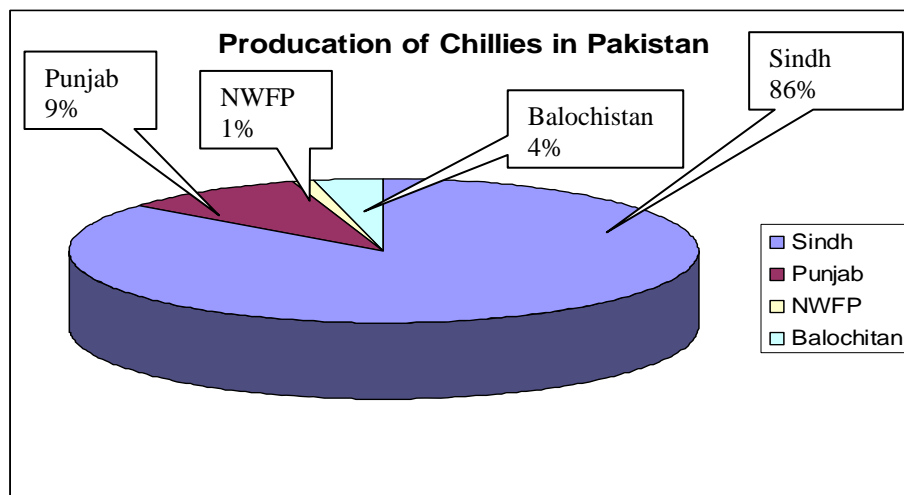
7. Chillies Crop

7.1 An Introduction

Chillies originated in the Latin American regions of New Mexico and are known from prehistoric remains in Peru and were widely cultivated in central and south America. These were totally unknown to Europe even before discovery of America. It is said that Columbus carried seeds to Spain in 1493 and from there the cultivation of Chillies spread rapidly in rest of the parts of Europe.

In Indo-Pak sub-continent, most probably chillies were introduced by Portuguese in the middle of 17th century, where some types established so promptly that some of the early botanists believe that chillies had their origin from the east.

At present chillies are being cultivated in different parts of Pakistan. However, in Sindh both red and green chillies are being cultivated on large scale. The share of Sindh in chillies production is about 86% of the whole country production (Fig.7.1)³. Umerkot district of Sindh is the major producing area of Red Chillies, which contributes major part and biggest Asian chilli market also exist in the area.



7.2 Economic Importance and Climate

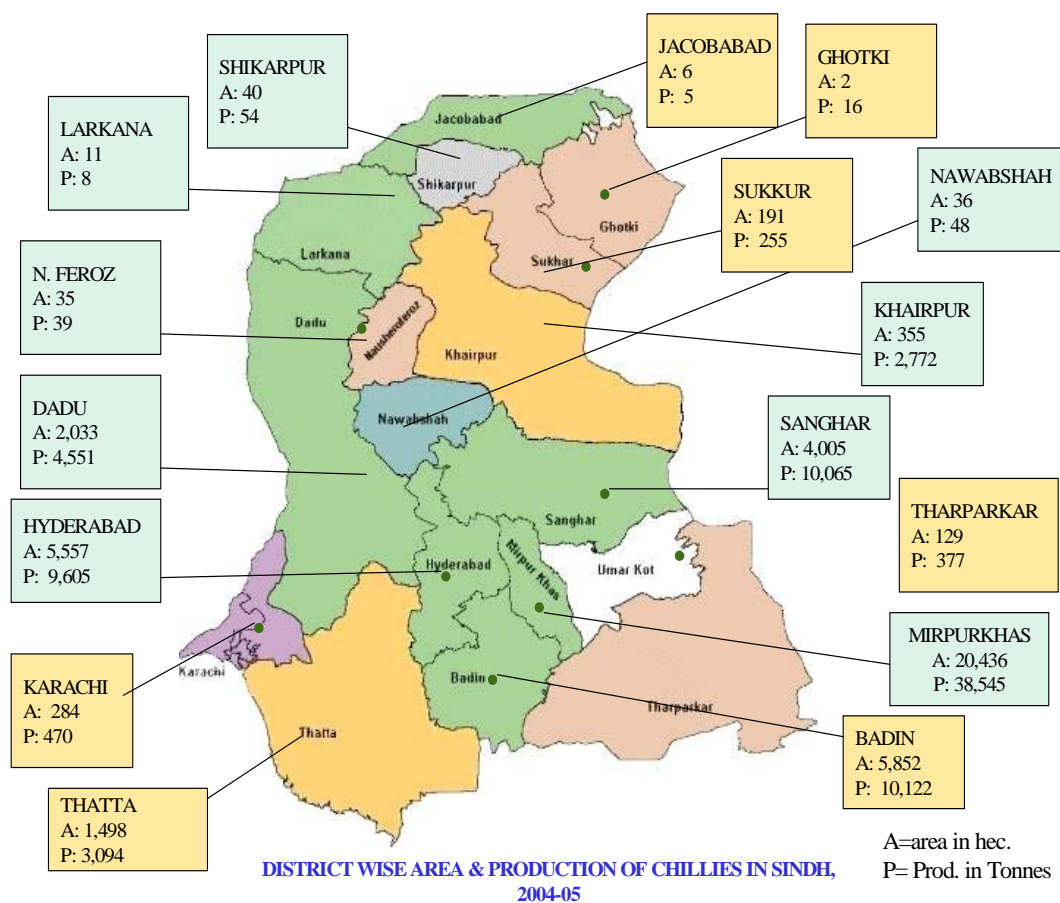
Chilli is an important source of Vitamin A, B and C it also contains an appreciable amount of Calcium, Phosphorus and iron besides having medicinal value and integral part of food and beverages. Chilli is a warm weather crop requiring high temperature for its growth and development. It is sensitive to cold and wet weather conditions.

7.3 Area and Production Map of Chillies in Sindh

Fig. 7.1 indicates the Chillies area and production in various districts of Sindh province of Pakistan. The data have been gathered from the Ministry of Food, Agriculture & Livestock, Government of Pakistan, 2004-05.

³ Source: Ministry of Food, Agriculture and Livestock, Government of Pakistan, 2004-05

Fig. 7.1 Area and Production Map of Chillies in Sindh



7.4 Area and Production of Chillies in Sindh

Area and production of chillies in Sindh are presented in table 7.1

Table 7.1 Chillies Area and Production in Sindh

Area (in 000 hectares)			Production (in 000 tons)		
2002-03	2003-04	2004-05	2002-03	2003-04	2004-05
47.4	46.9	40.5	84.5	82.2	77.7

Source: Development Statistics of Sindh 2006, Bureau of Statistics, Government of Sindh.

Export Data

Table 7.2 presents the export quantity and earned value of chillies.

Table 7.2 Export and Value

	2003-2004		2004-2005		2005-2006	
	Quantity (in KGs)	Value (In 000 Rs.)	Quantity (in KGs)	Value (In 000 Rs.)	Quantity (in KGs)	Value (In 000 Rs.)
Red Chillies (Whole)	2,413,188	110,548	1,730,581	96,287	5,315,439	238,198
Red Chillies (Powder)	1,362,032	10,854	1,237,587	96,037	2,073,049	134,126

7.5 Cost of Production

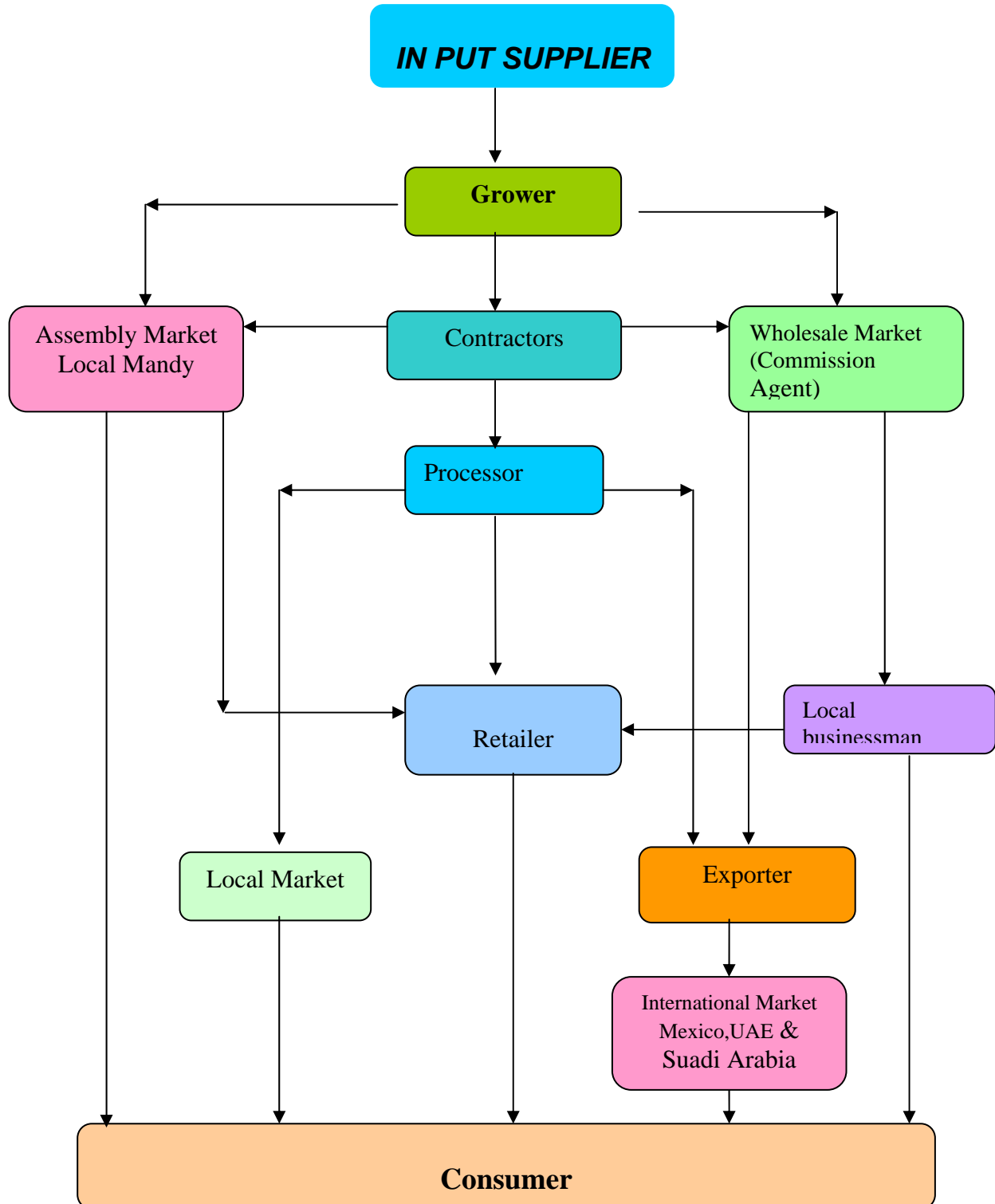
The cost of production (per acre) has been assessed by interviewing several growers in Umerkot district. It is presented in table 7.3.

Table 7.3 Chillies Cost of Production

COST COMPONENT	Amount (Rs./acre)
LAND PREPARATION	
Disc Plough	1,000
Chiesel Plough	500
Land Leveling	500
Cultivator	500
Ridges Making	500
SOWING	
Nursery raising	1,000
INPUTS (FERTILIZERS AND PESTICIDES)	
DAP (1.5 bags)	4,200
SOP (1 bag)	2,700
Sever (1 packet)	400
Urea (6 bags)	3,900
Keurakeran (Pesticide)	1,650
Polo (1 liter)	2,200
Amenda (4 packets)	1,400
Score (2 liters)	1,600
PICKING	
Labor Charges Rs.100/ Maund (wet) 100 mds per acre	10,000
Packing and Loading (dry chillies) Rs.30/Md, 30 mds per acre	900
Market (Commission agent) (Rs.6,000/ per one hundred thousand rupees)	6,000
Total average expenses per acre	38,950

7.6 Value Chain of Chillies

The chillies value chain refers to the outlets or routes through which chillies pass to reach the final consumers. The existing chillies value chain is presented Fig. 7.2.



7.7 Constraints

The constraints in chillies crop has been identified through deliberation with relevant individuals, focus group discussions and one-day stakeholder workshop. These have been presented below:

- Insects, Pests & Diseases
 - Bud mite
 - Aphid and Jassid
 - American Boll work
 - Powdery Mildew
- Poor infrastructure
- Poorly managed market
- No drying facilities
- Non existence of direct export system
- Non compliance of certification systems
- Non availability of cold storage facilities
- Shortage of irrigation water
- Injudicious distribution of irrigation water
- High cost of inputs
- No soil testing facilities

7.8 SWOT Analysis of Chillies Crop

Strengths, weaknesses, opportunities and threat analysis has been made in chillies crop of Sindh:

1. Strengths

- Favorable soil and climatic conditions
- High demand
- Motivated growers
- Presence of Government Research and Extension Departments
- Existence of input suppliers in the area
- Availability of seasonal labor

2. Weaknesses

- Non availability of in-time irrigation water
- High cost of inputs (fertilizer and pesticide etc)
- Non availability of Aflatoxin resistant varieties
- Non availability of skilled labor
- Non availability of soft term credit facilities
- High risk of pest and diseases

3. Opportunities

- Strengthening of existing Government Chili Research Station, Kunri
- Capacity building of Government Extension workers, growers and farm labor
- Restructuring of existing market with the facilities of direct export

- Establishment of processing units within production area
- Establishment of common drying facilities at farm level
- Adoption of certification systems
- Establishment of cold storage facilities
- Strengthening of existing Chillies Growers' Association (CGA)

4. Threats

- Irrigation water
- Rapid increasing inputs cost
- Deterioration of existing high value chilli varieties
- Increasing level of aflatoxin due to poor management practices
- Decreasing trend of Export due to non compliance of Certification Systems.

7.9 Recommendations

The pertinent stakeholders during the workshop, individual meetings and focus group discussions recommended that:

Irrigation Water

- Improvement of existing irrigation facilities
- Improvement of water distribution system through legislation
- Provision of laser leveling and modern irrigation systems i.e. drip and sprinkle irrigation system
- Establishment of small and medium reservoirs
- Social mobilization for judicious water distribution and management.

Quality Seed

- Strengthening of existing Chilli Research Station Kunri for the production of quality seed
- Capacity building of Government. Extension workers, growers and farm labor.

High Cost of Inputs

- Provision of soft credit facilities
- Establishment of quality & price control systems
- Provision of Subsidies.

Decreasing Trend of Export

- Capacity building of all stakeholders (farm workers /growers, associations, BDSPs and Extension Workers)
- Encourage certification systems
- Establishment of cold storage and drying facilities
- Establishment of processing units within the production area
- Establishment of quality testing facilities
- Improvement of farm to market roads

7.10 Proposed Interventions

After deliberations, it has been observed that following potential interventions are possible under ASF program:

- Capacity building of contract growers and farm workers
- Hiring services of technical experts for nursery raising to produce quality seedlings
- IPM coverage from sowing to harvesting
- Global GAP Certification of crop of contract growers
- Establishment of drying tunnel at growers' field to improve the existing drying systems
- Establishment of agriculture extension services in private sector
- Strengthening of chilli merchants association
- Strengthening of chilli growers association
- Establishment of drying tunnels with FEGs, Service Providers, Associations etc

7.11 Stakeholders Contacted

The stakeholders interviewed through individual meetings and focus group discussions are listed below:

S#	Stakeholder	Place	Number of Persons
1	Representatives of Government Agriculture Extension & Research Departments	Kunri, Umerkot	07
2	Growers (Small /Large)	Kunri, Umerkot	17
3	Input suppliers/BDSPs	Kunri, Umerkot	06
4	Elected Representative (Local government)	Umerkot	02
5	Farm workers and laborers	Kunri, Umerkot	05
6	Commission Agents	Kunri	03
7	Representatives of Mirch Mandi (Chillies Market) Association	Kunri	02
8	Processors	Karachi	04
9	Exporters	Karachi	02
10	Certifying Body Representatives	Karachi	04
11	Chilli Marchant /Wholesalers	Karachi	02

Annex – 1 Team Members

S#	Name	Designation	Organization
Banana Team			
1	Ali Muhammad Khushk	Agri Economist	Director TTI Tando Jam
2	Ghulam Mustafa Nagraj	Information Officer	Agriculture Extension Sindh, Hyderabad
3	Imtiaz Ahmed Cheema	Agribusiness Specialist Horticulture	Agribusiness Development and Diversification Project (MINFAL) Azad Jammu and Kashmir
4	Aslam Parvez	Deputy District Officer	Agriculture Extension Matiary
5	Abdul Karim Gandahi	Program Officer	SRSP Nawabshah
6	Raza Muhammad	Social Organizer	SAFWCO Bhitshah
Dates Team			
7	Mr. Mohd Usman Shar	Deputy Director	Agriculture Research Tandojam
8	Mr. Abdul Khabir		
9	Mr. Ihsan-ul-Haq Kakar	Agribusiness Specialist Horticulture	Balochistan
10	Mr. Mohd Ayoob Solangi	Deputy District Officer	Agriculture Extension Khairpur
11	Mr. Mueenuddin Qureshi	Project Coordinator	SRSP Nawabshah
12	Mr. Qurban Ali Buriro	President	Khajji Cooperative Society Khairpur
13	Mr. Ikhtiar Khaskhelly	Managing Director	
Mango Team			
14	Mr. Qamar-u-Din Abbasi	Assistant Professor	Sindh Agriculture University, Tando Jam
15	Mr. Tajamal Hussain Nisar	Agribusiness Specialist Horticulture	Punjab
16	Mr. Abdul Malik Soomro	Project Coordinator	SAFWCO
17	Mr. Muneer Ahmed Shaikh	Rtd. Professor	Sindh Agriculture University, Tandojam
18	Sayed Zulfiquar Ali Razvi		Agriculture Extension, Mirpurkhas
19	Mr. Shafique Ahmed Memon	Program Officer Social Mobilization	SRSP, Nawabshah
20	Mr. Rai Chand	Program Officer Social Mobilization	SRSP, Kunri
Guava Team			
21	Zerner M. Newnton	Incharge	Guava Research Station Larkana
22	Abdul Latif Joyo	DDO Agriculture	Agriculture Extension Ratodero
23	Mehboob Ali Qadri	Program Officer	SRSP, Kunri
24	Muslim Shah	Agribusiness Specialist Horticulture	FATA
25	Imtiaz Ahmed	Agribusiness Specialist Horticulture	NWFP

Chillies Team			
26	Shoukat Arain	Research Officer Incharge	Chilli Research Station, Kunri
27	Lal Chand Mukwana	Agriculture Officer	Agriculture Extension, Matiari
28	Mehmood Asghar	Agribusiness Specialist Horticulture	FANA
29	Imtiaz Ali Laghari	Project Coordinator	SRSP Kunri
30	Abdul Majid	Agribusiness Specialist Horticulture	Sindh
31	Ghulam Serwar Dars	Honorary General Secretary	Red Chillies Grower Association Kunri
Monitoring Team			
32	Asmatullah Khan	National Coordinator	ASF, Islamabad
33	Shad Muhammad	Advisor Farmer Enterprise	ASF, Lahore
34	Moula Bux Lund	Provincial Coordinator	ASF, Karachi
35	Dr. Yameen Memon	Trustee	SRSP, Hyderabad
Organizing Team			
36	Abdullah Khan	Enterprise Dev. Officer	ASF, Lahore
37	Akbar Dars	Program Manager	SRSP, Hyderabad