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SURVEY REPORT ON TECHNOLOGICAL & SOCIAL CONSTRAINTS OF BANANA PRODUCTION IN SIND, PAKISTAN, 2008

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KNOWLEDGE FOR LIFE

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Acknowledgement

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1.0 - Executive Summary

Banana is cultivated on 34.9 thousand hectares in Pakistan. More than 90% area under banana falls in Sind province, contributing 80% of the total production in the country. In Sind, Thatta and Khairpur districts occupy 50% of the banana cultivated area and contribute 52% of the total banana produced in Sind.

A survey was conducted by the CABI South Asia to find out the technological and social constraints of banana production in Sind. A total of 260 respondents were contacted to collect the information. The respondents were 60% farmers/land owners, 15% farm workers, 2% pre harvest contractors, 5.4% commission agents, 0.8% transporters, 3.8% inputs suppliers, 5.4% agriculture officers and 8.5% research officers. The data was collected through semi structured interviews and focused group discussions. The banana value chain stakeholders identified were inputs suppliers, farmers, farm workers, contractors, commission agents, wholesalers, retailers and consumers.

About 98% of the farmers were planting the dwarf cavendish variety known as “Basri” while 2% were planting William hybrid. Farmers had no access to healthy planting material as 90% of the farmers were using the planting material from their own plantation, 8% from the fellow farmers and 2% from the progressive growers, resulting in the spread of Banana Bunchy Top Virus (BBTV).

On the basis of survey findings, the farmers were classified in to three categories i.e. Small (<20 hectares), medium (20-40 hectares) and large (>40 hectares). Smallholders represent 90% of total banana growers in Sind. The average yield of surveyed banana smallholder was 37050kg/ha, while that of progressive grower 49400kg/ha. Moreover, during the year 2005-06, there was 6.24% decrease in banana production in Sind in spite of 8.34% increase in area (annex.2). According to the respondents this was due to the epidemic of Banana Bunchy Top Virus disease. However, no documented information was available on the losses due to BBTV disease.

While ranking the banana production constraints, around 52% of the farmers identified the BBTV as the priority issue followed by 30% lack of knowledge and skills in banana management and production, 10% non availability of healthy planting material and 6% shortage of irrigation water. More than 87% of the farmers planted banana in flat fields and applied flood irrigation at fortnightly basis without having information on crop water requirements, resulting in the

shortage of irrigation water during the crop season and affecting the soil heath through water logging and salinity. On the use of insecticides, 78% farmers sprayed confidor and tenakil, 5-6 applications in one crop season to control banana aphid. More than 93% of the farmers had no information about the role of beneficial insects in the banana ecosystem.

Farmer's access to knowledge and information for producing healthy planting material, planting techniques, crop stand establishment, weed management, irrigation and plant nutrition management, insect pests and disease management, harvest and post harvest management and marketing was poor, as 92% of the farmers never visited the agriculture extension office or horticulture research institute to get information for banana production.

Banana had a very short shelf life and about 100% of the farmers and contractors had no knowledge or skills of proper packing, and storage facilities to enhance the shelf life and shift their produce to markets in bulk using the open trucks that cause 8-10% loss through fruit damage during transportation. Marketing system was dominated by the contractors/commission agents and whole sellers. Buyers from the Punjab and NWFP play a key role in the marketing of Banana and 64% farmers and pre harvest contractors sell their produce at farm gate. Farmer's share in overall value added amount was 23%, contractor's 35% and whole seller's 42%.

The progressive growers were using the healthy/disease free planting material, bed/furrow planting techniques, proper plant spacing to get the good crop stand, balanced use of fertilizer and produced 12350 kg/ha more banana as compared to smallholders. By bridging this yield gap an additional 0.358 million tonnes banana can be produced annually from the existing land use under banana in Sind province.

This requires a comprehensive effort that integrates capacity building of the stakeholders in quality banana production, post harvest technologies and market interventions. This comprehensive effort will require a two pronged strategy aimed at capitalizing on existing resources to increase productivity, farm gate quality, capacity building of all value chain stakeholders, and facilitate efficient market linkages in the short term. While building the foundation of a strong sustainable banana production should be major part of a medium- term strategy.

The short term strategy must be based on:

A. Capacity building of the farming communities and the agriculture extension system to manage the BBTV and implementation of good agriculture practices for quality banana production.
B. Training of the public and private sector stakeholders to establish germ plasm units (GPU) to supply disease free (certified) planting material of banana.
C. Establishment of marketing information systems for the banana growers.

The medium term strategy for the development of banana production should consist of following elements;

A. Strengthening of the research system.
B. Innovations in extension services.

2.0 - Introduction

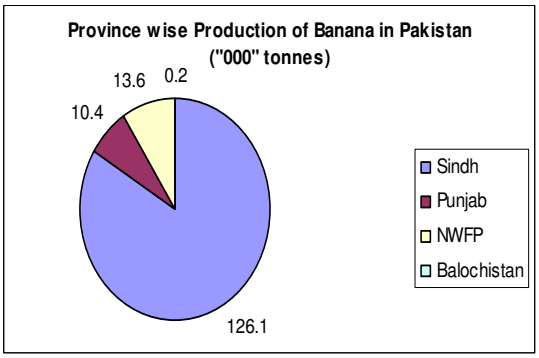
Banana is nutritious fruit and leads all other fruits in food value. It is rich in carbohydrates, minerals and vitamins. (Table- 1&2).

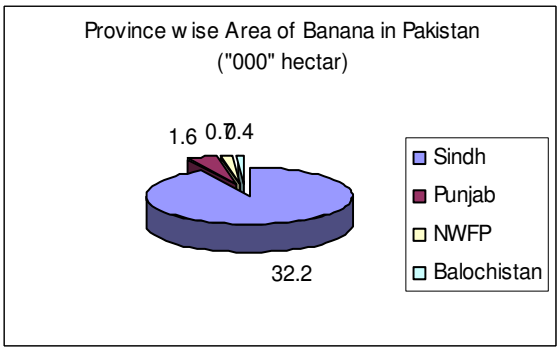
Table – 1 FOOD VALUE	
Moisture	70.1%
Protein	1.2%
Fat	0.3%
Minerals	0.8%
Fiber	0.4%
Carbohydrates	27.2%
	100%

Table – 2 MINERALS AND VITAMINS	
Calcium	17mg
Phosphorus	36mg
Iron	0.9mg
Vitamin C	7mg
Small amount of Vitamin B Complex	1.0%

Source: http://www.pediatriconcall.com/forpatients/DietandDisease/banana.asp

Banana occupies the 2nd ranking in fruits of Sindh province in Pakistan. It was cultivated on 32.2 thousand hectare, which is 92 % of the area under banana in Pakistan, producing 126 thousand tonnes, 80 % of total bananas produced in the country.

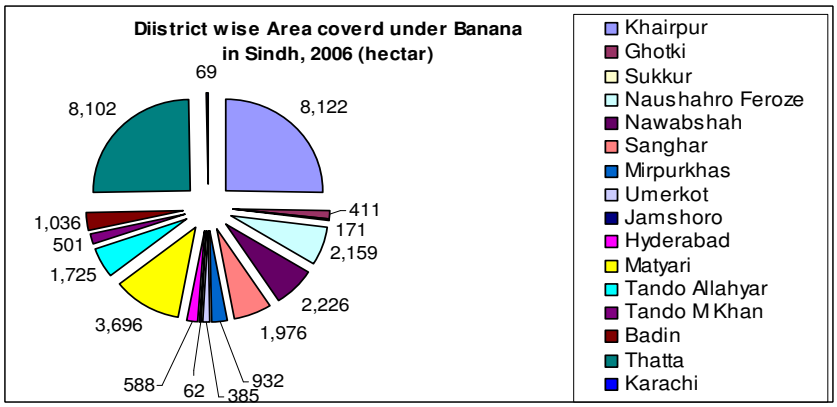




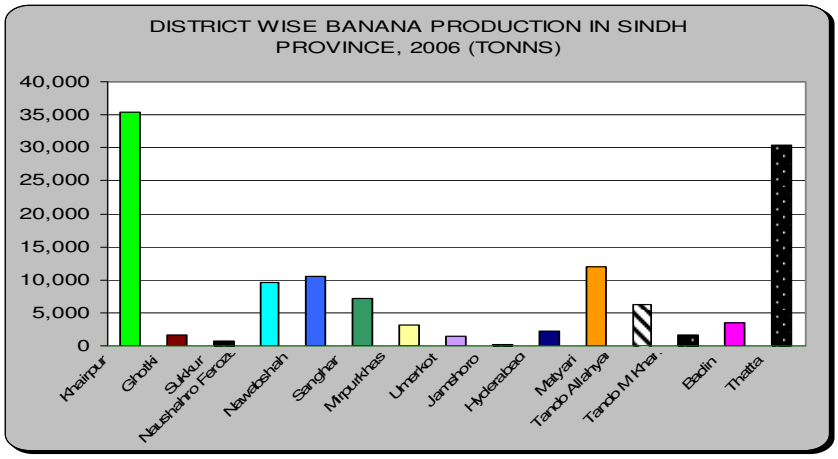
Dwarf Cavendish Variety known as Basri was cultivated on 98% of total area, while other 2% area was occupied by William hybrid variety.

Major banana cultivation districts of Sindh province (See Map) were Thatta, Khairpur, Badin, Matiari, Mirpur khas, Naushero Feroze Sanghar, Nawab Shah and Jamshoro. Hyderabad, Sukkur, Ghotki, Umar Kot and Karachi and other districts contribute in banana production with small area and less volumes.

During 2006 half of the total area under banana cultivation was concentrated in two districts Khair pur and Thatta.



Both districts produced 65.7 thousand tonnes bananas, 52 % of total production in Sindh.



Banana Bunchy Top Virus (BBTV) was reported on banana cultivation in 1989.

Banana bunchy top disease is caused by a single – strained circular DNA virus, banana bunchy top virus (BBTV), which is member of the genus Babuvirus (family Nanoviridae), that is transmitted by the aphid vector pentalonia nigronevosa.

Molecular characterization of banana bunchy top virus from Pakistan, Imran Amin, Javeria Qazi, LLC2007

Banana growing areas of Sindh

2.1 - Banana planting material

90 % of farmers re-planted banana suckers from their own plantation if not available buy from fellow farmers for 3 to 5 rupees per plant. There were no certified public/private nurseries to supply a certified planting material. Horticulture Research Institute, Mirpur Khas and Nuclear Institute of Agriculture (NIA) Tandojam, were conducting field experiments on new varieties and the production technologies of the crop but had limited resources to fulfil market requirement. A few progressive farmers were conducting trials with new planting material imported to Pakistan from un-identified sources.

2.2 - Planting time

Banana was planted twice in a year. Sowing period in upper Sindh lag behind the lower part of the province for15 days. Banana sowing calendar;

Banana Sowing Calendar												
	Months											
Activity	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Sowing												

2.3 - Planting Methods

Planting of banana orchard was a resource allocation decision. Two methods were generally adopted for banana sowing, on bed/furrows (13%) and in flat field (87%).

Both suckers and Rison were utilized for planting purposes. Broad leaf sucker were avoided in contrast to narrow leaf suckers as later one bears the better fruit.

2.4 - Irrigation Management

Banana is high delta crop and requires a huge amount of water in the root zone because of the large foliage area, moisture content of the pseudo stem and transpiration losses. Different irrigation methods were under practiced by the banana growers in Sindh. More than 90 % of the farmers were dependent on the canal water from the Indus River while 10 % farmers use the deep-well pumps to irrigate their orchards. The watercourses were not managed properly which causes wastage of water in the field.

2.5 - Banana nutrition management

Balanced and judicious use of fertiliser is necessary to improve soil fertility and sustainability in banana production. About 95% of the farmers applied DAP, nitrogen and potash without any consultation with the agriculture expert and soil analysis. 42% of total production cost of banana was spent on fertilizer and chemicals.

2.6 - Weed management

Weed management operations were being performed manually and was a high cost input therefore banana growers tried to prolong it as long as possible, not aware of the loss to the crop productivity.

2.7 - Insect Pest and Diseases

Banana bunchy top virus (BBTV)

Majority of the growers (70-80%) had no idea of banana insect pests and beneficial insects. Banana disease known as banana bunchy top virus (BBTV) was epidemic. The BBTV was known as a cancer of banana by the local labour and managers involved in crop management. A serious threat to crop, its severity now, at a first glance was moderate except districts Sukkur and Punnu Aqil, where farmers have abandoned banana cultivation. No study on the yield loss due to the disease incidence was reported.

3.0 - Survey Methodological Approach

3.1 - Secondary data collection

The literature was reviewed and statistical data collected regarding banana production in Pakistan. This was done mostly through internet.

3.2 - Primary data collection

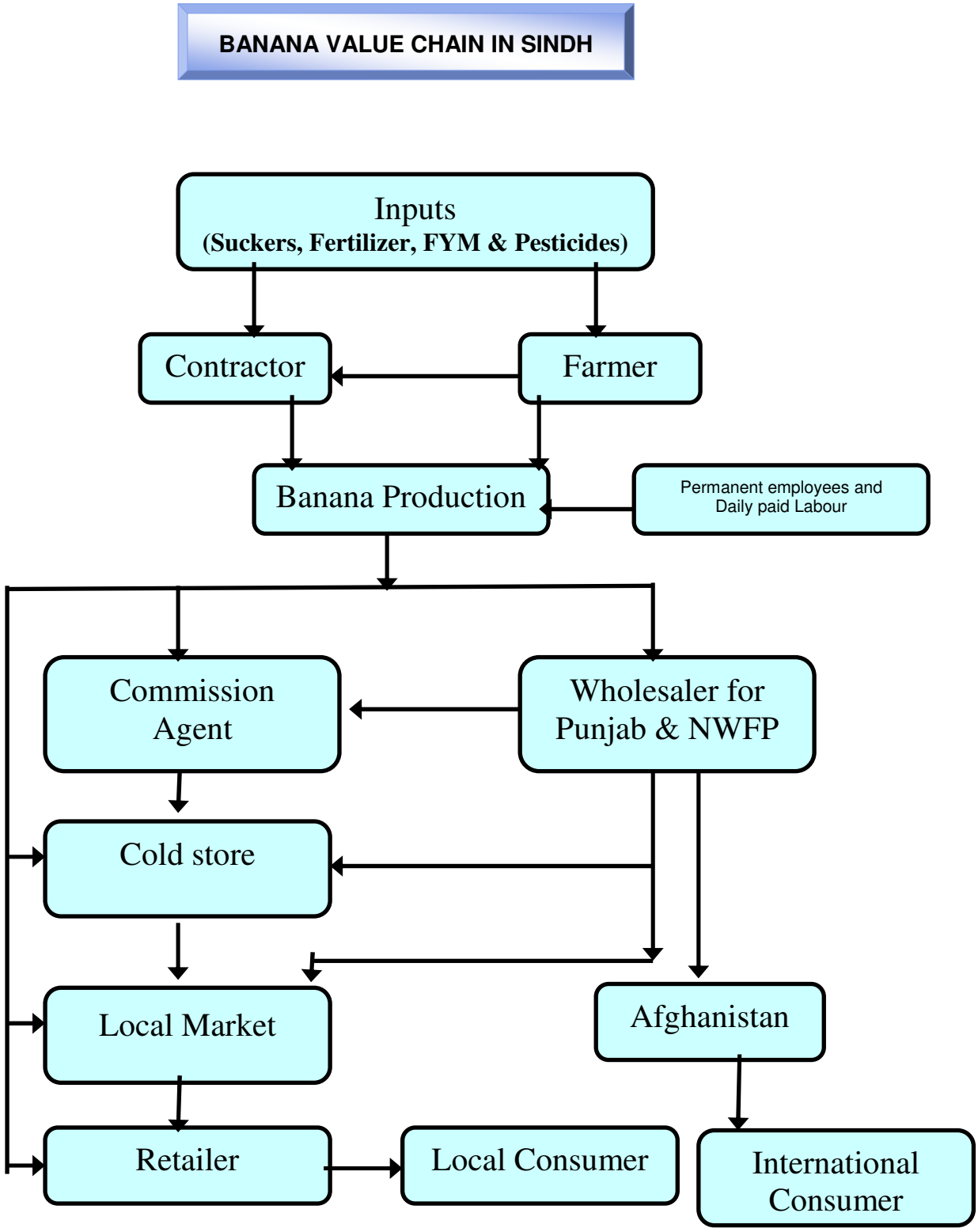
Consultative meetings were conducted with the researchers from Agriculture research institute, Tando jam to identify the banana production chain stakeholders and main banana growing areas of Sindh.

- A questionnaire was designed to evaluate banana production and social constraints. (Annex.1).
- While banana production constraints were the primary focus of the survey, other stakeholders were also interviewed. Table.1 provides an overview of the respondents.
- Focused group discussions with all banana value chain stakeholders were organized in Nawab Shah and Nowshero Feroze at offices of the Agriculture Extension department. SWOT Analysis was conducted to identify key points of concern of all participants.
- Identification of potential interviewers in consultation with field officers of Agriculture research and extension departments and banana growers to ensure inclusion of respondents from different socio economic background.

Respondents Categories									
Location	Farmer	Labour	Contractor	Mali	Transporters	Commission agent	Extension Officer	Research Officer	Input suppliers
Thatta	6	20		4				2	1
Matiari	6			4				2	
Tandojam	12			2				6	
Mirpur Khas	6							7	1
Pano Aqil	15			2				1	
Sukkur	18							1	
Khairpur	20							1	1

Karachi						10			1
Hyderabad	8	4	3			4			3
Nawab Shah	8	2	2	1	1		8	1	
Naushero Feroze	12				1		6	1	1

4.0 - Banana Value Chain:



4.1 - Input Supply

Labour

- Banana production was labour intensive crop. According to information collected Labour cost contribute almost 50% of total production cost. Two types of labour was involved, one permanent employees (3 to 5 per farm on orchard of 25 acres) for managerial and semi professional purposes and other labour was hired on seasonal basis for irrigation, intercropping, harvesting and bringing fruit from plants to collection point.
- Labour was engaged with other crops like mango or dates in seasons resulting in labour shortage for banana crop.

Irrigation

Banana orchards were irrigated fortnightly mostly with flood irrigation method without in-hand information of crop water requirement. Due to over irrigation, water shortage dominates and underground water used as alternative, which adversely affects both soil health and cost of production.

Pesticides

About 78 % farmers were using “confidor” and “tenikal“against aphid. 5 to 6 pesticide applications were common without having any significant control of the target insect pest. 93% of the farmers had no information about beneficial insects.

Fertilizers

- Fertilizer was the second major input. Only big contractors were applying recommended doses while small farmer were not following the recommendations due to resource constraint.
- Farmers were not aware of soil testing facilities to determine proper dosage of fertilizers to apply in spite of existence of excellent soil testing lab facility in tandojam.

4.2 - Extension service

The interaction for service provision between agriculture extension department and farmers was poor. 92% farmers never visited agriculture extension office for information. Horticulture Research institute, Mirpur khas in its Banana research centre was conducting field trials for the evaluations of germ plasm, crop production etc. but had limited resources to fulfil the farmer’s need. A small

horizontal information flow system existed through few progressive farmers ("Asim farms", Tando soomro) through the provision of basic banana production training.

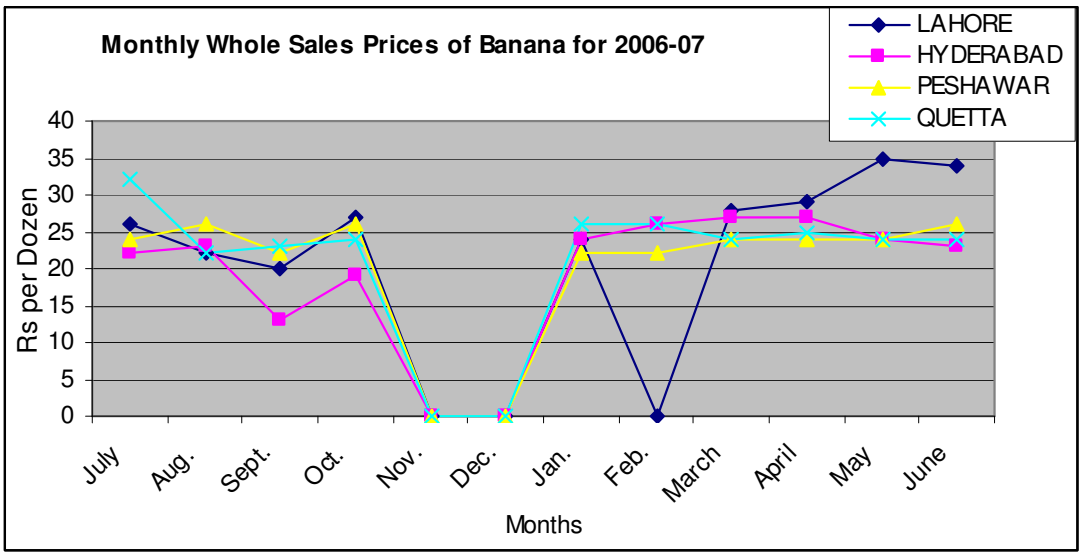
4.3 – Banana production system.

Available data indicate that the production of banana and land under its cultivation had been increasing during last two decades. Recently for the year 2006-7 banana production in Sindh was at 126,332 tonnes and total land used for the banana cultivation was 32,169 hectares. Survey results showed that 97% producers had a land holding between 20 to 50 hectares. Small land owners avoid banana cultivation because, less than 15 hectares cultivation of banana was economically not feasible. Large or semi large size commercial banana orchards existed throughout the province but were scattered. Big farms practice much better production technologies, such as application of balance fertilizers, tree spacing and disease management practices. The banana yield attributed;

- The Banana production contributed significantly to the agriculture sector and the economy in general and Sindh province especially. Banana production was a source of income and employment with millions of farmers' dependant on it. Extended cultivation and implementation of good agricultural practices could help in improving the livelihood of the farming communities.
- Banana was grown on 34,889 hectares during 2007, which was 04 % of total land under fruit cultivation in Pakistan. Sindh province was devoted to banana production from Thatta to Ghotki, producing 3.9 tonnes per hectare.
- There was huge gap of yield per hectare between the progressive growers and other farmers growing banana in Sind. The national average yield of Banana was 3922kg/ha, while that of progressive grower 49400kg/ha.

4.4 - Markets

Almost whole production shifted to internal markets of Pakistan or exported to Afghanistan. There was good demand for quality bananas in Pakistan as well as for export. During the season, the fruit was widely available for period of two months. Due to extremely short shelf life, both farmers and traders were under heavy pressure to sell their product as quickly as possible. This often depressed the farm gate price.



4.5 - Marketing and transportation

Buyers from Punjab and NWFP played a key role in flow of banana product from producer to consumer across the country and abroad (Afghanistan). More than 64% farmers and contractors were selling their produce on farm gate.

During survey three major marketing channels were identified:

- Medium to large sized farmers selling banana directly to Wholesale markets of Punjab and Peshawar;
- Farmers and contractors selling banana directly to local markets;
- Farmers and contractors selling banana via intermediaries, who are selling bananas either to local or distant wholesale markets.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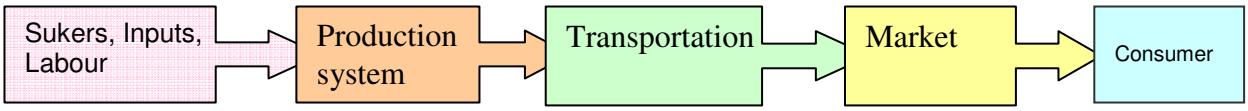
4.6 – Transportation.

Common mode of transport was trucks. Cost of the transport from cities of Sind to Punjab and NWFP Whole sale markets was very high. Truck fairs for Thatta to Lahore was Rs. 36,000 and Matiari to Lahore Rs. 2500. Shortage of transport in crop season was common phenomenon. Bananas were loaded into the back of truck to maximum capacity without proper packing. This resulted in 8-10% loss through physical fruit damage and appearance.

4.7 - Sub-sector map

From the findings above, a Subsector map could be drawn which highlighted both the main operations being performed within the chain and the flow of produce from production system to end markets.



5.0 - Cost / benefit ratio

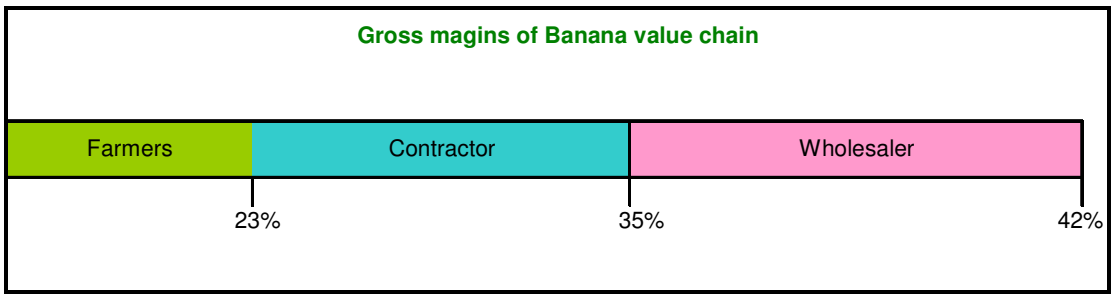
Cost/benefit ration of banana	
Type of input	**Amount**
Rent for acre per year	10,000.0
Land preparation (Ploughing; Levelling; Lining)	5,000.0
Suckers Transplanting	6,000.0
Fertilizers	
DAP	22,400.0
Urea	6,000.0
Potash	3,200.0
NPK	2,250.0
FYM	1,200.0
weeding	3,000.0
Irrigation	7,200.0
Interculturing	4,000.0
Pesticides (Confidor & Tenikal against aphid)	4,000.0
Cutting and Removal of stems of old banana	4,000.0
Harvesting	4,800.0
Management cost	4,000.0
Production cost	**87,050.0**
Average gross income of farmer	**131,250.0**
Profit of farmer	**44,200.0**
Truck fare Thatta-Lahore	**36,000.0**
Labour charges for truck unloading	**2,000.0**
Market price	**219,000.0**
Commission 10%	21,900.0
Profit of contractor	**65,850.0**
Cold storage	**25,550.0**
	2,920.0
Market price	**525,600.0**
Profit on wholesale	**278,130.0**

5.1 - Farm gate and Market Prices

According to surveyed respondents during 2007 farm gate price per 40 kg varied from Rs. 350 during season to Rs. 600 in off season. Market price had same dynamics. On May 08th, 2008 Karachi wholesale market offered Rs. 925 for 40kg bananas.

5.2 - Gross margins

Farmers share in overall value added amount is 23 % in situation described by respondents. De facto wholesalers / Commission agents acted as donors towards local contractors and paid their bills not only to ensure constant and sure supply but harvested maximum gain from banana crop trade.



6.0 - Key issues / constraints

Through individual and group interviews main constraints identified during survey were ranked by respondents and are briefed as under:

Issue/Constraint	%age	Ranking
BBTV	52	1
Lack of knowledge and skills in good agricultural practices	30	2
Non availability of certified planting material	10	3
Shortage of irrigation water	6	4
High cost of Inputs	2	5

6.1 - Production constraints

Suckers

- Disease free certified planting material was not available.
- BBTV infected Suckers were being transplanted.

Irrigation

- Misuse of irrigation water through flooding the banana fields that ultimately resulted in shortage of irrigation water at the critical crop growth stages.
- Under ground water was being used as an alternative for irrigation.

Nutrition management

- The use of chemical fertilizer led to degradation of soil health.
- Unbalanced use of fertilizers due to lack of knowledge.
- Non availability of fertilizer specially potash.
- Access to fertilizers among small farmers or contractors was limited due low income, resulting in sub optimal use.

Pest and Disease management

- Incidence of Banana Bunchy Top Disease resulting in the shifting of banana growers to other crops.
- Lack of knowledge and skills of insect pests and disease management.

Organic waste

- Banana production produces vegetal and organic waste includes shoots, flowers, crowns, leaves, and rejected fruits. The volume of waste produced was double than the volume of banana produced. Farmers had no knowledge and skills of using this organic waste as an organic fertilizer.

- This waste was normally reincorporated into the soil or /and are gathered and thrown in large open air dumps and finally burnt.
- Poor disposal and lack of special treatment (Compost making) for this biodegradable waste could result in proliferation of pathogenic organisms.

Ecological effects

- Water logging and salinity
- "The banana was an ecologically demanding species that requires abundant humidity, high temperatures, and soil with diverse nutrients. If banana was cultivated without rotation, on same land, over a given period, it was common to find all too noticeable mineral deficiencies in the soil, especially of calcium, iron, magnesium, nitrogen, phosphorous, potassium, and zinc "(Astorga, 1995)

Technological issues

- Technological upgrading was limited and a major bottleneck hampering growth of the banana production and restricting producers into selling bananas only into the national market.
- Extension workers lack technical knowledge and skills about banana crop management.

Crop management

- Poor and inappropriate management practices resulting in less yield and low quality product.

Environment

- Fluctuations in environmental conditions badly effect the production and farmers had no knowledge to cope with adverse affects of sever environment (frosts) on banana crop.

Variety

- Cultivation of same variety over the years had deteriorated the crop quality.

6.2 - Post Harvest Constraints

Primary processing

- Lack of information/knowledge about processing and post harvest management.

Storage and Transport

- Low cost packing materials not available.
- Non-availability of refer containers.
- Lack of information on post harvest losses due to poor storage and transport system.
- Lack of cold storage facilities in the main banana production areas.
- Poorly managed cold storages in big cities.
- Expensive storage

6.3 - Marketing constraints

- Banana production was a profitable but a risky endeavour due to vulnerability of crop from many factors.
- Short shelf life of banana exerted pressure on prices and lowers the bargaining power of producer.
- Despite establishing of mobile phone networks, communication gap still exists.
- Commission agents in big markets, actual financiers of local contractors have no interest in strengthening their marketing capabilities, which in turn limited the markets for growers of banana.
- Opportunities for farmer to engage with better buyers were restricted.
- Lack of information regarding marketing strategies.

Formation of marketing groups

- In Sind currently no formal groups exist based on commodity vested interests

Export

- Domestic market had limited capacity of absorption.
- Export to large market was not possible due to poor quality of bananas.

Market reforms

- No specific market development strategy regarding banana available.
- No marketing information system available for the growers.

6.4 - Training and development

Business planning

- No records were made throughout the chain.
- Less linkages among themselves and with market
- Limited access to knowledge

Information and Knowledge

- Lack of technical and planning skills
- Lack of extension materials on good agricultural practices.
- Lack of ability to access knowledge
- Lack of capacity to use knowledge

6.5 - Social Constraints

- Lack of networking of banana value chain actors.
- Limited tenure of contractor discourages investment in banana orchards.
- Labour health issues were persistent.
- Tenancy
- National labour laws were not implemented.
- Low labour wages

6.6 - Chain wide Constraints

Financial resources

- At large farmers had limited or costly access to financial resources

Subsidies

- Subsidies of any kind are absent.
- Lack of support price

Banana import

- Traders give preference to import bananas instead to foster quality production to fulfil the need of staff of multinational companies.

Regulatory authorities

- Never heard across the chain.
- Pesticide residue testing facility is limited.
- No Phyto-sanitary inspections.

Research and development

- Limited research and development activities relating banana production were visible in the area.
- No evident was found regarding research efforts in marketing and economics.

Capacity building

- There was little opportunity for well paid employment in banana sector, as actors seek personal loyalty rather professionalism.
- Qualified horticulturists specializing on banana not present in the market.
- No capacity building programme is underway.

Gender

- Currently there was no role of women in banana value chain.

7.0 - SWOT Analysis

Joint meetings with all banana value chain actors were conducted and all pro and cons of banana crop were discussed in the form of SWOT analysis. Output of this brainstorming is presented as under and recommendations followed the analysis are also presented unchanged or edited as they are self explanatory.

Strengths	Weaknesses
• Favourable environment • Fertile soil • Sufficient labour force • Presence of Research & Extension • Good productivity • Good market price • Better profitability than other crops • Improve soil fertility • Create job opportunities • Cash payment to farmer in advance • Community cohesion	• Shortage of irrigation water • Improper land levelling • Soil analysis • Involvement of unskilled labour in banana cultivation • Insect pest (Aphid, Fruit fly & nematodes) • Diseases Banana bunchy top virus (BBTV), • High prices of fertilizers • Improper irrigation • Imbalance use of fertilizers • Less knowledge about schedule of fertilizer application • Less use of Farm Yard Manure (FYM) • Lack of weed management • Untimely inter culturing • Improper selection of suckers to remove • Access plant population • Low plant population • Shortage of banana nursery • Fluctuation in market price • Mono cropping system • Unskilled labour • Less knowledge about insect pest and beneficial • High water table • Non availability of cold storage • Illness of labour • Less marketing facilities • Shortage of crop specialist • Shifting of Labour to other crops
Opportunities	**Threats**
• Expansion in production area • Improvement in productivity • Improvement in production quality • Export of banana • Introduction of new varieties • Access to new market • Community organization • Training & skill improvement • Use of banana for by product	• Sudden change in environment • Unable to find solution for disease treatment • Less interest of farmer in training • Less number of crop specialist • Monopoly of commission agents • Uncertainty in government policy or shift of priorities • Low market price • Lack of medical facilities for labour • Unfairness in irrigation water distribution

8.0 - Feedback from the respondents for quality banana production.

- Capacity building of the banana value chain stakeholders in quality banana production and management.
- Soil health management training to banana growers.
- Introduction of new improved banana varieties
- Increase of Farm Yard Manure in banana production
- Training on irrigation management practices.
- Minimize the use of pesticide in banana
- Training in self marketing
- Establishment of marketing information network
- Establishment of government purchase centre
- Supporting price
- Subsidy on fertilizers
- Establishment of cold storages in each banana growing district
- Specialize transport facilities
- Maintenance & construction of roads from farm to market

9.0 - Conclusion

The farmers had insufficient access to good plant materials (no certified source of planting material in the province) and other information about good agricultural practices relating to plant and soil health management issues of banana production. Lack of knowledge and skills in good agricultural practices for banana production was the priority issue of the stakeholders, while ranking the banana production constraints. Banana bunchy top virus (BBTV) was found to be the serious threat to banana production in Sind. The main cause of BBTV was the use of infected planting material from the infested sources. Moreover, during the year 2005-06 there is 6.24% decrease in banana production in Sind in spite of 8.34% increase in area cultivated under banana (see annex.2). This includes a number of factors;

- Incidence of banana bunchy top virus.
- Use of infested planting material by the growers
- No varietal choice except Basri
- Lack of knowledge and skills in good agricultural practices for banana production and management
- Poor post harvest management practices.
- Weak social contacts among the banana grower and commission agents.
- Banana growers have very limited information about banana market.
- Poor market information systems.

The survey results showed that there is need to develop banana production and marketing strategy based on production and market interventions intended to build capacity of banana value chain stakeholders to increase and sustain productivity and farm gate quality of bananas.

Annexure 1:

Survey form

Name:---------- Village:----------

District:---------- land ownership:----------

- Which banana variety did you cultivate in?----------

- How much area did you cultivate under banana?----------

- Are you looking for other varieties? Yes / No why?----------
  ----
- What is the source of getting banana sowing material?----------
  ----
- Did you get sowing material from a certified source? Yes / No? ----------
  ----
- How did you sow banana crop and why?----------

- Time of sowing of banana:----------

Fertilizer application

- Why to apply?----------
- What type of;----------
- When apply?----------
- How apply?----------

What are the major inputs that you use?

Inputs	**Type**	**Price**	**Quantity**
Fertilizer			
Pesticide (specify)			
Planting materials			
Labour			
Financial			
others			

Are these inputs readily available to you? How do you rate their availability? Could you also give me a reason?

Inputs	**Reason**
Fertilizer	
Pesticide (specify)	
Planting materials	
Labour	
Financial	
others	

Production and management

- What are the insect pests of banana? ----------
- Do you know the disease of banana crop and what are those?----------
  ----
- Losses due to diseases, weeds and pest (%) ----------

- What are the pest management methods in your area?
  1. Cultural
  2. Chemical
  3. Physical
  4. Biological

- Did you the banana beneficial insects in banana crop?

- Did you apply pesticides: Yes / No/

- If yes, where did you get the advice of pesticide application?

- No of spares?

- Did you know the techniques of fertility management in banana crop?

- What was the yield of banana crop in n2006-2007?

- How did you get the information / advice for banana crop management?

- What are the banana crop production and management information sources in your area? Give details?

- Have you got any training on banana production and management? Yes / No. if yes from where?

- Do you also practice intercropping? Yes / No. If yes please specify?

Harvesting techniques

- Did you know the proper harvesting techniques? Yes / No. What are -?

- Did you know proper handling methodologies of banana? Yes / No. What they are?

- Have you got any training on banana harvesting? Yes / No. if any from where?

Marketing

To whom do you primarily sell your crop to? Specify please

Local market	
Buyers from Punjab and NWFP	
Contractors	

For how much do you sell (on average) your banana?

Start price ----Rs. / kg End price -------Rs. /kg

Do you thin it is a good price, if not, why?

Degree of fairness	**reason**
Unfair	
Relatively fair	
Fair	
Good	

- Did you ever considered selling production directly to provincial markets or / and exporters? Why or why not?

- Could you please give me an estimation of what it costs you to produce banana?

- Could you briefly describe me on how you set prices with buyers?

- Did you have any credit facility available?

In case you produce other crops, where would you rank banana in term of profitability compared to other crops?

No.	**Rank crops**

In relationship to the previous question, please tell me what are the biggest constraints you face as banana grower?

Availability & quality of planting material	
Crop management training	
Information about price and market demand	
Good relationship with buyers	
Market access	
Others	

How do you think this obstacle may be resolved?

Availability & quality of planting material	
Crop management training	
Information about price and market demand	
Good relationship with buyers	
Market access	
Others	

If possible would be you are willing to produce banana in larger quantities and for lager time period?

In general would you say that purchasing Banana is ----?

Answer	**reason**
Risk but profitable	
Unrisky and profitable	
Risk and unprofitable	
Unrisky but not profitable	

Did you receive some assistance from the Govt./ exporter or some other organization / association?

Assistance by	
Government	
NGO	
Other chain member	
others	

How would you role the strength of your relation to other chain members?

Chain actor	**Strength**	**Problem & Solution**
Input suppliers		
Land owners		
Intermediaries		
Government		
NGO		
Exporters		
Local consumer		

Do you also collaborate with the following individuals in your community?

Community members
Other banana growers
Other crop producer
Local consumer
Local organization
Other CBOs

Annex 2.

Banana area and production in districts of Sindh

PROVINCE / DISTRICT	AREA IN HECTARES		PRODUCTION IN M.TONS	
	2006	2005	2006	2005
SINDH	**32,169**	**29,693**	**126,332**	**134,743**
Khairpur	8,122	7,111	35,324	32,234
Ghotki	411	95	1,751	404
Sukkur	171	92	723	411
Nowshero Feroze	2,159	1,088	9,603	5,054
Nawab shah	2,226	1,849	10,561	9,686
Jacobabad	0	0	0	0
Kashmore	0	0	0	0
Shikarpur	8	5	31	20
Larkana	0	0	0	0
Kambar Shahdad Kot	0	0	0	0
Sanghar	1,976	1,766	7,227	10,997
Tharparkar	0	0	0	0
Mirpurkhas	932	1,278	3,224	5,571
Umerkot	385	0	1,484	0
Dadu	0	57	0	231
Jamshoro	62	0	208	0
Hyderabad	588	7,752	2,150	33,186
Matyari	3,696	0	12,056	0
Tando Allahyar	1,725	0	6,206	0
Tando Muhammad Khan	501	0	1,584	0
Badin	1,036	1,109	3,584	4,494
Thatta	8,102	7,412	30,432	32,236
Karachi	69	79	184	219

Annex 3:

Banana area and production in Pakistan

Year	Punjab	Sindh	NWFP	Balochistan	Pakistan
			(Area '000' hectares)		
5-Years'Avg:	**2.3**	**18.8**	**0.5**	**0.1**	**21.7**
1990-91	2.3	19.8	0.5	0.1	22.7
1991-92	2.7	8.0	0.5	0.1	11.3
1992-93	2.4	9.2	0.6	0.1	12.3
1993-94	2.5	9.2	0.7	0.1	12.5
1994-95	2.5	20.7	0.7	0.1	24.0
5-Years'Avg:	**2.5**	**13.4**	**0.6**	**0.1**	**16.6**
1995-96	2.6	21.3	0.6	0.2	24.7
1996-97	2.6	21.5	0.6	0.4	25.1
1997-98	2.6	22.2	0.6	0.6	26.0
1998-99	2.5	22.6	0.6	0.7	26.4
1999-00	2.5	24.2	0.6	0.7	28.0
5-Years'Avg:	**2.6**	**22.4**	**0.6**	**0.5**	**26.0**
2000-01	2.6	26.3	0.6	0.8	30.3
2001-02	2.4	27.3	0.7	0.8	31.2
2002-03	2.2	25.4	0.6	1.5	29.7
2003-04	2.0	27.5	0.7	1.4	31.6
2004-05	1.9	29.0	0.7	1.5	33.1
5-Years'Avg:	**2.2**	**27.1**	**0.7**	**1.2**	**31.2**
2005-06	1.7	29.7	0.7	0.4	32.5
2006-07	1.6	32.2	0.7	0.4	34.9

Year	Punjab	Sindh	NWFP	Balochistan	Pakistan
			(Production '000' tonnes)		
5-Years'Avg:	**11.5**	**170.9**	**9.2**	**0.9**	**192.6**
1990-91	12.1	179.2	9.3	1.2	201.8
1991-92	14.6	19.3	9.0	1.3	44.2
1992-93	15.0	23.2	12.5	1.3	52.0
1993-94	15.4	23.8	12.6	1.4	53.2
1994-95	15.7	49.6	12.7	1.5	79.5
5-Years'Avg:	**14.6**	**59.0**	**11.2**	**1.3**	**86.1**
1995-96	16.1	51.5	12.4	1.7	81.7
1996-97	16.6	52.5	12.4	1.7	83.2
1997-98	17.0	62.3	12.5	1.8	93.6
1998-99	16.4	63.6	12.4	2.2	94.6
1999-00	16.7	89.0	12.4	7.1	125.2
5-Years'Avg:	**16.6**	**63.8**	**12.4**	**2.9**	**95.7**
2000-01	17.4	101.7	12.2	8.1	139.4
2001-02	15.8	113.5	12.3	8.1	149.7
2002-03	14.7	112.9	12.2	3.1	142.9
2003-04	12.9	125.7	13.1	2.3	154.0
2004-05	12.4	129.6	13.1	2.9	158.0
5-Years'Avg:	**14.6**	**116.7**	**12.6**	**4.9**	**148.8**
2005-06	11.4	134.8	13.7	3.6	163.5
2006-07	10.4	126.3	13.6	0.2	150.5

Annex 4:

Area under Banana in Pakistan upto 2001

(Hectares)

Provinces	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
PAKISTAN	30,341	31,177	29,747	31,599	33,096	32,512	34,889
PUNJAB	2,618	2,411	2,244	1,984	1,882	1,754	1,645
SINDH	26,304	27,305	25,419	27,473	29,070	29,693	32,169
N.W.F.P	611	640	604	672	674	679	687
BALOCHISTAN	808	821	1,480	1,470	1,470	386	388

Source:- Crop Reporting Services of Provinces

Annex 5.

Banana exports incl. plantains, fresh / dried

Quantity = Kgs
Value = Thousand Rupees

COUNTRY	UNIT	2006-07		2005-06		2004-05	
		QUANTITY	VALUE	QUANTITY	VALUE	QUANTITY	VALUE
Afghanistan		7,933,010	73,601	10,886,067	84,902	852,700	7,136
Kuwait				--	--	50	1

Fruit, Vegetables And Condiments Statistics of Pakistan 2006 - 2007, Government Of Pakistan (Economic, Trade And Investment Wing) Islamabad. November, 2007

Annex 6:

Banana Monthly Whole-Sale Prices in Main Market (Rs. Per dozen)

Market/Year	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Average
LAHORE													
2001-02	22.00	23.00	19.00	15.00	17.00	17.00	17.00	18.00	18.00	18.00	25.00	19.00	19.00
2002-03	18.00	20.00	19.00	15.00	17.00	17.00	18.00	20.00	19.00	17.00	18.00	19.00	18.08
2003-04	24.00	17.00	19.00	19.00	18.00	17.00	17.00	21.00	21.00	17.50	25.00	24.00	19.96
2004-05	21.66	21.00	21.00	17.00	-	-	20.00	23.00	13.00	27.00	26.00	31.00	22.07
2005-06	24.00	20.00	19.00	24.00	-	-	23.00	-	26.00	26.00	33.00	31.00	25.11
2006-07	26.00	22.00	20.00	27.00	-	-	24.00	-	28.00	29.00	35.00	34.00	27.22
HYDERABAD													
2001-02	21.00	18.00	16.00	16.00	16.00	14.00	14.00	17.00	18.00	21.00	21.00	21.00	17.75
2002-03	20.00	21.00	16.00	16.00	15.50	14.00	19.50	20.00	20.00	20.75	20.00	16.25	18.25
2003-04	12.00	12.00	14.75	17.00	17.00	17.00	18.00	17.00	18.00	18.00	18.00	17.00	16.31
2004-05	18.00	19.00	19.00	18.00	19.00	-	17.00	17.00	19.00	20.00	19.00	19.00	18.55
2005-06	20.00	20.00	19.00	18.00	-	-	20.00	20.00	20.00	21.00	21.00	21.00	20.00
2006-07	22.00	23.00	13.00	19.00	-	-	24.00	26.00	27.00	27.00	24.00	23.00	22.80
PESHAWAR													
2001-02	24.00	17.00	16.00	18.00	17.00	19.00	21.00	21.00	23.00	19.00	20.00	19.00	19.50
2002-03	21.00	22.00	16.00	18.00	17.00	19.00	19.00	20.00	18.00	18.00	18.00	18.00	18.67
2003-04	18.00	20.00	24.00	20.00	21.00	21.00	21.50	17.00	17.00	17.00	16.50	22.00	19.58
2004-05	21.00	24.00	23.00	24.00	23.00	-	17.00	18.00	25.00	25.00	24.00	25.00	22.64
2005-06	23.00	24.00	21.00	25.00	-	-	20.00	20.00	20.00	20.00	20.00	20.00	21.30
2006-07	24.00	26.00	22.00	26.00	-	-	22.00	22.00	24.00	24.00	24.00	26.00	24.00
QUETTA													
2001-02	18.00	19.00	19.00	17.00	16.00	17.00	17.00	15.00	15.00	17.00	26.00	26.00	18.50
2002-03	21.00	20.00	-	-	-	-	18.00	19.00	15.00	17.00	20.00	23.00	19.13
2003-04	20.00	17.50	19.00	19.00	20.00	21.00	20.00	20.00	19.00	17.50	18.00	20.00	19.25
2004-05	24.00	25.00	26.00	25.00	24.00	-	23.00	19.00	-	-	25.00	36.00	25.22
2005-06	31.00	20.00	18.00	20.00	-	-	23.00	24.00	23.00	24.00	23.00	23.00	22.90
2006-07	32.00	22.00	23.00	24.00	-	-	26.00	26.00	24.00	25.00	24.00	24.00	25.00

Source:- Agricultural & Livestock Products Marketing and Grading Department (ALMA), Karachi

Annex 7:

Banana production and yield in provinces

Sindh			
Year	**area**	**Prod**	**Yield (T/h)**
5-Years'Avg:	**18.8**	**170.9**	9.1
1990-91	19.8	179.2	9.1
1991-92	8.0	19.3	2.4
1992-93	9.2	23.2	2.5
1993-94	9.2	23.8	2.6
1994-95	20.7	49.6	2.4
5-Years'Avg:	**13.4**	**59.0**	4.4
1995-96	21.3	51.5	2.4
1996-97	21.5	52.5	2.4
1997-98	22.2	62.3	2.8
1998-99	22.6	63.6	2.8
1999-00	24.2	89.0	3.7
5-Years'Avg:	**22.4**	**63.8**	2.8
2000-01	26.3	101.7	3.9
2001-02	27.3	113.5	4.2
2002-03	25.4	112.9	4.4
2003-04	27.5	125.7	4.6
2004-05	29.0	129.6	4.5
5-Years'Avg:	**27.1**	**116.7**	4.3
2005-06	29.7	134.8	4.5
2006-07	32.2	126.3	3.9

Punjab			
Year	**area**	**Prod**	**Yield (T/h)**
5-Years'Avg:	**2.3**	**11.5**	5.0
1990-91	2.3	12.1	5.3
1991-92	2.7	14.6	5.4
1992-93	2.4	15.0	6.3
1993-94	2.5	15.4	6.2
1994-95	2.5	15.7	6.3
5-Years'Avg:	**2.5**	**14.6**	5.8
1995-96	2.6	16.1	6.2
1996-97	2.6	16.6	6.4
1997-98	2.6	17.0	6.5
1998-99	2.5	16.4	6.6
1999-00	2.5	16.7	6.7
5-Years'Avg:	**2.6**	**16.6**	6.4
2000-01	2.6	17.4	6.7
2001-02	2.4	15.8	6.6
2002-03	2.2	14.7	6.7
2003-04	2.0	12.9	6.5
2004-05	1.9	12.4	6.5
5-Years'Avg:	**2.2**	**14.6**	6.6
2005-06	1.7	11.4	6.7
2006-07	1.6	10.4	6.5

NWFP			
Year	**area**	**Prod**	**Yield (T/h)**
5-Years'Avg:	**0.5**	**9.2**	18.4
1990-91	0.5	9.3	18.6
1991-92	0.5	9.0	18.0
1992-93	0.6	12.5	20.8
1993-94	0.7	12.6	18.0
1994-95	0.7	12.7	18.1
5-Years'Avg:	**0.6**	**11.2**	18.7
1995-96	0.6	12.4	20.7
1996-97	0.6	12.4	20.7
1997-98	0.6	12.5	20.8
1998-99	0.6	12.4	20.7
1999-00	0.6	12.4	20.7
5-Years'Avg:	**0.6**	**12.4**	20.7
2000-01	0.6	12.2	20.3
2001-02	0.7	12.3	17.6
2002-03	0.6	12.2	20.3
2003-04	0.7	13.1	18.7
2004-05	0.7	13.1	18.7
5-Years'Avg:	**0.7**	**12.6**	19.1
2005-06	0.7	13.7	19.6
2006-07	0.7	13.6	19.4

Annex 8:

Production of Banana in Pakistan							
							(Tonnes)
	2000-01	**2001-02**	**2002-03**	**2003-04**	**2004-05**	**2005-06**	**2006-07**
PAKISTAN	139,431	149,687	142,864	154,083	157,976	163,477	150,450
PUNJAB	17,378	15,778	14,687	12,924	12,404	11,401	10,353
SINDH	101,711	113,553	112,916	125,746	129,590	134,743	126,332
N.W.F.P	12,270	12,291	12,161	13,104	13,051	13,702	13,575
BALOCHISTAN	8,072	8,065	3,100	2,309	2,931	3,631	190
Source:- Crop Reporting Services of Provinces							

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