UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

TRADE RELATED TECHNICAL ASSISTANCE (TRTA) PROGRAMME PAKISTAN

Report on Enterprise Based Survey of Horticulture Sector

by

Muhammad Aurangzaib Khan
UNIDO Sector Expert in Horticulture

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Table of Contents

List of Acronyms

AQD	Animal Quarantine Department
ASLP	Agriculture Sector Linkages Programme
DFID	Department for International Development
DPP	Department of Plant Protection
EU	European Union
IPPC	International Plant Protection Convention
OIE	Office International Epizooties
NAPHIS	National Animal and Plant Health Inspection Service
PHDEC	Pakistan Horticulture Development and Export Company
SPS	Sanitary and Phyto-Sanitary
WTO	World Trade Organization
TRTA	Trade related Technical Assistance
UNIDO	United Nations Industrial Development Organization

1. Executive Summary

Pakistan, the land of Indus valley civilization has the total geographical area of 796,096 square kilometers. Pakistan has always been known for its fertile land. And it is because of this land that agriculture is one of the four major drivers of growth.Most of the areas in the Punjab and Sindh provinces are comprised of plain land, formed by the River Indus. Country is part of the sub-continent south of Himalayan mountains situated between longitude 61° and 76° E and latitude 24° and 37° N.

Agriculture has played a key role in the development of human civilization. Until the Industrial Revolution, the vast majority of the human population labored in agriculture. Development of agricultural techniques has steadily increased agricultural productivity. A remarkable shift in agricultural practices has occurred over the past century in response to new technologies. There is considerable scope for many developing countries to join the group of successful exporters, despite the significant external and internal obstacles.

Agricultural progress has been a crucial factor in worldwide socio-economic change all around the world. Wealth-concentration and militaristic specializations rarely seen in hunter-gatherer cultures are commonplace in societies which practice agriculture. When farmers became capable of producing food beyond the needs of their own families, others in their society were freed to devote themselves to projects other than food acquisition. Historians and anthropologists believe that the development of agriculture made civilization possible.

Developing countries have yet to reap the full benefits of globalization and are lagging far behind the developed countries. Developing countries have been bypassed by the global economy due to geographical handicaps, civil wars and poor governance in particular. Institutions in Pakistan are always under structural adjustments, lacking in physical infrastructure and

short of skilled manpower, with little progress to show. Private businesses face high transaction costs, and the security of property is inadequate. Globally, those characteristics have been associated with slow economic growth and declining shares of world exports. Moreover, Pakistan faces external hurdles in the form of protected and subsidized markets in developed countries and the formidable competition of China, India and other established Asian exporters.

If Pakistan depends on domestic markets then the country would not be able to generate the foreign exchange needed for imports to provide raw materials, components, machinery, equipment to the industry and also will not be able to pay for petroleum products to keep our transport, railways, electricity and other economic activities running. Even if the country keeps on borrowing from external creditors it won't have sufficient foreign currency to repay them. Thus those who look inward for growth and poverty reduction are sadly mistaken and suffer from romantic idealism rather than practical realities.

The linkages of exports to growth and poverty reduction differ, in some cases operating mainly through employment and learning effects at the firm and industry level, in others through expanded financing for public infrastructure or imported capital equipment, and in others through the use of export promotion to achieve focused improvements in public services and the business environment. The strength of those channels, and the time scale over which they operate, also differ. Substantial near-term opportunities are open to coastal and labour-abundant economies, while greater challenges face landlocked and resource-scarce economies.

Agriculture plays an important role in the economy of Pakistan because most of the rapidly increasing population resides in rural areas and depends on agriculture for subsistence. The agriculture sector's dependence on nature causes fluctuations in supply conditions of primary products, thus making export receipts unstable. Also, primary products are known to have low supply and demand elasticities. Although the supply constraint rather than external demand constraint has been considered an important factor inhibiting the growth of agricultural exports of developing countries, much of the debate on these issues hinges on the adequacy of empirical evidence on the quantitative significance of various factors affecting supply and demand for agricultural exports. The export supply function indicates the relative influence of relevant price and non-price factors and associated policies in stimulating the supply of exports.

The agriculture framework in Pakistan is supported to a great extent by a crop sector. In Pakistan, both the Federal and Provincial governments are involved in agricultural research and development. The Federal Ministry of Food & Agriculture and Livestock & Dairy Development have the overall coordinating responsibility for agricultural research in the country.

The Pakistan Agricultural Research Council is the apex body for agricultural research in the country, which has overall responsibility to support and coordinate agricultural research in the country. Other Federal Institutions involved in research work are ministries of Science and Technology, Water and Power, besides Pakistan Atomic Energy Commission. Most of these organizations undertake their research activities independently with little coordination in programme planning or budget allocation. Agricultural research by the Provincial governments is scattered among many provincial departments including agriculture (crops), animal husbandry/livestock and fisheries.

Despite of an impressive increase in Pakistan's agriculture production, it has not resulted in improving the living standards of the rural population to the extent desired. One of the factors is the relationship of the rural population with land. Since independence Pakistan has tried thrice to implement land reforms by limiting land ceilings and giving land to the tillers. All these efforts had a very limited effect on redistribution of land.

Horticulture is an important sub-sector of agriculture and plays a vital role not only in rejuvenation of rural economy but also in improving human nutrition which is often deficient in ingredients such as vitamins and minerals. Horticultural products, which include vegetables, fruit and cut flowers, have grown steadily and become the single largest category in agricultural trade.

Nature has blessed Pakistan with an ideal climate for growing a wide range of delicious fruits. Thus a very wide range of tropical, sub-tropical and temperate fruits are grown in the country. Over the years, Pakistani experts have developed unique strains of exotic fruit varieties. Pakistan is producing a large variety of fruits on an area of 857•1 thousand hectares with a total production of 7051•5 thousand tons. Pakistan exported 465•9 thousand tons of fruit in the year 2008-09 (Agricultural Statistics of Pakistan).

Global opportunities are extremely varied and sectors with high potential differ across countries, these differences reflect differences in factor endowments, locational advantages, and scale or agglomeration effects. Horticultural production creates employment opportunities for the rural poor, notably women, and has significant impacts on poverty reduction. Also, studies show that households that participate in horticultural production, in both rural and urban areas, earn higher incomes than households that do not.

General situation of the fruit export is not very satisfactory as for every fruit there is glut season, when it is sold cheap, rejected without processing and during the glut on the average 40% fruit is wasted from harvesting to final consumption. The perishable nature of horticultural products and the

high sanitary and phytosanitary standards require technical know-how and quality control. The horticulture industry is characterized by rapid structural change, requiring upgrading by producing countries. Increasingly, distribution is dominated by large supermarket chains with exacting quality standards.

Horticulture crop growers do not make money, not due to middle men exploiting them, but the exploitation is due to the fact that growers do not know the proper technologies involved in raising fruit corps, proper harvesting and packaging, transport requirements, marketing and export. Middle man on the other hand is better informed and gets the orchard for harvest at a cheap rate, engages some uneducated rural, rustic labour which is available very cheap, harvest, pack and market it. He is also exporter. Middle man's own knowledge is also limited and the responsibility of 40% loss of fresh fruits or vegetable lies upon him. For his ignorance responsibility lies on the government which had failed to produce well trained horticulturists and extension workers to help growers in proper harvesting, packaging, transport and marketing.

Citrus and mango are the main horticultural crops which contribute substantially to the national income of Pakistan. Citrus is a prized fruit of Pakistan and holds number one position among all fruits both in area and production in the country. Citrus cultivation is spread throughout the world on both sides of equator. The quality of the citrus fruit varies in different regions. The areas with semi-tropical climate near the southern and northern most latitude limits are the best for commercial production of citrus.Season of Kinnow (mandarin) in Pakistan starts from December and last till April. Kinnow is very delicious in taste and if treated with proper fungicide and wax and careful handing and storing of Kinnow at about 4 Degree Centigrade can retain it's freshness until 2 months.

Pakistan stands among the top ten citrus growing countries in the world. Kinnow is grown primarily in the plains of Punjab province of Pakistan. Due to the inherent good quality of taste, foreign fruit vendors generally prefer Kinnow from Pakistan.

2. Introduction

Agriculture will continue to play an important role in the economic development and poverty alleviation in Pakistan in the era of economic liberalization and globalization. The resistance of hunger in the developing world means that ensuring adequate and nutritious food for the population will remain the principal challenge facing policy makers in many developing countries in the years to come.

2.1 Scope & Objectives

Agriculture is the backbone of Pakistan's economy. Generation of gainful employment and income for the rural poor, strengthening of household food and nutritional security and sustainable use of natural resources dominate the objectives of agricultural development in the country.

However, there is going to be paradigm shift in the development strategy. Market forces will now greatly guide agricultural production, and private sector would be a useful ally of public sector in the development process. Knowledge will be the key catalyst of growth, besides the traditional sources of growth like land and other resources.

The aim of the present study is to ascertain the current situation of the two prominent horticulture exports (Kinnow and Mango) of Pakistan. The primary objectives of the study were to ascess:

- the awareness of respondents (exporters and growers) towards export market
- the quality of infrastructure and services available for testing, certification and accreditation
- the knowledge about compliance criteria and intellectual property rights
- value addition

2.2 Methodology

The study was designed to get both qualitative and quantitative data. Sample size of 20 enterprises was considered as appropriate to make the results of the survey statistically significant. In total 42 questionnaires were completed for the two clusters. Selection of the enterprises in the survey was based on the reputation of the firm and significant share of revenue from the export earnings. However, few newly established enterprises but progressing at a fast rate were also included in the survey.

A detailed interview based questionnaire was designed after discussions and recommendations of the international consultants, keeping in view both the qualitative and the quantitative objectives of the study. The questionnaire was approved by the UNIDO before the conduct of field survey. National Expert Horticulture was assigned to collect the data. Data was analysed by using SPSS.

2.3 Important Areas of Export Competitiveness

For several decades, developing countries have undertaken far-reaching economic reforms, including trade liberalization and integration. Yet, these countries continue to be marginalized in the world economy. The

persistent underdevelopment is indicative of the fact that trade and integration are necessary for development leading to poverty reduction in developing countries.

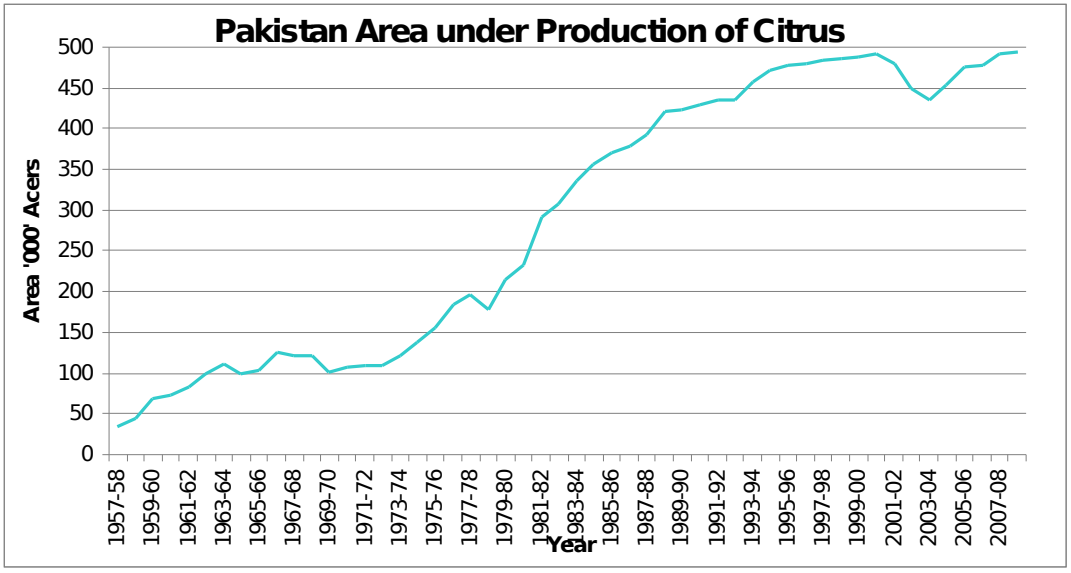
Pakistan faces external and internal development challenges and the problems in order to enhance exports. The three important areas of exports with significant growth potential are: horticulture, fishing and tourism. There could be dynamic gains particularly in horticulture, if some useful effort is made for technological upgrading, quality control, marketing networks and market connections. Product price, quality and ability to comply with International market requirements are the three primary areas of export competitiveness. Pakistan is blessed with a variety of inherent good quality horticulture products, so product quality is not an issue. The food processing of Pakistani products does not comply with the international standards. The inadequate processing impacts the quality of food product preventing it from entering in high and value markets.

3. Sustainable Economic Growth & Export Competitiveness

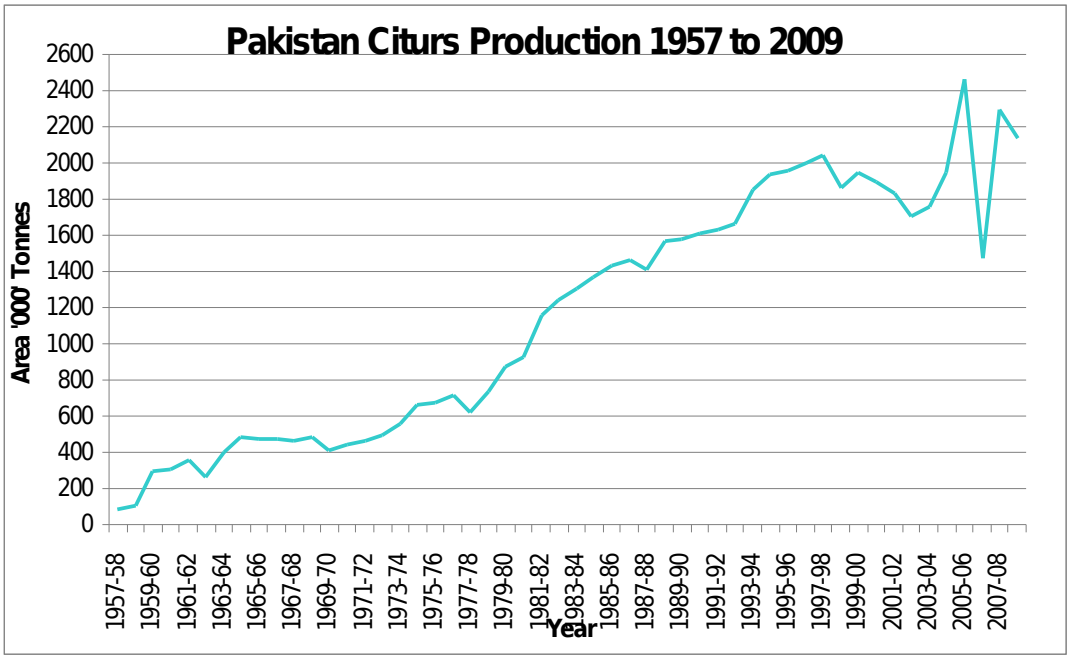
Pakistan's agro-climatic conditions provide a suitable environment for the production of various horticultural crops, as well as a strong comparative advantage in horticulture, as indicated by the sector's rapid growth even in the absence of policy interventions. However, the perishability of horticultural products means that the sector requires an efficient processing and marketing infrastructure that is largely lacking in Pakistan. Exploitation of Pakistan's export potential of horticultural products requires considerable streamlining in the areas of storage, transportation, and packing. Since globalization has significantly increased competition, compliance with international standards is necessary. If Pakistan is able to improve the processing of horticultural produce, then the country will become competitive and there is no doubt that horticulture will contribute substantially to sustain the economy of the country.

3.1 Present Situation of the relevant sector industry

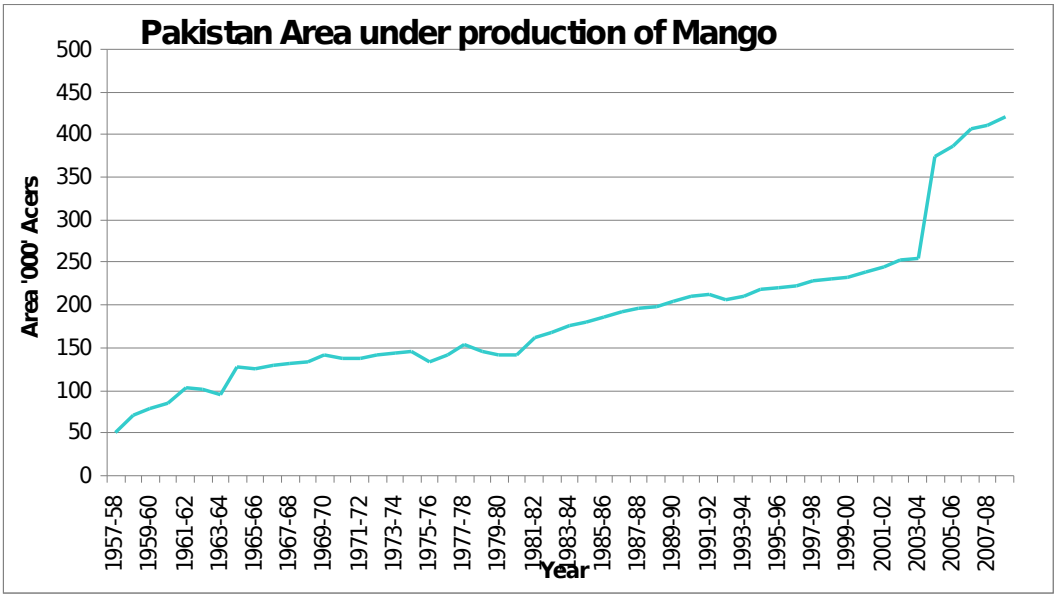
Pakistan is the tenth largest producer of citrus in world. In Pakistan citrus production has increased over the time. In 1959-60 the total area under citrus cultivation was 68.50 thousand acres. It has increased to 494.07 thousand acres in the year 2008-09.



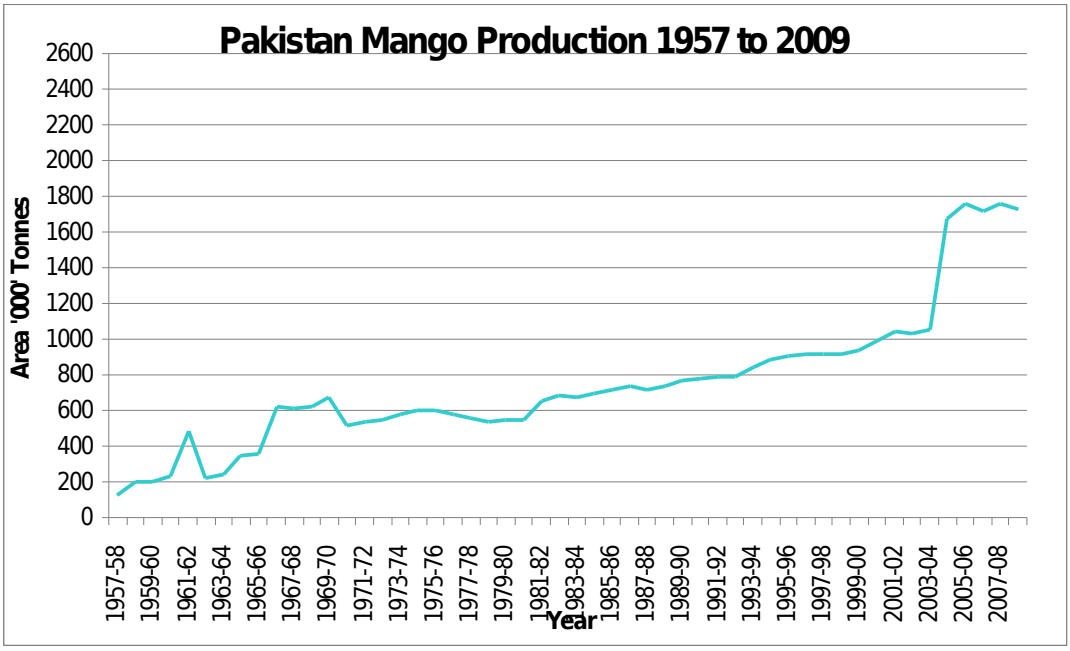
The production of citrus was 298.00 thousand tones during the year 1959-60 and has increased to 2132.28 thousand tones in 2008-09.



Pakistan is the sixth largest producer of mango in world after India, China, Mexico, Indonesia and Thailand. In 1960 the total area under mango cultivation was 79 thousand acres. Graph shows a consistent increase in production area, increasing to 420.50 thousand acres in the year 2008-09.



The production of mango was 202.00 thousand tones in 1960 and has increased to 1727.93 thousand tones in 2008-09.



When viewed against experience of many successful developing countries, Pakistan’s export performance has been lackluster. Pakistan produces high quality mango and citrus, having inherent superior quality which is indigenous to this part of the world and liked all around the world but export performance is not up to the mark. Pakistan can improve its exports of horticulture products especially kinnow and mango to earn substantial amounts of foreign exchange, just by making few improvements in the supply and value chains of these products.

3.2 Important Areas of Compliance

Satisfying developed country health and safety norms has become a major challenge for Pakistani exporters. EU requirements are particularly strict for food safety. Sanitary standards in the developed world are driven by consumer demands and any kind of exemption from meeting them is not possible. Compliance is difficult and costly; it requires investment in laboratories, safety and management systems, and technical expertise. Pakistan can upgrade standards and export successfully, with the help of donors and foreign investment. Particularly important areas of compliance in the horticulture sector for Pakistan are:

1. Establishment of a functional SPS management system
2. Establishment of a food safety management and inspection system
3. Value addition Production

Effective SPS management system requires a policy making institute at the federal level, with provincial governments having the mandate of implementation. The implementation system should have inspectors at district and farm level for effective SPS management. Parallel to the SPS management system a strong food safety management and inspection system is also required.

A strong focus is required on value addition in a world of increasingly diverse offerings. Currently most of the horticulture exports from Pakistan are in the raw form. The processing part mainly consists of washing, waxing, hot water treatment (in case of mangoes), sorting/grading and packaging. Therefore, no real value addition in terms of product diversification takes place. In order for Pakistan to become more competitive and have greater market access and share, exporters have to be incentivised to move their products towards value addition. This may translate to the production of packaged and ready to eat fruit cocktails, fruit pulps, jams, marmalades/preservatives, etc. This will ensure the industry to grow, become more competitive and give greater value to the product destined for export.

Food safety has become a very significant issue, particularly after the food scares in Europe. Consumers want to be informed about the food they are consuming through appropriate labeling and tracking and traceability schemes. The quality requirements citrus and mango fruits and products have to comply with, would be determined by attributes such as maturity, hygiene, presentation, absence of residues, blemishes and diseases and environment protection.

3.3 Human Resource Development/Institutional Capacity Building

The quality of institutions and policies is decisive in determining whether countries can benefit from globalization or not. The institutional environment encompasses macroeconomic stability and openness to trade, as well as the enabling environment for markets, consisting notably of the legal and judiciary systems, the financial system, taxation, labour relations, investment procedures and customs administration. Weak property rights, red tape and corruption remain pervasive

Reliable and reasonably priced infrastructure is one of the main requirements for export diversification and growth. Infrastructure includes transport (land, air and maritime), electricity and water, and telecommunications. Poor transport systems impede international trade. Lack of investment and inadequate maintenance of facilities, as well as poor administration and extortion; characterize transport systems all around the country.

The primary hurdles which are limiting the exports of Pakistan are:

- Skilled labour force
- Inspection bodies

To fulfill the SPS requirements of the developed countries Pakistan needs to train labourers/workers working in the processing plants and the farmers in the fields. There is a severe shortage of technical staff which is aware of food safety, SPS, HACCP and Global GAP. Harvesting time and application of pesticides/insecticides are very critical for horticultural products and it requires trained and dedicated labour force. The management staff at the fruit farms and processing plants should also be trained to address the quality issues and must exercise the rules and standards of ISO 9000, ISO 14000 and ISO 22000 and HACCP.

Inspection bodies are necessary to check the fruit production at farms and processing plants. Unfortunately Pakistan lacks inspection system. The institutions dealing with animal safety, plant safety and food safety does not have enough staff capable of inspection. There is an intense need to revise the acts and ordinances being implemented by these institutions, according to the current international standards described by the consumer demands. These institutions need to employ enough numbers of qualified inspectors having capability and authority to inspect the farms and processing plants according to the international standards and also supervisors which supervise the inspectors. These inspection bodies require qualified technical staff which has deep understanding of international standards such as HACCP, Global GAP, ISO 17025, etc.

3.4 Investment Climate

Despite the fact that there is enormous potential and many attractive business opportunities in Pakistan, the potential investors do not come out with money at the desired level due to various reasons, especially the unpredictable policies and attitude of the past governments. As the trade rule says, "investment in any business, any area and any country calls for careful judgment". The overseas investors doing business in Pakistan view the business environment in Pakistan from various angles. Their major concern seems to be frequent change in policies, lack of follow up for effective implementation of the good decisions, unfriendly attitude of government officials, corruption, international political situation and above all is the law and order situation.

The business community, local and foreign investors, is however pinning hopes for stability in the situation that seems in the offing due to repeated assurance held out by the present government for continuation of the policies, level playing field for local and foreign investors and strong signals for improvement at macro-economic level.

4. Relevant Industry/Sector

4.1 KINNOW

4.1.1 Overview

The kinnow is a sub form of Oranges. It is smaller in size but tastes relatively similar. Kinnow is a cross between the ‘King’ & ‘Willow-leaf’ species of citrus fruits, created after successful experimentation at the Citrus Research Centre, University of California, USA in 1951. Both of these parent breeds have Indo-China origins.

The soil and climatic conditions in Pakistan have given the Kinnow a unique flavor which distinguishes it from other comparable mandarins grown in the world. Kinnow is one of the best varieties of fresh mandarins. It’s refreshing, rejuvenating, scented and mouthwatering. Primarily Kinnow is in close relation with tangerine, similar in taste. Ideal conditions for growing kinnow include abundance of water, rich nitrogen content in the soil and relatively cool weather. Winter in the plains of Punjab province provides an excellent atmosphere for this fruit and the resulting fruit is sweet and has a very distinct taste. At this point Sargodha is the main citrus producing district, with about 23 per cent of Pakistan’s total citrus plantings, producing around 650,000 metric tons of fruit each year. Toba Tek Singh ranks second and Sahiwal.

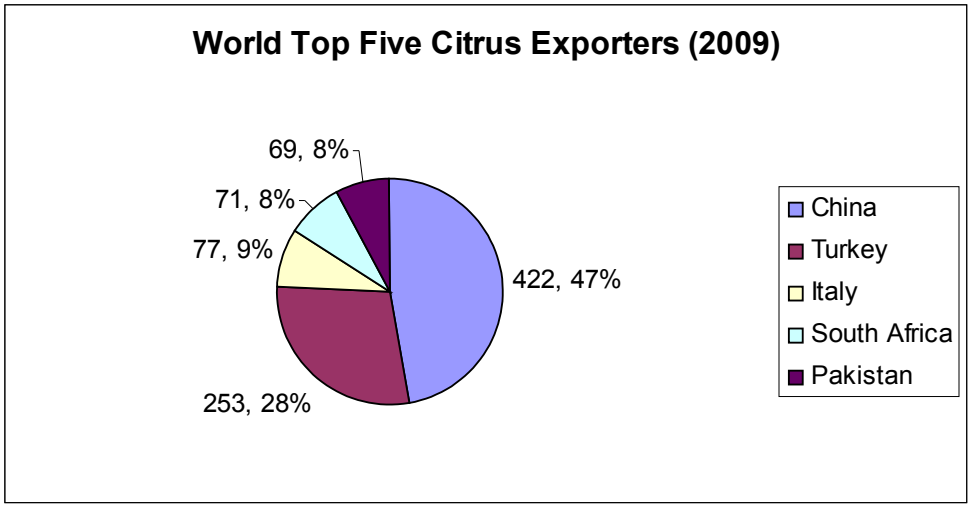
As compared to the processing of other fresh fruits processing of Kinnows appears to be very well developed. There are around 250 kinnow processing enterprises in Sargodha. 140 are listed with PHDEC. 37 processing enterprises have some sort of certifications including Global GAP,

HACCP and BRC and to enhance exports the processors and exporters are improving their processing plants to get more certifications particularly BRC to enter in EU market. The installed processing plants definitively require improvements for quality processing.
Details are as following:

	Certification	Certified	Certification in process
1.	HACCP	37	5
2.	Global GAP	13	2
3.	BRC	4	9

Pakistan is the tenth largest producer of Kinow (mandarin) in the world (FAO STAT). Pakistan is also the largest producer of 'Citrus Reticula' variety (Kinnow), this unique variety of citrus is indigenous to this part of the world. According to an estimate approximately 95 percent of the total Kinow produced all over the world is grown in Pakistan. The main Kinnow growing district in is Sargogha.

Pakistan produced 2132.2,000 thousand tones of citrus (Agricultural Statistics of Pakistan 2008-09). Total world export of mandarins amounts to US Dollars 1,194,775,729 and Pakistan's share of export is only USD 69,207,224 (UN comtrade).

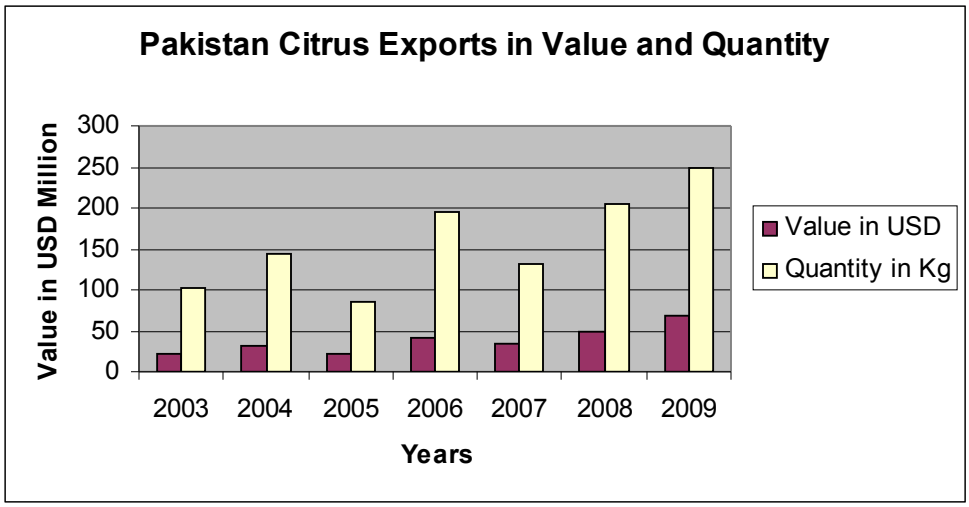


4.1.2 Contribution to National Economy

Importance of exports in the development of an economy cannot be denied. This is particularly true in case of a developing economy like

Pakistan. Export of fruits is mainly concentrated in citrus and mango. The commodity concentration and the supply side fluctuations in fruit exports are known to have serious consequences for overall export earnings.

Horticulture is 5% of Pakistan's agriculture GDP. Citrus fruit is 14% of the horticulture. Pakistan is exporting Kinnow to various countries. Table shows a consistent increase in Pakistan's citrus export. The exports amounted to USD 69,207,224 in the year 2009. In 2008-09 Pakistan was the fifth largest exporter of citrus.



There were very less earnings from export of citrus fruits in the early years which gradually increased at the end. The fluctuating performance of fruit exports is attributed to highly fluctuating domestic production, inconsistent export policies, currency devaluation, export duties, competitiveness of exports and situation in the international markets.

4.1.3 Structure of the Industry

Seventy percent of the kinnow processors and exporters are also growers. Their land holdings are
Small, so they get fruit for export from other orchards. The processing plants are well established. According to the survey there are 14 permanent employees and 228 contractual employees at each processing plant. The processing plants maintained almost same number of employees two years back. Most of the Processing plants do not employ females and children. Employing children at processing plants is against the labour laws. Less than one percent of employees are children and less than 0.5 percent of women are employed in the processing plants as clerical staff.

There is only one processing line at most of the processing plants. The processing lines are well developed, so they do not need to out source any part of processing. Processors do purchase more than 80% of the fruit from market. The processing plants are fully developed for the processes of

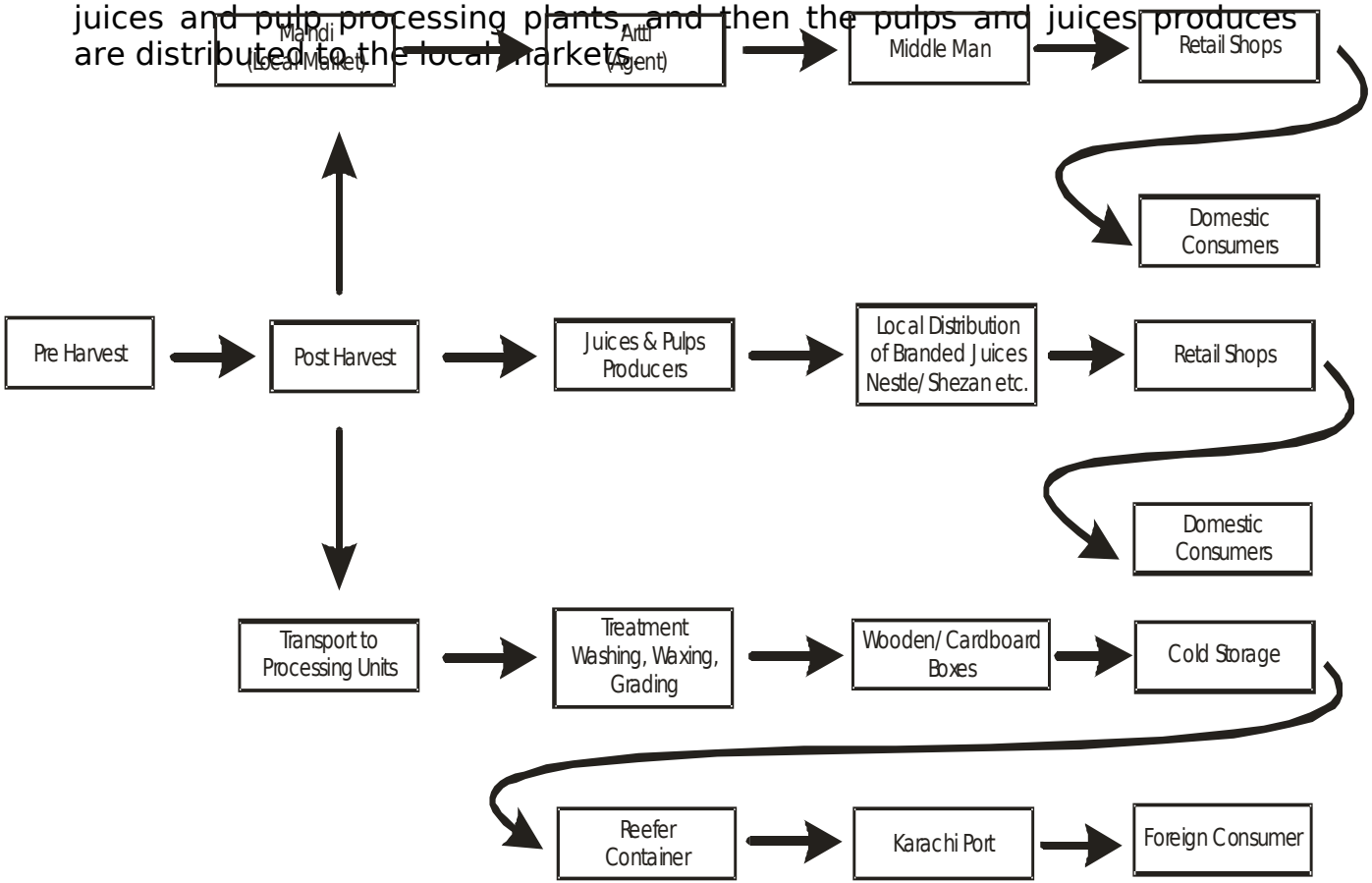
washing, sorting/grading, waxing, weighing, packing and stripping and cool storage. Processors get 20-25% more profit on exports than domestic sales. 20-25% of the B grade fruit which could not be exported is sold in the domestic market at lower rates. 63% exporters get feed back from the consumers.

Exporters have definite and established clients/customers in the international markets. Exporters with production up to 1500 tons send around 96 consignments to 8 clients and exporters with export volumes larger than 7100 tons send 125 consignments to 11 clients.

Pakistan Kinnow growers Association Sargodha is the association of kinnow of kinnow producers of the region. Due to difference of opinion between members it is inactive these days. Association of growers and exporters is the forum through which useful informations could be disseminated to individual processors and exporters in the most effective way. It is now necessary to strengthen associations of producers and exporters through which government of Pakistan and concerned organizations can extend support such as marketing, training and development of guide lines for good agricultural practices and implementation at the farm level.

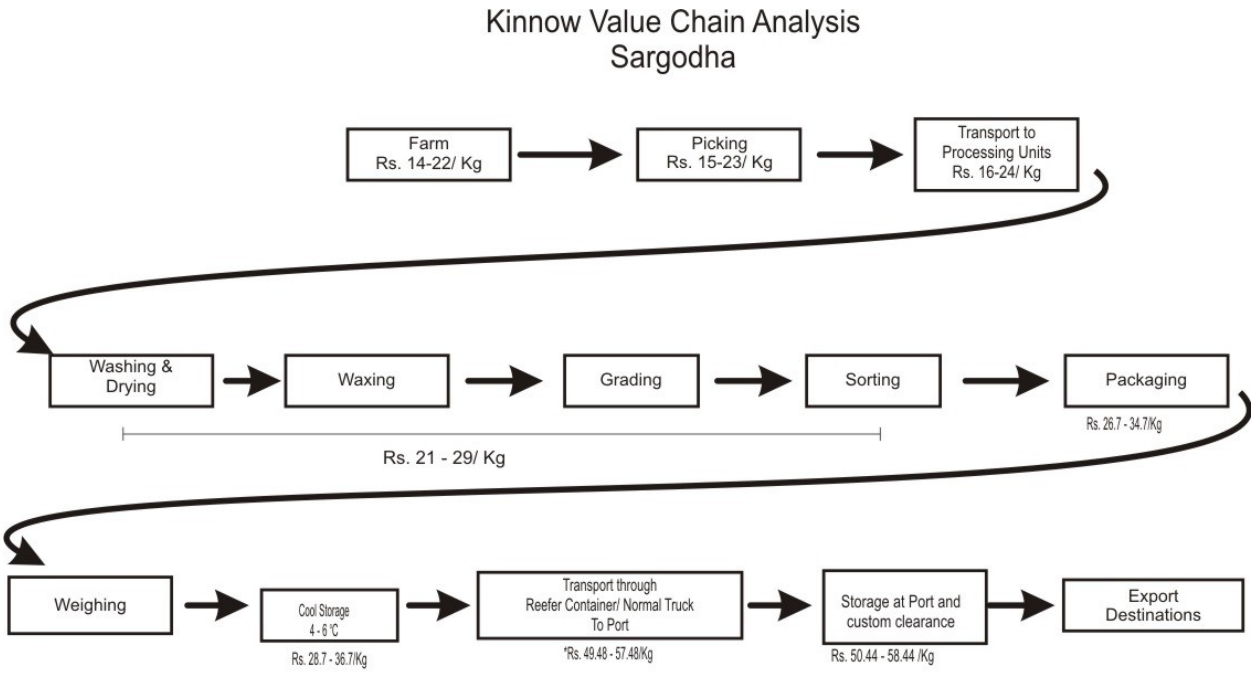
4.1.4 Value Chain Analysis

Kinnow produced in Sargodha reaches through three distribution channels to the consumers. It reaches the domestic consumers through commission agents and middle men. In the second channel it is taken by juices and pulp processing plants, and then the pulps and juices produces are distributed to the local markets.



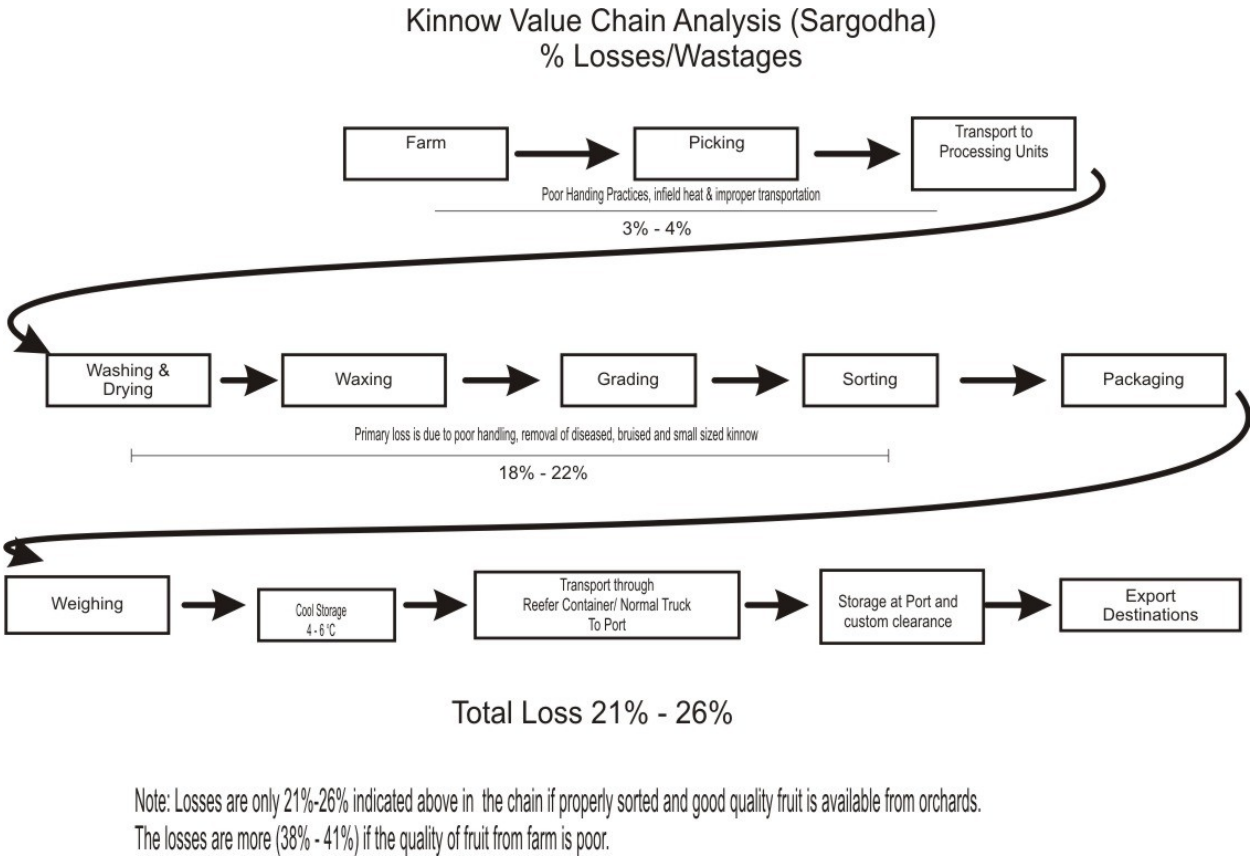
Kinnow Supply Chain, Three Distribution Channels of Citrus Fruit (Sargodha)
Losses in Distribution Channel are about 35-40%

The third channel runs for the export. The fruit is purchased by the processors. It undergoes processing i.e., washing, waxing, grading and packing and then it is stored in the cold storage for some time before it is transported to Karachi for shipment to the export destination.



* The cost of Truck up to port = Rs. 70,000
Cost of Reefer container up to Russia =Rs. 4,70,400
Container comprises of 26000 Kg of Kinnow
Hence, Cost per Kg (540400/26000) = 20.78

Analysis of the value chain reveals that the average purchase price of kinnow ranges from Rs 14-22/Kg. The cost of picking is Rs 1/Kg and the cost of transport from orchard to the processing plant is also Rs 1/Kg. The average cost of processing which includes washing, drying, waxing, grading and sorting is Rs 5/Kg. So, the cost of processed kinnow is between Rs 21-29/Kg. The cost of packing is Rs 5-6/Kg. So the cost of kinnow after packing is Rs 27-34/Kg. After packing the kinnow is sent to the cool storage. Cool storage on an average costs Rs 1/Kg. The fruit is then sent to Karachi for shipment to the export destination. The cost of kinnow increases to Rs 49.48-57.48/Kg as it reaches Karachi. It might require short term storage at Karachi port, rasing its cost to Rs 50.44 - 58.44/Kg.



The value chain for losses indicates that 3 – 4% of the fruit is lost during picking and transport to the processing plant from the orchard. There is 18 – 20% loss of fruit during the processing. So in total 21 – 26% of the fruit is lost.

4.1.5 Export Competitiveness of the Sector

It has been identified from the survey that most of the export of kinnow is to the central Asian states Russia and Middle East. Few processors are exporting to south Asian countries including Indonesia, Malaysia and Philippines. Only 2 processors are exporting Kinnows to UK and Neither land. It has also been found that the processors/exporters have plans to extend exports to USA and Europe. However they are not in a position to meet the requirement of these countries

The global competitors of Pakistan are China and Turkey whereas Morocco and Israel have a niche of seedless kinnow in the world market of kinnow. According to exporters Pakistani citrus has unique taste and high juice content. Taste and juice of Pakistani kinnow attracts the consumers all over the world. Competitors have niche because of seedless variety whereas Pakistani Kinnow have an edge because of taste and high juice content.

Major constraints which prevent the processors to export are improper picking, poor handling practices after picking, transportation (farm to the processing unit) and cool storage. These factors make it difficult for the exporters to comply with the defined international quality standards.

Another factor is the presence of various layers (7-8) intermediaries between the growers and the consumers. The advance payment made by the importers to processors and exporters is generally less than 20%. This makes it very difficult for them to recover the amount from importers after deliveries.

4.1.6 Quality and Standards

Pakistani exporters have a keen eye on the fruit coming from the farms. They recognize blemish and fruit fly free fruit with shiny appearance after processing as the primary parameters of quality assessment thus ignoring the interior of fruit. They also describe high grain weight (means high juice content), and strong fruit as quality parameters. In the same way importers also determine these parameters.

Another key thing is the packing. Currently the exporters are concentrating on using card board boxes instead of wooden boxes as demanded by the importers.

Exporters try hard to maintain quality. Infact they make serious attempts to raise quality by hiring of skilled manpower and making occasional improvements in picking, washing, waxing and grading practices. Some have purchased new blast chillers and processing line. Few exporters have established new control atmosphere (CA) store in addition to increasing cool storage facility. Some processors who have their personal farms have improved farm management and also have got Global-GAP certifications for their farms. Another important measure taken by the exporters is the informative lectures to the farmers on farm management to maintain the fruit quality.

4.1.7 Compliance Status

There are serious issues/problems which hinder the exporters to maintain the quality standards. Pollution at orchards is effecting the production. Lack of knowledge, guidance and directional research of agriculture department is the primary problem. Short shelf life of fruit, introduction of seedless kinnow in the international market and insufficient marketing by Government of Pakistan are the factors which are badly affecting the exports. Farmers need the support of government to properly manage their farms because fertilization application and pesticide spray are not at proper time with defined intervals and quantity. Processors demand

subsidy on electricity and continuous provision of electricity to run the processing plants and maintain cool storage.

There is only one supplier of wax in Sargodha and processors have concerns over the quality of wax. It is largely known that the supplier of wax does not distribute imported wax and rather prepares the wax and sells it with international labels.

The quality control measures taken by the processors and exporters along the whole value chain primarily include, trained personal staff for picking, personal transport to bring kinnow from farm to processing plant, separate packing room, immediate shifting to cool storage after packing, mixing of tacto powder (Antifungal) in water for washing and removing injured kinnow during initial sorting

The requirements for additional quality improvement in the next three years are high. They include the provision of refer containers for the transport of kinnow from Sargodha to Karachi, improvement in logistics with Provision of dedicated shipping lines, subsidy in freight, installation of sorting machine, use of mono vision technology, skilled labour for the maintenance of orchards, regular fertilizer and pesticide spray, skilled labour to work in processing plants, procurement of good quality processing Materials (Wax), improvement in cool storage, installation of small processing unit for B grade kinnow to sell in local market and installation of conveyer system

Some of the processors and exporters have greatly improved their processing plants. They do not hesitate to bench mark the processes of picking, control Atmosphere (CA) store, timely Delivery, packing, and overall best processing practices

All the processors and exporters interviewed are engaged in compliance activities like achieving Certification to an International Standard, meeting Health, hygiene, and sanitary requirements, and complying Labour laws (child labour etc.)

One enterprises has arranged accommodation, mess and separate washrooms for labour

- Getting products tested in accredited labs
- Calibration of equipment
- Routine Inspection of products and processes, by certifying bodies for HACCP/ ISO 22000

Less than 50% of the respondents are aware of SPS compliance. The primary processes in which compliance activity is needed are production at farm, transport to export destination and transport of the fruit from orchard to avoid the damage caused by field heat
Cool storage

4.1.8 Testing & Certification Capacity

To comply with the standards and the requirements of international markets it has become essential that Pakistani producers and exporters have ready access to the product testing laboratories.

Laboratories conducting testing should follow standard practices for sampling and testing and have controls in place, including equipment calibration, to ensure the accuracy of their results. The validity of test results ensured and accepted worldwide only if the laboratories possess internationally recognized accreditation to ISO 17025.

In Pakistan, there are currently 20 accredited testing laboratories (under TRTA), of which 6 laboratories cater for microbiology testing and 7 laboratories conduct chemical testing. These accredited testing laboratories are enough to meet the demands of the country for product testing of agro-based exports. Internationally accredited laboratories should be near the main areas of citrus production.

The standard tests demanded and conducted by the exporters of citrus cluster of Sargodha (Bhalwal) are Brix test (Sugar content), Residue test, Heavy metal test, Wax test, Pesticide test, Normal water bidigical test, Water test and test for nutritional composition. The exporters use the facilities of PCSIR laboratories, Lahore and NIAB, Faisalabad for these tests.

The exporters have to send their samples to PCSIR laboratories, Lahore and NIAB, Faisalabad for testing. This wastes lot of time. It is the need of time that a well equipped laboratory and internationally accredited should be established for citrus cluster in Sargodha to facilitate exporters. This will have positive impact in enhancing exports and also lead to poverty alleviation.

4.1.9 Value Addition & Productivity

The processors and exporters describe value addition as improved packaging, product innovation (seedless kinnow), introduction of new technology and adoption of new selling/marketing techniques. In the past three years investments have been made for up gradation of machinery for washing and grading, installation of control atmosphere store, blast chilling, expansion of cool storage, installation of conveyer system and use of imported packing material

4.1.10 Access to Markets

Exporters want to diversify their markets in the next three years. The primary markets where they find the potential and are targeting for Philippine, Indonesia, Holland, UK, Ukraine, West Africa, Eastern Europe, Brazil and chain Stores

For market diversification to increase export support is required for introduction to new markets and information about their requirements, inviting foreign trade delegations, arrangement of trade delegations to foreign countries by government of Pakistan, credit line from Government, and marketing.

It has been found during the interviews with the exporters and association that there is a need to train and to provide them with the modern marketing techniques to create better image of the Pakistani Kinnows in the importing countries and also there is a strong need to explore new markets.

According to the agreements signed by Department of plant protection with different countries, Iran requires cold treatment of kinnows at 2 °C for 22 days. Similarly China requires cold treatment at 1.67 °C

Name of the country	SPS requirements
Iran	Cold Treatment at 2 °C for 22 days.
China	Cold Treatment at 1.67 °C or below for not less than 17 consecutive days or 2.2 °C or below for not less than 21 consecutive days.
Jordan	Cold Treatment at 2.2°C for 14 days in reefer containers
Europe	Cold Treatment at 2.2°C for 14 days.

SPS requirements of different countries for the import of fresh kinnows from Pakistan:

or below for not less than 17 consecutive days or 2.2 °C or below for not less than 21 consecutive days. Jordan and European countries cold treatment at 2.2°C for 14 days. Those Pakistani processors and exporters who fulfil these requirements are successfully exporting their products to these countries.

4.1.11 Policy Capacity & Support

Farmers, processors and exporters mostly rely on their own resources and skills to maintain and raise quality. Government departments do not take interest. PHDEC however, is providing guidance to a few farmers and

processors. University of Agriculture, Faisalabad, and Agribusiness support fund have also helped a few.

PHDEC is the only service providing agency for quality and compliance issues. PHDEC field officer gives information and advises to the farmers, processors and exporters about plant diseases, certifications required for export, market updates and preparation to get certifications, i.e., HACCP, BRC and Global GAP.

There is no particular help extended by the Sargodha chamber of commerce and industry, except for the arrangement of trade delegations. For resolving the issues of concern in the whole value chain, processors and the exporters are not getting any particular and directional support from any government agency. PHDEC has a field office in Sargodha, but the lack of funds and human resource is affecting its performance. However with limited resources PHDEC is providing technical support in improving orchard management and labour training.

4.1.12 Intellectual Property Rights

Producers, processors and exporters are not aware of the IP system, so they have never used it to protect their technologies and obtain new technologies. Eighty eight percent of the respondents are not aware of the IP services provided by SMEDA and IPO. Exporters face technical problems, but ninety four percent have not collaborated with any research institution or university to obtain solutions to the technical problems which they face or for the upgradation of technology. However, more than seventy percent of the producers and exporters are ready for any kind of collaboration to proceed for IP system.

4.1.13 Recommended TRTA Interventions

Exporters ranked the processes of production at farm and picking as highest priority where technical assistance for improvements is required. Trained (skilled labour) and permanent staff for picking is largely demanded.

Processors and exporters foresee a variety of interventions across the value chain. There is a growing concern over the quality of fruit which is being supplied from the orchards. Role of middle man is also highly objectionable for them. Middlemen do not take care of the fruit properly and ultimately the fruit which reaches the processing plants is scratched. The primary interventions suggested in the value chain are:

- Training workshops to improve farming techniques
- Develop mechanized Picking systems (Lifter machine, cutting techniques etc)

- Development of improved mechanisms for transport of fruit from farms to processing plants to minimize field heat losses

- Facilitating the improvement of waxing techniques through the identification of quality waxes.

- Improvement of sorting/grading practices

- Awareness programmes (workshops/seminars) for exporters/processors on international food standards

- Development of a traceability system from farm to fork through proper labeling using
  1. Paper based system
  2. PC based software system

- Development of food safety standards specifically customized for Pakistan

- Improvements in the supply chain to reduce the post harvest losses through the development of schemes to promote market access to the farmers

- Provision of technical assistance to the processors to help them achieve third party certifications like Global GAP/ Pak GAP, HACCP, BRC etc.

- Strengthening of the kinnow Growers Association

- Subsidy on Freight

Government of Pakistan should take the responsibility (should own) for the exported product by introducing Pakistan or Sargodha as brand

4.2 MANGO

4.2.1 Overview

Mango (*Mangifera indica* L Family *Anacardiaceae*) is the second largest fruit crop of Pakistan. At present it is grown on an area of 170.1000 thousand hectares with production 1727.9000 thousand tones (Agricultural Statistics of Pakistan 2008-09). The area under mango crop has increased but the rise in production is comparatively slow. The main mango growing districts in the Punjab province are Multan, Bahawalpur, Muzzaffargarh and Rahim yar Khan. In the province of Sindh it is mainly grown in Mir pur Khas, Hyderabad and Thatta in the province of NWFP it is grown in D.I Khan, Peshawar and Mardan. Mangoes have been produced in Pakistan for well over two thousand years,

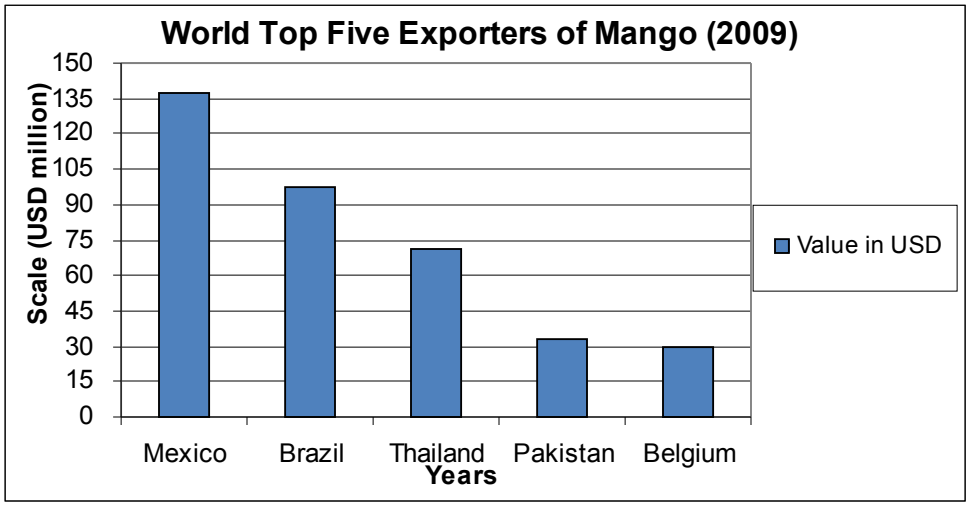
and the country is now the sixth largest producer in the world behind India, China, Mexico, Indonesia and Thailand (FAO STAT).

The climate of Sindh gets warmer about one month earlier than the Punjab which has given the province the privilege to grow early varieties of mango. Subsequently, a new trend of growing late varieties in Punjab has received a wide popularity which has extended the market period and added to the exportable surplus.

Pakistan mangoes are sweet, aromatic, yellow skinned and soft. This delicious fruit is nutritionally superior, source of several vitamins and minerals. Mango farms range in size from less than 2ha to more than 400ha. It is very much unfortunate that mango industry of Pakistan is poorly developed. Production, post harvest and marketing systems are poorly developed and returns are distributed quite unevenly, favoring middlemen. Fruit quality is generally poor and 30 to 40 per cent of fruit is wasted in the harvest to market system. Modern infrastructure for cool storage, grading, post harvest treatment and transport is almost non-existent. Orchard owners do not take care of their orchards; they simply sell the fruit of the orchard to the contractors. So, very few mango farmers in Pakistan are responsible for selling or marketing their own crop. There is no processing plant installed to properly process mango for export.

There are 6 Global GAP certified Mango Orchards in Punjab and only one in Sindh. The total area of the Orchards in Punjab is 2109 Acres and in Sindh is 135 Acres. Certification is in process for eight farms.

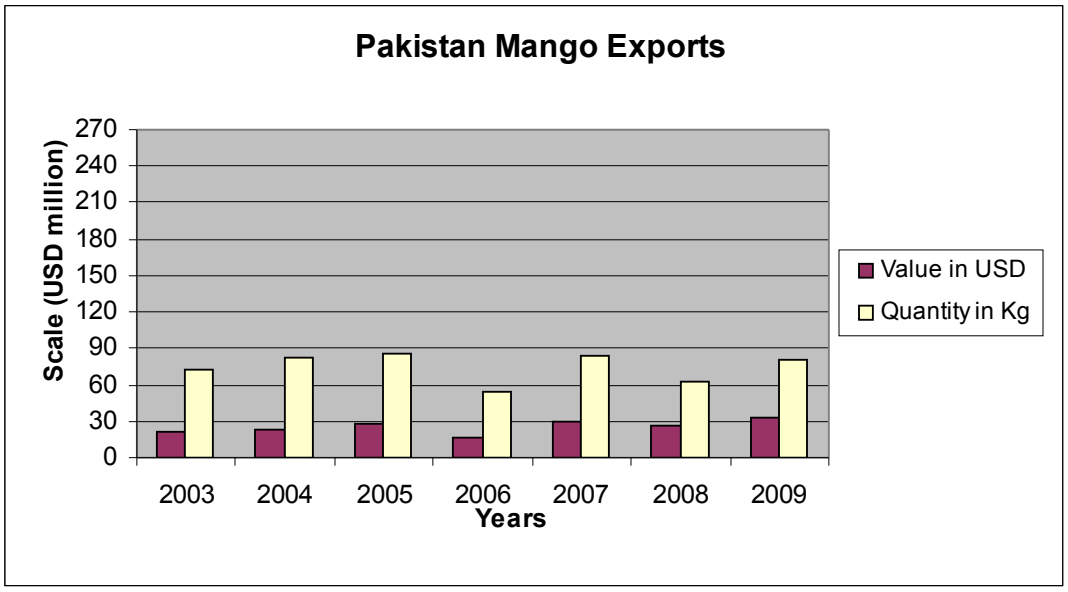
Pakistan produced 1727.93 thousand tones of mangoes in the year 2008-09 (Agricultural Statistics of Pakistan 2008-09). Total world export of mangoes amounts to US Dollars **1,194,775,729** and Pakistan's share of export is only USD 33,178,617 (UN comtrade).



4.2.2 Contribution to National Economy

Among Pakistan's estimated population of 162 million there is a wide discrepancy in income levels, with around 35% of the population said to be living below the poverty line. Locally produced mangoes are the main fruit eaten between June and September. There is little infrastructure, little knowledge about handling of mangoes and very limited cool storage. The majority of mangoes are therefore retailed in poor quality and with a short shelf life.

Mango fruit is 12% of the horticulture's 5% contribution to the agriculture GDP of Pakistan. Pakistan is exporting Kinnow to various countries. Although Pakistan is producing huge quantity of mangoes (1727.93 thousand tones), it is not able to export much. In the year 2009 Pakistan was the fourth largest exporter of mangoes with exports amounting to USD 33,178,617. The table shows a consistent increase in the export of mangoes, but as compared to produce the quantity is not satisfactory.



4.2.3 Structure of the Industry

Although mango is a premier fruit of the country, the mango industry is poorly developed, processing units that comply to the standards are almost nonexistent. The processors and exporters are keen to enhance export by making improvements in the production, picking/harvesting, transport (refer containers) and grading processes.

In an effort to raise the quality of fruit in the past three years exporters have worked on farmer training, picking practices, training the labour for processing the mango and increasing skilled labour. In collaboration with PHDEC and ASLP they have developed the process of desaping mangoes.

Farmers, processors and exporters mostly rely on their own resources and skills to maintain and raise quality. Government departments do not take interest. Pakistan Horticulture Development and Export Company is working with different agencies such as Australia Pakistan Agriculture Sector Linkages Program (ASLP) and US Aid. PHDEC and ASLP have jointly provided cutters and grippers to some growers. Lime treatment (desaping)and mango harvesting guide based on colour changes of mango fruit have also been developed jointly by PHDEC and ASLP. FIRMS (a project of US Aid) have very recently entered in picture. FIRMS plan to establish processing plants for mangoes. For this they have held meetings with processors, but so far there is no development on ground.

There are two associations of mango growers in Multan, namely Mango Growers Cooperative Society and Multan Mango Growers Association. The heads and the members of the associations are very much willing to work with government and concerned agencies for trainings, marketing, etc.

4.2.4 Value Chain Analysis

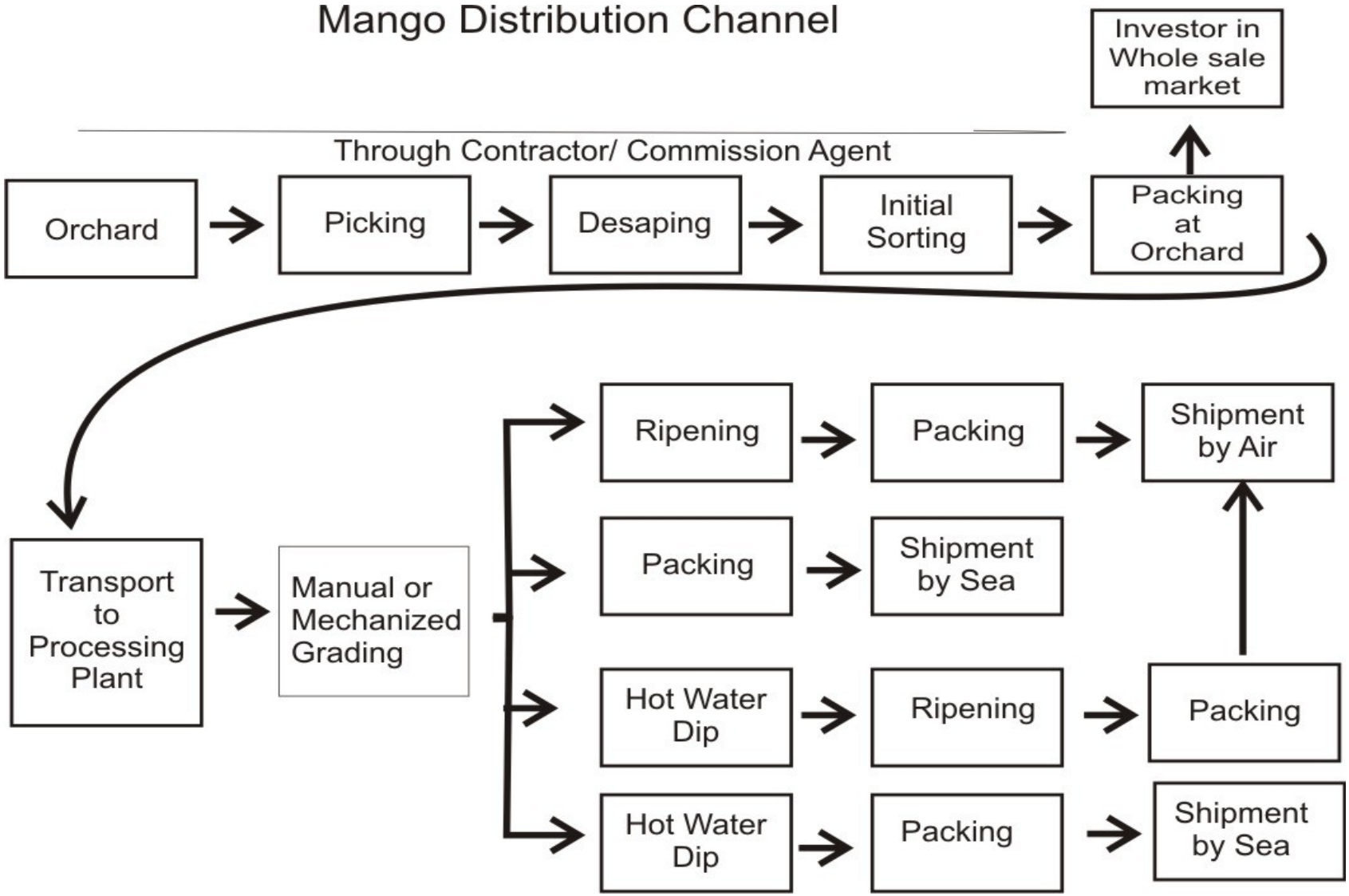
Value chain analysis helps to identify constraints to competitiveness and growth. Value-adding activities in the agro-based products are picking, sorting, washing, waxing, grading, packing, cooling/storage, transport, and logistics. These value-addition activities increase the cost of products, but the value added dominates cost and therefore increases the firm’s profit and customers also pay a premium if processing for value addition is executed professionally.

Primarily two distribution channels run for mango fruit. Mango fruit of the orchard of a season is purchased by the contractor directly from the owner of the orchard. Contractor known as BEKHAR in the local language actually gets money from the commission agent to purchase the fruit of the orchard. So, contractor is working for the commission agent.

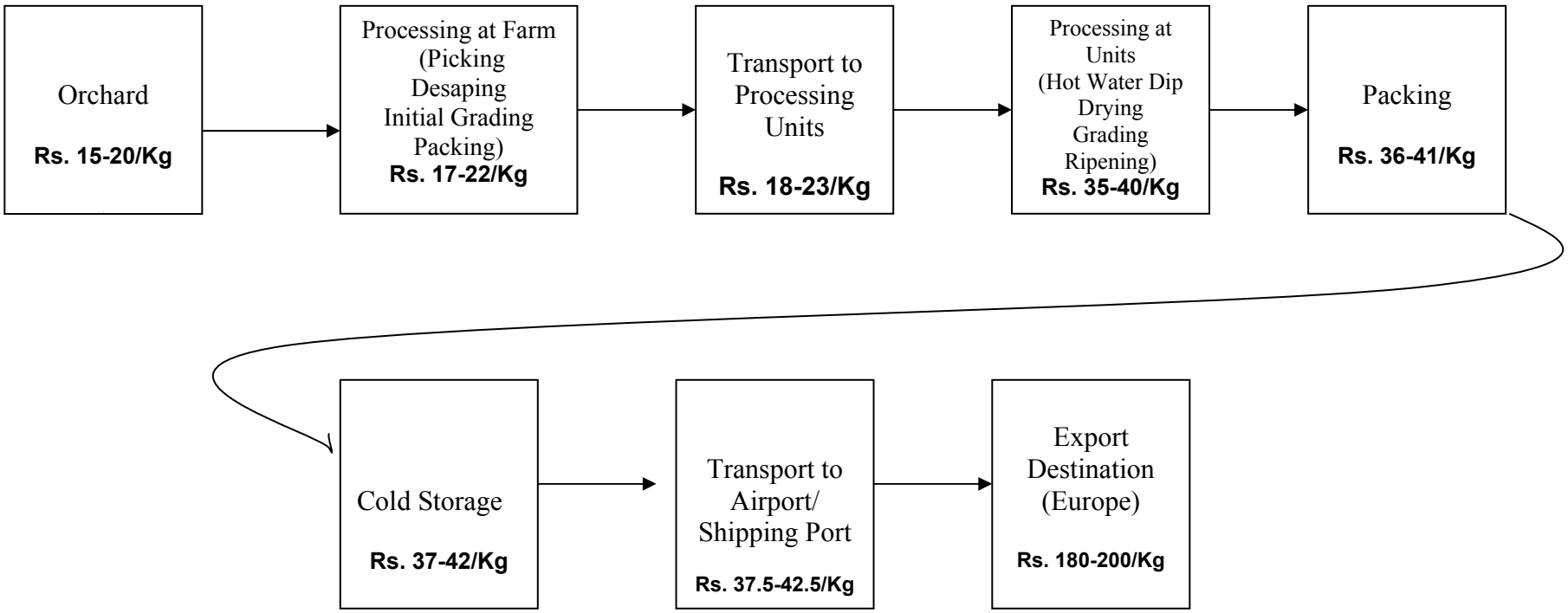
Commission agent now sells the fruit to investors in the local whole sale market (Mandi). Commission agent is also the exporter, so the high quality fruit is braught to the processing plant where it is processed for

export. According to the SPS agreements signed by Government of Pakistan with different countries hot water dip is essential requirement for mangoes to be exported to Iran, China and Europe. Presently only three processing plants have the facility of hot water dip. Ripening is mostly carried out for the mangoes going to the export destination by air.

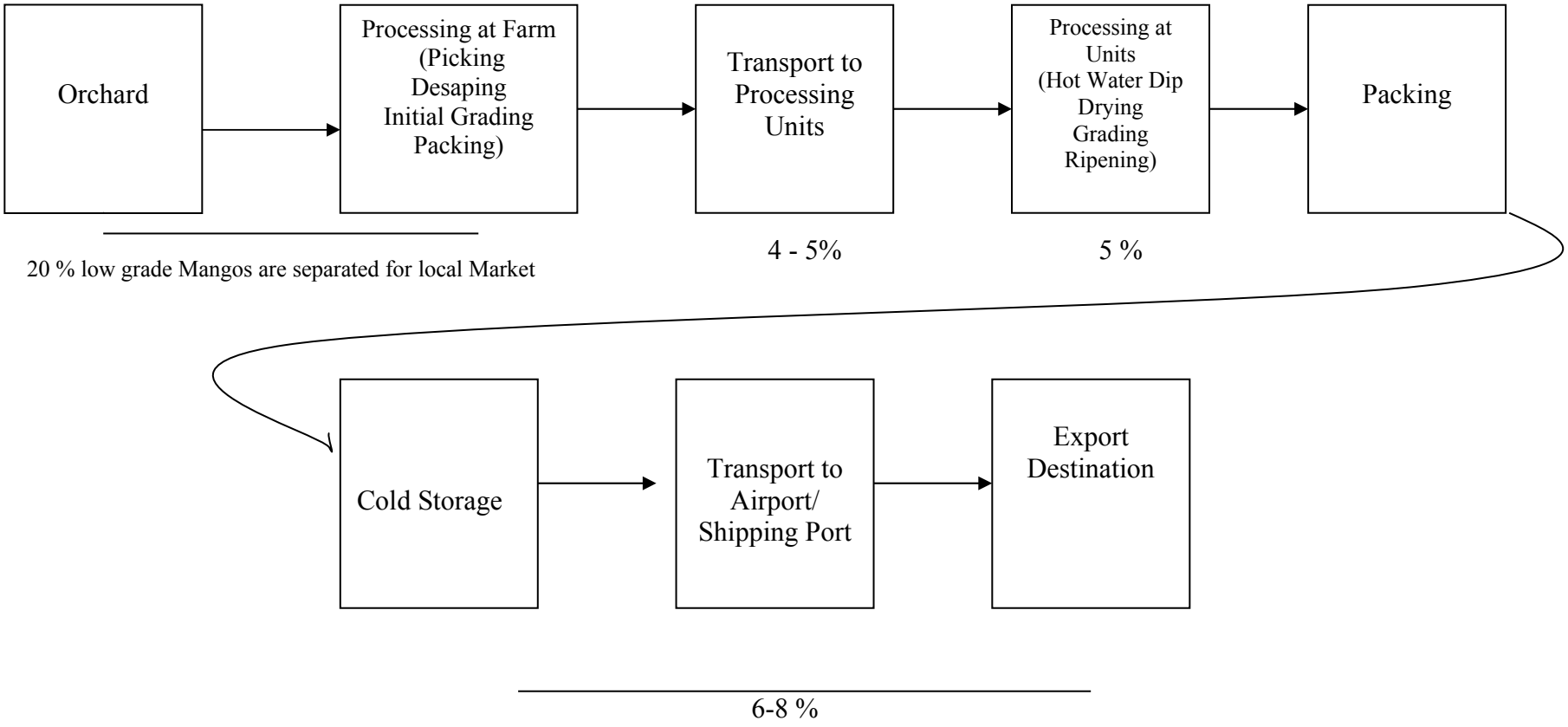
The analysis of value chain indicates that on an average the purchase price of mango is Rs 15 – 20/Kg. Mango is sold very cheap during the gluts. The cost of mango reaches to Rs 36 – 41/Kg after processing. Due to the highly perishable nature of the fruit and improper picking and handling 20% of the loss occurs at the farm level. The mango is then put in the plastic baskets and transported to the processing plants in open trucks. During this at least 4 - 5% of the mango is lost. At the processing plant during the processing again 5% is lost. 6 – 8% of the fruit is lost during transportation to the export destination. So the total loss reaches to 40%.


Mango Distribution Channel
Investor in Whole sale market
Through Contractor/ Commission Agent
Orchard
Picking
Desaping
Initial Sorting
Packing at Orchard
Transport to Processing Plant
Manual or Mechanized Grading
Ripening
Packing
Shipment by Air
Packing
Shipment by Sea
Hot Water Dip
Ripening
Packing
Hot Water Dip
Packing
Shipment by Sea

MANGO VALUE CHAIN ANALYSIS



Mango Value Chain Analysis
%Losses/Wastages



Note : There are 40% losses along the whole value chain

4.2.4 Export Competitiveness of the Sector

The study identified that the major export destinations of Pakistani mango are Norway, Sweden, UK, Germany, Switzerland, Canada and Middle East. The processors and exporters declare that there is no competitor of Pakistani mango all over the world. It is due to the fact that at the time (May to September) when Pakistani mango matures and arrives in market, there no other mango in the market. Secondly, Pakistani mango has inherent good quality and standard that is not produced any where in the world particularly white chaunsa.

Pakistani processors and exporters recognize the competitive price and inherent good quality, particularly the taste as the strengths of Pakistani mango Both the processors and the exporters are very enthusiastic to increase their exports but some major factors which do not allow them to enhance exports are the inability to comply with international quality standards of processing, inability to make deliveries at decided delivery times and loans to purchase mango from the market and pay freight charges. Special flights for export, if arranged, to make the export quick will definitely have a positive impact on the export of mango.

4.2.5 Quality and Standards

Pakistani processors and exporters describe the fruit quality and standard as clean, undamaged and clean fruit with good appearance, appropriate size and colour, external beauty, no sap lines, bruise free, disease free(No spots of any fungal disease) and harvested at proper time. Importers of Pakistani Mango describe quality in a slightly different way. Their parameters of quality standards are proper desaping of mango (fruit without sap lines), mango originated from Global GAP certified farm, reasonable size colour and appearance, bruise free, disease free (No spots of any fungal disease) and long shelf life.

Exporters face serious issues/problems to maintain the quality standard requirements. The primary issue is the global GAP certification of the farms. As mentioned earlier there are only 7 Global GAP certified farms in Pakistan and importers demand fruit originated from certified farms. The demand of global GAP certification by the importers is primarily due to traceability. Traceability is the primary of international market Pakistani exporters should develop the ability to trace back and track forward the movement of ingredients and finished goods along the supply chain. To comply with the international standards it is mandatory that all members of the supply chain are able to trace goods one step forward and one step backward, as well as know the transporter of

the goods. Availability of cold storage and reefer containers for transport of mango are the issues which need attention.

Maintenance of mango orchard is necessary to get good quality fruit. Pruning of mango tree is an essential feature of mango farming. Mango tree usually assumes a graceful dome shape shading the main trunk. No pruning is practiced. It is necessary that annually after fruit harvest diseased, dried, broken branches and those touching the ground should be pruned off. To rejuvenate the orchard after every 3-4 years it is advisable that 15-20% of old wood should be removed. Considering the size of mango tree use of mechanical pruner becomes necessary.

4.2.6 Compliance Status

Processors and exporters take general quality control measures along the whole value chain. These measures include hiring of skilled labour, giving high salary to labour to get good results, keenly monitoring of the desaping process to ensure clean appearance of the fruit, arrangement of plastic containers to keep harvested mango and plastic tubs for lime treatment and removing injured mango after desaping. These quality control measures are not enough for them to comply with the standards of high price EU markets.

The requirements for additional quality improvement in the next three years form a very long list. The processors and exporters wish to have cutters and grippers for harvesting, hydraulic lifter for harvesting, ethylene chamber for ripening, cool storage, global GAP certification of orchards, mango grading machine, refrigerated containers for transport and arrangement of special cargo flights during the season

Compliance activities carried out by processors and exporters interviewed are achieving Certification to an International Standard (Global GAP for orchards), meeting Health, hygiene, sanitary requirements, abiding labour laws (child labour etc.) and getting products tested in accredited laboratories.

4.2.7 Testing & Certification Capacity

The tests necessary to be performed for mango export are Leaf Analysis Fit for Human Consumption and Water test. Exporters have to send their samples to PCSIR laboratories, Lahore and NIAB, Faisalabad for testing. This wastes lot of time. It is the need of time that a well equipped laboratory and internationally accredited should be established for citrus cluster in Multan to facilitate exporters. This will have positive impact in enhancing exports and also lead to poverty alleviation.

4.2.8 Value Addition & Productivity

Currently approximately 3 per cent of mangoes are processed into value added products such as pulp for use in drinks and ice cream, canned mangoes and dried mangoes. The processors visited, produce 1000 to 5000 tons of pulp annually. Pulp is held in 200-250 litre drums in cold storage. Mangoes are generally purchased from the wholesale market at normal wholesale prices. No quality standards are communicated to potential suppliers; mangoes are purchased mature green and ripened using calcium carbide on the processor's premises. Fruit is then graded for processing. Bruised, rotten or unripened fruit are removed. After processing, skins are discarded and seeds are supplied to the nursery industry. Although its inherent quality is suitable and supply is available, very little processed mango is exported from Pakistan, mainly due to competition from a more organized mango industry in India and China.

4.2.9 Access to Markets

Exporters want to diversify their markets in the next three years. They are targeting for USA, Canada, Iran and chain Stores. For market diversification to increase exports they require support for introduction to new markets, meetings with foreign trade delegations, arrangement of trade delegations to foreign countries by government of Pakistan, funding and marketing by Government of Pakistan. Processors and exporters need comprehensive training for marketing Pakistani Mangoes all over the world.

Sanitary and Phytosanitary standards continue to hinder market access. Pakistan is not complying with SPS standards because of limited SPS management capacity, food safety, animal health and plant health capacity. Therefore it has become necessary for Pakistan to develop a SPS inspection system.

Name of the country	SPS requirements
Iran	Hot Water Treatment at 45 °C for 75 minutes.
China	Hot Water Treatment at 48°C for 75 minutes
Jordan	The consignment should be free from quarantine pests i.e. Peach Fruit fly (*Batrocera zonata*), Melon Fruit fly (*B. cucurbitae*), Oriental Fruit fly (*B. dorsalis*) and Guava

	Fruit fly (*B. correcta*).
Europe	Hot Water Treatment at 48°C for 75 minutes in Hot

SPS requirements of different countries for the import of fresh mangoes from Pakistan

Different countries have different SPS requirements to ensure food safety. According to the SPS agreements signed by Government of Pakistan with different countries for the export of mango, Iran requires hot water treatment of mangoes at 45 °C for 75 minutes. China and European countries also requires hot hater treatment but at 48°C for 75 minutes.

4.2.10 Policy Capacity & Support

Farmers, processors and exporters mostly rely on their own resources and skills to maintain and raise quality. Government departments do not take interest. PHDEC however, is providing guidance to a few farmers and processors. It also provides information to the exporters about the international markets. PHDEC is the only service providing agency for quality and compliance issues. PHDEC field officer gives information and advises to the farmers, processors and exporters about plant diseases, certifications required for export, market updates and preparation to get certifications, i.e., HACCP, BRC and Global GAP.

There is no particular help extended by the Multan chamber of commerce and industry, except for the arrangement of trade delegations. For resolving the issues of concern in the whole value chain, processors and the exporters are not getting any particular and directional support from any government agency. They have not used the services of SMEDA, NPO or any other agency. PHDEC has a field office in Multan for the mango growers in Punjab and in Tando Allah Yar for the mango cluster in Sindh province, but lack of funds and human resource is affecting its performance. However with limited resources PHDEC is providing technical support in improving orchard management and labour training.

4.2.11 Intellectual Property Rights

Producers, processors and exporters are not aware of the IP system, so they have never used it to protect their technologies and obtain new technologies. The respondents are not aware of the IP services provided by SMEDA and IPO. Exporters face technical problems, but ninety four percent have not collaborated with any research institution or university to obtain solutions to the technical problems which they face or for the upgradation of technology. However, more than seventy percent of the producers and exporters are ready for any kind of collaboration to proceed for IP system.

Multan Mango Growers Association, however have filed case for getting white chaunsa as patent. President of the association is very enthusiastic to work on IP issues, but requires technical support.

4.2.12 Recommended TRTA Interventions

Processors and exporters foresee a variety of interventions across the value chain. There is a growing concern over the maintenance of orchards and the quality of fruit which is being supplied from the orchards.

Role of middle man is also highly objectionable to the growers. Middlemen do not take care of the fruit properly and ultimately the fruit which reaches the processing plants is scratched. The primary interventions suggested in the value chain are

- Farm Owner/Middle man should do grading
- Ripening Chamber
- Installation of Grading Machine

The average cost of a kinnow processing plant is Rs 3.5 million, cost of land is in addition to this. All the processors and exporters of kinnow have established processing plants by using their own resources. Perhaps mango producers and exporters should be persuaded to arrange their own resources to establish processing plants. Government of Pakistan can extend support by providing soft loans, if required. Technical support could be provided by development agencies.

Following interventions are suggested in the value chain are:

- Training workshops to improve farming techniques

- Improvement in picking practices
  Hydraulic lifter for harvesting
  Cutters and grippers for harvesting

- Technical assistance for improvements in the pruning techniques

- Provision of technical assistance to develop improved lime water treatment (desaping)

- Training the staff of processing plants/field operators for processing the mango

- Development of improved post harvest techniques to ensure increased shelf life by provision of:

1. Pack houses with complete processing lines
2. Blast chillers and Cool storage
3. Refrigerated containers for transport
4. Ethylene chamber for ripening

- Awareness programmes (workshops/seminars) for exporters/processors on international food standards

- Development of a traceability system from farm to fork through proper labeling using
  1. Paper based system
  2. PC based software system

- Development of food safety standards specifically customized for Pakistan

- Improvements in the supply chain to reduce the post harvest losses through the development of schemes to promote market access to the farmers

- Provision of technical assistance to the processors to help them achieve third party certifications like Global GAP/ Pak GAP, HACCP, BRC etc.

- Strengthening of Multan Mango Growers Association and Mango Growers Cooperative Society

4.3 Monitoring Indicators

Monitoring indicators are shown in the following matrix

No.	Monitoring variable	Level*	Definition	Unit	Base line	Target	Source
1	Capacity of inspection system	1	Nos. of inspectors/1000 consignments of exports annually	One Inspector posted each at Airport and shipping port to check all export consignments. In addition one Inspector posted during season in Sargodha to check all consignments.	4 for all consignments	10	PACE CA survey and PIFFA
2	EU RASFF alerts rate	1	No. of RASFF alerts for products of plant origin/100 consignments	%	22.6/No. of consignments	11.3/no. of consignments	DG SANCO PIFFA
3	Inspection capacity	1	No. of inspectors/100 enterprises under control	No.	Zero	20	PACE CA survey
4	SPS Compliance rate	2	% of enterprises with full & minor non-compliance/no. enterprises under control	%	86% Non Compliant	50% Compliant	PACE CA survey
5	Market limitation rate	3	% of enterprises reporting market access limits due to SPS controls	%	96%	50%	PACE Enterprise survey (2)
6	Export reject rate (by sector)	3	No. of quality related disputes/100	%	30%	15%	PACE Enterprise

			consignments				**survey**
7	**Employment rate in exports**	**4**	**No. of employees/ U$1000 of exports**	**No.**	**50**	**75**	**PACE Enterprise survey**
8	**Female employment rate in exports**	**4**	**No. of female employees/ U$1000 of exports**	**No.**	**Nil**	**25**	**PACE Enterprise survey**

[*] *Level refers to the output/outcome/impact diagram overleaf*

5. Conclusion

Export growth and diversification are decisive contributor to economic development and economic growth is primarily a matter of increasing productivity and efficiency. Every country needs a vision statement which stirs the imagination and motivates all segments of society to move towards greater level of scientific progress, economic growth and human development. Synthesis of thoughts is an essential step in building a consensus on a broad national development strategy encompassing the roles and responsibilities of different agents in the economy.

The time is therefore opportune for revitalizing our agricultural progress by making agrarian prosperity, food security and sovereignty the bottom line for government policies and priorities in agriculture and rural development. For the development of horticulture sector in Pakistan both general (transport, electricity and telecommunications) and horticulture-specific infrastructure (cold storage areas and irrigation) must be available, as well as a liberal trading environment, such that inputs and foreign exchange are readily obtainable. Sufficient air cargo space is a particular concern.

In successful exporters, government intervention has been minimal, although assistance to growers in the form of extension services and support for producer associations can be helpful. Market access to developed country markets is a significant barrier. Agents with international connections such as resident Asians or foreign buyers play a crucial role in linking local economies to the international system, providing capital and know-how. Donor assistance can also be important in the initial phases.

Annex
Action Plan Matrix

Actions Recommended	Agencies/Actors Involved Responsibility	Priority Very High/High/Low
KINNOW		
• Training workshops to improve farming techniques	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
• Develop mechanized Picking systems (Lifter machine, cutting techniques etc)	UNIDO/PHDEC	Very High
• Development of improved mechanisms for transport of fruit from farms to processing plants to minimize field heat losses	UNIDO/PHDEC	Very High
• Facilitating the improvement of waxing techniques through the identification of quality waxes.	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
• Improvement of sorting/grading practices	UNIDO/PHDEC	High
• Awareness programmes (workshops/seminars) for exporters/processors on international food standards	UNIDO/PHDEC/Provincial Agriculture Departments	High
• Development of a traceability system from farm to fork through proper labeling using	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
	UNIDO/NAPHIS	Very High

1. Paper based system 2. PC based software system • Development of food safety standards specifically customized for Pakistan • Improvements in the supply chain to reduce the post harvest losses through the development of schemes to promote market access to the farmers • Provision of technical assistance to the processors to help them achieve third party certifications like Global GAP/ Pak GAP, HACCP, BRC etc. • Strengthening of the kinnow Growers Association	UNIDO/PHDEC/Provincial Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments	Very High High Very High
MANGO • Training workshops to improve farming techniques • Improvement in picking practices Hydraulic lifter for harvesting Cutters and grippers for harvesting	UNIDO/PHDEC/Provincial Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments	Very High Very High Very High

• Technical assistance for improvements in the pruning techniques	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
• Provision of technical assistance to develop improved lime water treatment (desaping)	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
• Training the staff of processing plants/field operators for processing the mango	UNIDO/PHDEC/Provincial Agriculture Departments	Very High
• Development of improved post harvest techniques to ensure increased shelf life by provision of: 1. Pack houses with complete processing lines 2. Blast chillers and Cool storage 3. Refrigerated containers for transport 4. Ethylene chamber for ripening	UNIDO/PHDEC/Provincial Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments	High Very High
• Awareness programmes (workshops/seminars) for exporters/processors on international food standards	UNIDO/NAPHIS UNIDO/PHDEC/Provincial Agriculture Departments	Very High Very High
• Development of a traceability system from farm to fork through proper labeling using	UNIDO/PHDEC/Provincial	High

1. Paper based system 2. PC based software system • Development of food safety standards specifically customized for Pakistan • Improvements in the supply chain to reduce the post harvest losses through the development of schemes to promote market access to the farmers • Provision of technical assistance to the processors to help them achieve third party certifications like Global GAP/ Pak GAP, HACCP, BRC etc. • Strengthening of Multan Mango Growers Association and Mango Growers Cooperative Society	Agriculture Departments UNIDO/PHDEC/Provincial Agriculture Departments	Very High