



CITRUS MARKETING STRATEGY

Pakistan Horticulture Development & Export Board

May 2005

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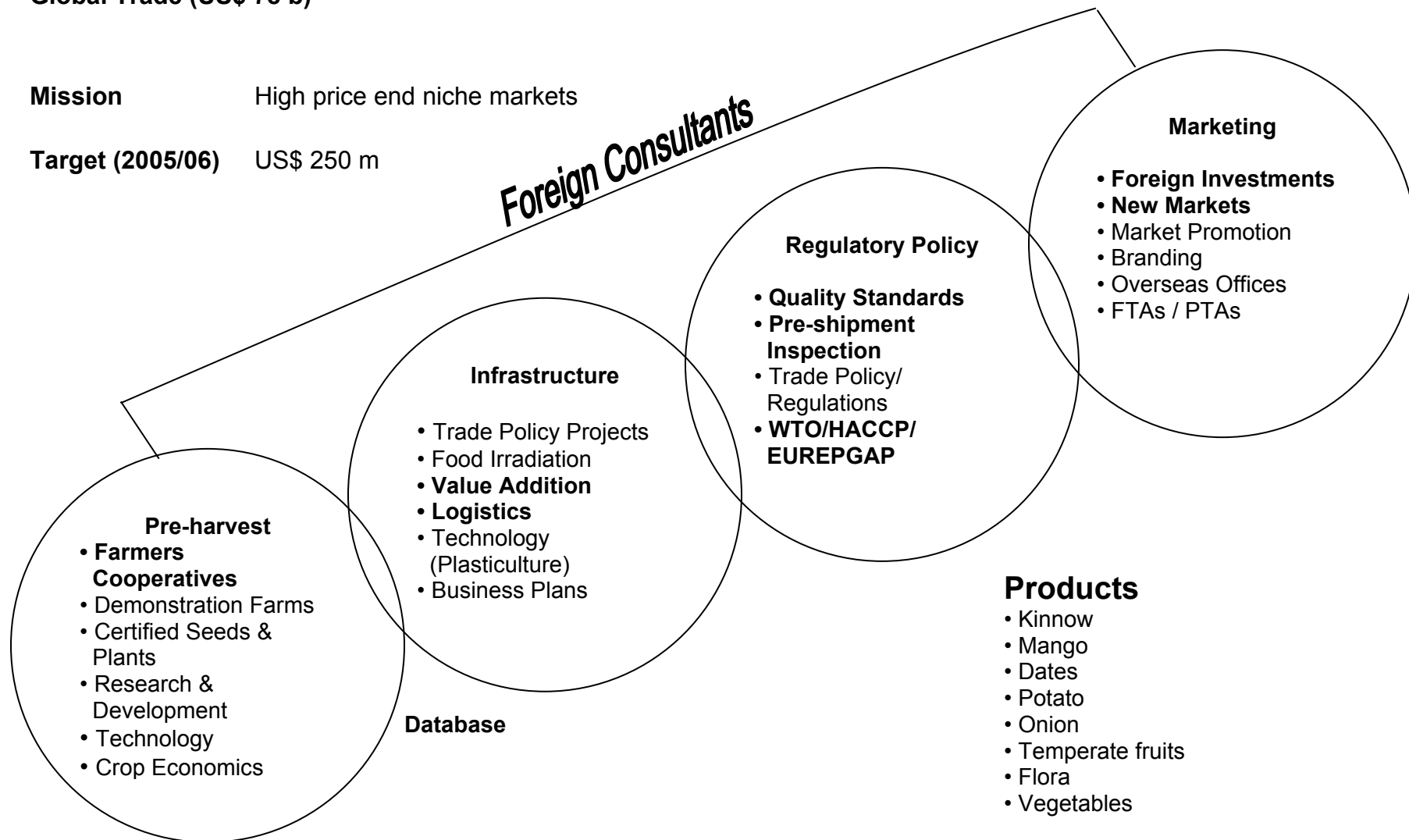
PHDEB OVERALL STRATEGY

PHDEB OVERALL STRATEGY

PHDEB Strategy - Schematic View
Global Trade (US\$ 78 b)

Mission High price end niche markets

Target (2005/06) US\$ 250 m



PHDEB –Strategy

Mission: High price end niche international market

Target: US\$ 250 million (2005/06)

Products:

1. Kinnow
2. Mango
3. Dates
4. Potato
5. Onion
6. Temperate fruits
7. Flora products (cut flowers, foliage)
8. Vegetables
9. Processed products

Broad Working Areas

1. Pre-harvest
2. Infrastructure
3. Regulatory/Policy
4. Marketing

Outputs/Activities/Interventions

1.0 Pre-harvest

1.1 Farmers associations/cooperatives

- 1.1.1 Citrus (kinnow) 1 (Punjab)
- 1.1.2 Mango 2 (Punjab & Sindh)
- 1.1.3 Dates 3 (Khairpur, D. I. Khan & Turbat)
- 1.1.4 Temperate Fruits 3 (NWFP, NAs, Balochistan)
- 1.1.5 Potato 2 (Punjab)
- 1.1.6 Onion 2 (Sindh & Balochistan)
- 1.1.7 Flora 4 (Punjab, Sindh, NWFP & Balochistan)
- 1.1.8 International expert

1.2 Model demonstration farms

- 1.2.1 Citrus (kinnow) 5 Punjab
- 1.2.2 Mango 2 (Punjab & Sindh)
- 1.2.3 Temperate Fruits 3 (NWFP, NAs, Balochistan)
- 1.2.4 Flora 4 (Punjab, Sindh, NWFP & Balochistan)

- 1.3 Certified seeds & plants
- 1.4 Research & Development
- 1.5 Economics of fruits & vegetable cultivation

2.0 Infrastructure

- 2.1 Value addition
 - 2.1.1 Processors meeting/contacts
 - 2.1.2 Pre-feasibility reports/business plans (SMEDA, BOI, EAC, DFIs,)
 - 2.1.3 Presentations in CC & Is
- 2.2 Logistics
 - 2.2.1 Reefers availability (Regional/Inland)
 - 2.2.2 GenSets
 - 2.2.3 Shipping companies
 - 2.2.4 Air cargo space (PIA, charters flights.....)
 - 2.2.5 Pakistan Railways
 - 2.2.6 NATCO, NLC & private sector
- 2.3 Technology
- 2.4 Trade policy initiatives/Food irradiation
 - 2.4.1 Projects follow up
 - 2.4.2 Monitoring system
 - 2.4.3 Cool van proposal

3.0 Regulatory/Policy

- 3.1 Quality standards
- 3.2 Pre-shipment inspection
- 3.3 Regulations/Trade policy
- 3.4 Compliance (WTO, EUREPGAP, HACCP, SPS.....)
 - 3.4.1 Workshops
 - 3.4.2 Seminars
 - 3.4.3 Website
 - 3.4.4 HortiMag
 - 3.4.5 Extension material
 - 3.4.6 Print media (Articles)
 - 3.4.7 Documentaries

4.0 Marketing

- 4.1 Foreign investment (JVs)
- 4.2 New markets

- 4.2.1 Mapping of potential foreign markets
- 4.2.2 Quarantine requirements
- 4.3.2 Compliance
- 4.3 Trade agreements/protocols (PTAs, FTAs,.....)
- 4.4 International branding & market promotion
 - 4.4.1 International expert on brand development
 - 4.4.2 Overseas offices (Europe, Far East, Middle East)
 - 4.4.3 Publicity (Fruit Journals, printed matter)
 - 4.4.4 Exhibitions
 - 4.4.5 Delegations
- 4.5 Local branding & distribution system

CITRUS OVERVIEW

Citrus (Kinnow)

1. Background Information

Pakistan is blessed with vast agricultural resources on account of its fertile land, well-irrigated plains, extremes of weather, and centuries old tradition of farming. It is because of its central importance in the economy that the Government has identified agriculture as one of the four major drivers of growth. According to an estimate, the total value of agriculture crops at current factor cost is estimated at Rs.550.268 billion, divided into major crops Rs.407.623 billion and minor crops including horticulture Rs.142.645 billion. The horticulture crops (fruits, vegetables & condiments) alone contribute Rs.116.645 billion, equivalent to US\$ 2 billion, which is 26% of the total value of all crops and 81.8% of the total value of minor crops.

Pakistan annually produces about 12.0 million tons of fruits and vegetables. Citrus fruit is leading in term of production followed by mango, dates and guava. Potato and onion are leading among vegetables and condiments. Fruit and vegetable export trade in Pakistan amounts to US\$ 134 million (2003/04), of which fruits account for US\$ 102.7 million (76.6%), vegetables US\$ 25.7 million (19.2%) and fruit & vegetable preparations (mostly juices) US\$ 5.6 million (4.2%). Their share in Pakistan's total exports is slightly over one percent.

Pakistan has unique but unsophisticated network of up to six or seven intermediaries between the primary source (producer and growers) and the end user. Because of the presence of so many layers and the lack of adequate marketing infrastructure facilities, 30 to 40% of the perishable produce gets spoiled before reaching the ultimate consumer.

Citrus fruit (mandarins, Clementine & oranges) is the most important tree fruit crop in the world. It is consumed direct as a fruit as well as juice (fresh & concentrates). Citrus fruits include oranges, mandarins (Kinnow), grapefruit and lemons, of which mandarins (Kinnow) is of significance to Pakistan. Kinnow is a cross between 'King' & 'Willow-leaf' species of Citrus Fruit, successfully experimented at the Citrus Research Centre, University of California, USA in 1951. Both of these parents have Indo-China origins. The soil and climatic conditions in Pakistan have given 'Kinnow' a unique flavour which distinguishes it from other comparable cultivars (mandarins) grown in the World.

The world market for citrus is expanding. The exporting countries are striving to further expand their market share as new markets open up with world trade liberalization.

2. Citrus Fruit Production in Pakistan

Pakistan annually produces slightly less than 200 thousand metric tons of citrus fruit (mainly kinnow). Area and production of citrus fruit in Pakistan have remained almost static over the past 5 years (Table 2):

Table 2: Area and production of Citrus Fruit for the Period from 1997/98 to 2001/02 in Pakistan

Year	Area (Ha)	Production (Tons)
1999/00	197,703	1,943,205
2000/01	198,670	1,865,518
2001/02	194,235	1,830,276
2002/03	181,577	1,702,347
2003/04	176,463	1,760,346
Average (1999-2003)	189,730	1,820,338

Source: **Fruit, Vegetables and Condiments Statistics of Pakistan, Ministry of Food, Agriculture and Livestock, Government of Pakistan, Islamabad.**

Citrus fruit in particular Kinnow production is almost confined to Punjab province, while oranges are mainly produced in NWFP. Province-wise production of citrus fruit is presented in Table 3:

Table 3: Province-wise Production of Citrus Fruit in Pakistan

Province	Area		Production	
	'000' ha	%	'000' Tons	%
Punjab	188	94.5	1,810	95.6
Sindh	4	2.0	30	1.6
NWFP	5	2.5	40	2.1
Balochistan	2	1.0	14	0.7
Pakistan	199	100.0	1,894	100.0

Source: **Fruit, Vegetable and Condiments Statistics of Pakistan, 2003-2004 Ministry of Food, Agriculture and Livestock, Islamabad.**

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 with annual production of about 150,000 tons ranks second and Sahiwal with 120,000 tons ranks third.

3. Harvest Season

Harvest season for citrus fruit starts from September with the harvesting of Feutral's Early and continues up to March ending with Kinnow, sometime extended on the tree up

to April. The harvest calendar of main citrus fruit producing countries which offer direct competition to Pakistan is presented in Table 4 below:

Table 4: Citrus Fruit Harvest Calendar for Main Producing Countries

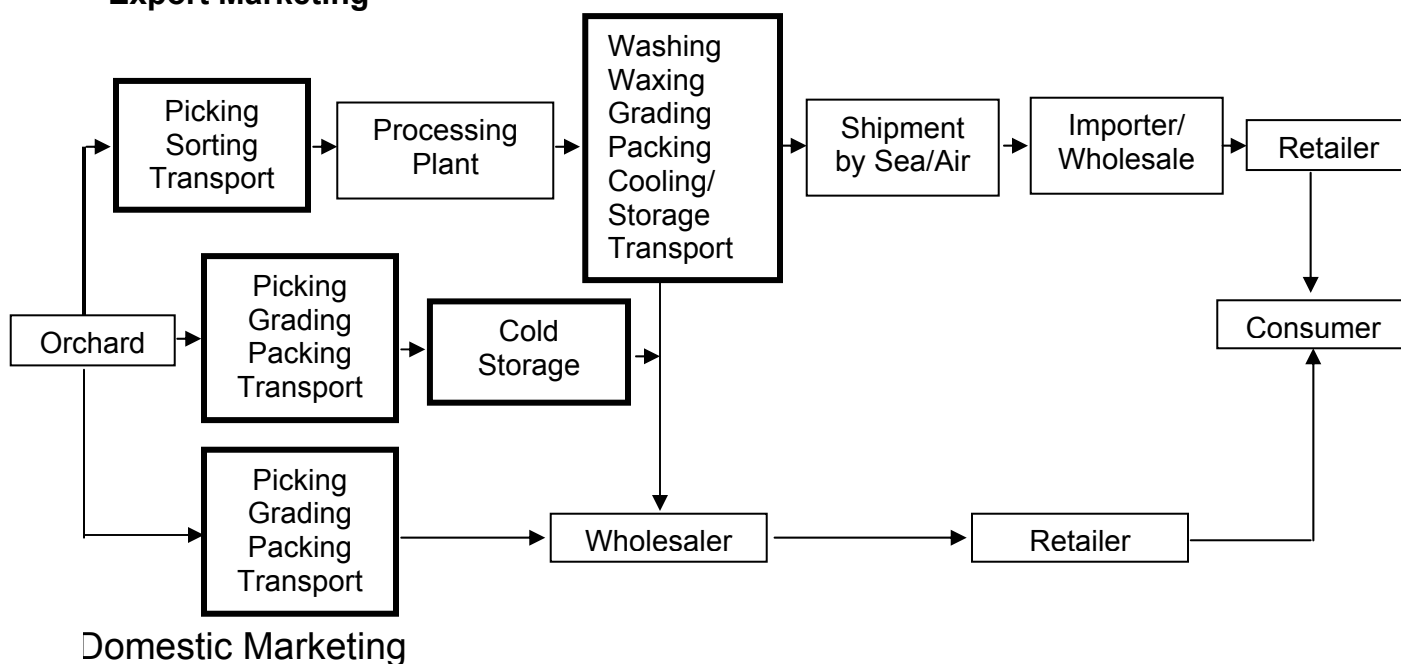
Country	M O N T H S											
	J	F	M	A	M	J	J	A	S	O	N	D
Australia												
Cyprus												
China												
Egypt												
India												
Israel												
Morocco												
Spain												
Tunisia												
Turkey												

4. Marketing System

Like other fruits, citrus fruit trade is with the private sector. However, Government largely facilitates the system by providing physical infrastructure especially wholesale markets & communication, market intelligence, market promotion and regulatory measures for smooth business operations. The flow chart of citrus fruit for export and domestic marketing is presented through diagram 1:

DIAGRAM 1: FLOW CHART – MANDARIN (KINNOW)

Export Marketing



5. Citrus Fruit Export

The world trade in citrus fruits is continuously growing. The prominent citrus fruit exporting countries include China, Pakistan, Spain, Turkey and Morocco. This has directly impacted exports of citrus fruit from Pakistan which steadily increased over the past 5 years.

The exports of citrus fruit from Pakistan for the last 5 years are given in Table 5:

Table 5: Export of Citrus Fruit form Pakistan from 1999/009 to 2003/04

Year	Quantity (Tons)	Value (000 US\$)
1999/00	82,750	13,916
2000/01	97,028	16,310
2001/02	121,692	20,842
2002/03	94,806	21,704
2003/04	149,587	30,763

Source: **Federal Bureau of Statistics, Government of Pakistan, Karachi.**

Export data for 2004/05 is still under compilation with the Federal Bureau of Statistics. However, the increase in tariffs from 5% to 25% in Indonesia combined with overvaluation of kinnow for tariff calculation purposes had significant adverse impact on export. Indonesia is the single largest market for kinnow. Annual exports of kinnow to Indonesia are around 30,000 tons.

Export of kinnow alone contributes about 97 percent in total export of citrus fruit from the country. Information on country-wise citrus fruit exports is contained in Annex 1. The kinnow exports are mainly directed to Indonesia, Dubai, Philippines, Afghanistan and Sri Lanka. The regional distribution is as follows:

Middle East/Gulf	Far East	Europe	Afghanistan	Others
30%	31%	16%	17%	6%

About 20,000 to 25,000 tons kinnow is exported to Central Asian Republics via Afghanistan (Chaman Border). This however remains unaccounted. The exporters say that they sometime the obtain form E for export purposes but most of the remittances are affected thru 'Havala'.

The consumption of oranges & mandarins as fresh fruit is declining in the developed countries. There are two reasons for this decline. First, it is being replaced by orange juice not from concentrates. Second with advances in transportation and storage, fresh citrus now faces more competition from other fruits such as banana, grapes and strawberries. On the other hand and contrary to the developed world, consumption in

many developing countries including India, Mexico, Argentina and Brazil is expanding. For Pakistan, Eastern European countries may emerge as potential markets. In some countries including Russian Federation & Ukraine It has already made entry.

The consumer is looking for convenience fruit and hence prefers seedless ‘mandarins’ or ‘oranges’. Therefore, efforts to produce seedless mandarins (kinnow) if succeed would open up new vistas for export of this fruit in the international market.

The projected export targets for export of kinnow from Pakistan over the next 5 years are presented in Table 6:

Table 6: Projected Citrus Fruit Exports from Pakistan

Year	Volume (000 tons)	Value (000 US\$)
2005/06	150	40
2006/07	160	45
2007/08	175	55
2008/09	200	70
2009/10	250	100

The above projections are based on the following assumptions:

- Reduction in tariffs (zero or previous level of 5%) and actual produce valuation (invoice value)–Indonesia.
- Verification of all units which conform to SPS requirements and allowing them market access- Philippines.
- Successful access to China & Iran.
- Compliance to sanitary & phyto-sanitary measures thru EUREPGAP & HACCP certification.
- Provision of physical infrastructure to address quarantine issues, for instance, compartmentalized cold storages equipped with automatic data loggers and reefer containers with sensors and data loggers.
- Improved logistics (availability of reefer containers, reefer haulage by road to Iran & China, etc).
- Consolidation of position in East Europe (Russian Federation & Ukraine)
- Market promotion (delegations, expositions, media)

6. Export Market Trend

The trend in marketing agricultural produce is toward fewer and larger processors and handlers. Farmers, too, are becoming fewer and larger, but their size and power in the market place remain small in comparison with processor/handlers. Packing house facilities are operating in many fruit and vegetable markets around the world. Growers

associations or cooperatives negotiate terms of trade with commercial companies. However, most of the time growers are operating in buyers market because supply of produce is abundant. Both growers and exporters have to keep pace with the changing market requirements. The best chance to make a profit for the growers is to meet the market requirements.

As most of the companies in the food-processing sector are in the small-sized category and economies of scale are difficult to attain in storage and transportation. This situation favors a service provider to whom these companies can outsource their storage and transport functions.

The world market is continually making higher demands for presentation, greater shelf life and uniform grading of fruit but also is requesting for more competitive commercial conditions including prices to develop consumption.

There is generally a large price differential between good, average, and poor quality fruit on the domestic as well as the export markets. Customers are becoming increasingly selective for high quality fruit. Customers are now looking to products safe to eat and less chemical prone during pre and post-harvest operations.

Due to poor production practices, poor cold storage facilities and inadequate research on their impact on marketability of the fruit, a substantial portion of the produce is rejected being unfit for export. This directly increases cost and renders produce uncompetitive in the international market especially due to over supplies from China which is close competitor of Pakistan.

Improvement in sea cargo handling has encouraged export by sea. As a result, citrus fruit from Pakistan is mostly shipped by sea except to Central Asian Republics. However, factors like non-availability of reefer containers, unilateral increases in freight rates and non-adherence to transit time continue obstructing smooth export operations and as a consequence export volumes. The problem is further compounded by unhealthy competition among the exporters entailing over supplies, credit sales and lack of effective associations for trade facilitation.

The problems encountered by the exporters on account of shipment by sea are reportedly as follows:

- Non-availability of reefers especially 20 feet containers
- Non-adherence to notified transit time
- Unilateral increase in freight amidst export season
- Off-loading cargo during transit
- Hidden charges (fuel adjustment, plug-in charges, container washing charges, handling charges at port of discharge etc).

- Non-entertainment of claims on account of cargo loss/damage caused by operational inefficiencies of the carriers like malfunctioning of reefer containers, unreasonably extended transit time etc.

7. International Market Preferences (Broad Parameters)

a) Size

- Gulf & Saudi Arabia 32-48 counts/10 kg
- Singapore & Malaysia 36-48 counts/10 kg
- Indonesia & Philippines 48-66 counts/10 kg
- Europe 66-81 counts/10 kg

b) Colour Red colour (In Far East it has ethnic/religious preferences)

c) Seed Seedless

d) Texture Firm

e) Rind Easy peeler, smooth & blemish free

f) Quality parameters TSS 12%, Sugar 9%, Acidity 1.0 (Max), TSS/Acid Ratio 10

8. Proposed Interventions

Pre-harvest

- Organization of Farmer Groups (PHDEB,DOA)
- Introduction of early and late maturing varieties (DOA)
- Awareness on GAP/EUREPGAP (PHDEB,DOA)
- Facilitate adoption of GAP (DOA,CABI,PHDEB)
- EUREPGAP certification (PHDEB)
- Facilitate contract growing (DOA,PHDEB)
- Improved extension services (DOA)

Harvesting & Field Handling

- Harvest at correct maturity keeping in view target market
- Correct harvesting techniques
- Use field collection boxes/bins
- On-farm sorting & manual grading

Post-harvest Processing Infrastructure

- Cold storages preferably CA storage (Facilities proposed under APZ)
- Washing, waxing & grading
- Blast chilling
- Quality assurance laboratories
- Packaging & labeling (SPS compliance)

Logistics

- Inland refrigerated transport (Road/Rail)
- Overseas shipment (sea/road)

Market Expansion

- New markets (Preferably thru bilateral trade agreements)
- Business contacts thru export delegations
- Product promotion thru expositions
- Branding
- Publicity

Market Information Collection & Dissemination

- Mapping of potential markets
- Import market requirements of product quality, packaging & labeling
- Import market legislation on tariffs, SPS, etc.
- International competitors & their strengths
- International Prices

Regulatory

- Compliance to emerging international requirements (SPS measures)
- National grades & quality standards
- Pre-shipment inspection

Research and Development

- Management of fruit flies & skin blemishes
- Physiological disorders like chilling injury at low temperature regimes
- Value addition

CITRUS FRUIT EXPORT MARKETING PLAN 2005/06

Pakistan Horticulture Development & Export Board

Citrus Fruit Export Marketing Plan 2005/06

Preamble

Citrus fruit in general and mandarins, Clementine & oranges in particular are among the most favored tree fruit crops in the world. The world market for citrus is expanding. The exporting countries are striving to further expand their market share as new markets open up with world trade liberalization. The soil and climatic conditions in Pakistan have given 'Kinnow' a unique flavour which distinguishes it from other comparable cultivars (mandarins) grown in the World. Though fluctuating from year to year, export of kinnow from Pakistan has exhibited an increasing trend.

Export Targets

Current Exports	100,000 tons
Target (2005/06)	150,000 tons

Citrus (Kinnow Production)

Anticipated production (2005/06) 2.0 million tons

Existing Main Markets

Market	Volume (Tons)	Value (US\$000)
Dubai	28,788	5,684
Indonesia	29,042	6,230
(Drastic decline in 2004/05 due to increase in tariffs)		
Afghanistan	25,524	4,586
Philippines	15,778	3,133
Saudi Arabia	14,484	2,992
Sri Lanka	9,115	1,825
Netherlands	5,611	1,269

About 20,000 to 25,000 tons kinnow is exported to Central Asian Republics via Afghanistan (Chaman Border). This however remains unaccounted. The exporters say that they sometime the obtain form E for export purposes but most of the remittances are affected thru 'Havala'.

Emerging Markets

China (MOU signed)
Iran (MOU signed)
Russian Federation & East Europe (Already entered)
South Korea (To be accessed)

South Africa (To be accessed)

Allocation of Export Targets (Additional)

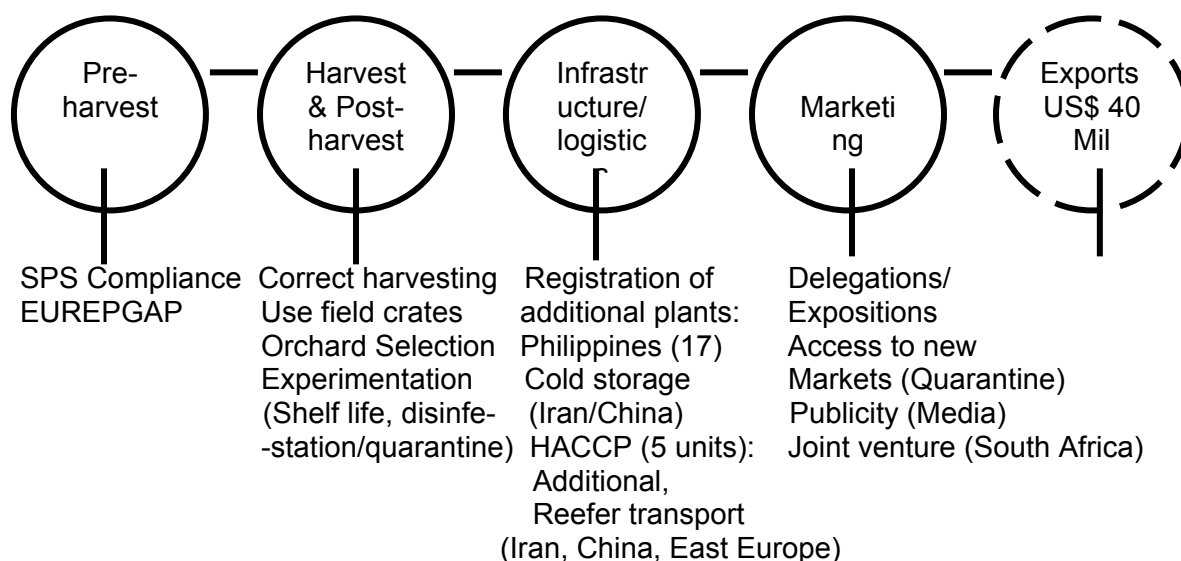
China	5,000 tons
East Europe	15,000 tons
Iran	20,000 tons
Indonesia	5,000 tons
Philippines	5,000 tons

The net gain in revenue will be more than the proportionate increase in volumes due to improvement in quality and presentation.

Pakistani exporters are experiencing competition from China. China starts exporting easy peelers to the Far East markets in October, earlier than Pakistan, and the Chinese season ends early March. Quality of Chinese citrus has been improving rapidly and citrus are packed in cardboard cartons only.

Marketing Plan for 2005/06

Schematic view:



Follow up Actions

Pakistan has the potential to fill a number of citrus marketing niches in the world, particularly in the Far/Middle Eastern markets, East Europe, China and Iran by addressing issues currently confronting the citrus fruit industry. The international market is becoming highly competitive and customers choosy. This necessitates concerted

efforts and effective planning to sustain and grow in the international trade of citrus fruits. These are briefly discussed below:

Regulatory Measures

- Meeting quarantine (cold treatment) requirements for Iran & China using existing infrastructure (cold storages & reefer containers)
- Reduction in tariffs for exports to Indonesia, the single largest market.
- Visit of Quarantine Official from Philippines for allowing access to all those plants/exporters which meet their requirements
- Bringing into loop the exports to CIS via Chamman border

Product Improvement

Citrus fruit consumer surveys conducted around the world have identified the need for 'convenience fruits' – fruit that can be consumed quickly and without excessive seed numbers (Japanese Satsuma mandarins possess these characteristics). Customers other expectations include easy-peeler, clean, residue-free, high quality fruit which has good shelf-life. Following actions are needed:

- Reduce number of pips/seeds in citrus or introduce seedless cultivars.
- Introduce early and late maturing cultivars to extend time window.
- Improve production practices to improve yield, fruit quality and shelf-life.

The National Institute of Bio Genetic Engineering (NIBGE) under the Nuclear Institute for Agriculture and Biology (NIAB) at Faisalabad has started limited production of seedless kinnow and 50 plants have been planted in Bhalwal at Demonstration Orchards. These would provide bud-wood for further multiplication of seedless plants in the nurseries with the farmers. This combined with improved production practices especially adoption of EUREPGAP protocols and certification of farms will support efforts for enlarging market for kinnow.

It may be added that Australia with only one percent of the world citrus production has imported more than 50 new varieties and clones during the last 10 years, giving the industry an opportunity to supply good-quality citrus fruit around the year. The local citrus industry is provided with research and development technology equal to the world's best. State and National agencies, together with funding agencies, work closely to provide answers to most of the cultural, packaging and processing problems confronting the citrus industry. Technical support is available in areas including post-harvest, crop improvement, quality management, pathology, virology, fruit fly, dwarfing, variety evaluation, nutrition, irrigation and marketing.

It is estimated that about 35% of the current growing crop is of a quality acceptable on world markets while another 35% though unsuitable for export, would be of a quality acceptable to the top quality range of the domestic market. This overall crop selection up to 70% of the harvested crop would be a viable proposition and anything less than this will render the commercial operation unviable. The remaining 20% being culls could be utilized by the processing industry.

The strategy will comprise of three components:

- i) Present production- selection and grading
- ii) Orchard improvement
- iii) New orchards adopting high technology

Improvement to existing orchards will include:

- i) Inter-planting: Removal of all intercrops and adopting a policy of clean cultivation.
- ii) Nutrition: Applying complex NPK fertilizers in accordance with recommendations, based upon regular soil and foliar analysis; applying copper, zinc, iron and manganese foliar sprays when necessary.
- iii) Pruning: Remedial pruning to restore shape, reduce overcrowding and size and remove all crossing and dead branches particularly with in tree canopy.
- iv) Spraying: Preventative spray programs regularly carried out in conjunction with professional advice on biological control.
- v) Tillage: Deep sub soiling to remove plough and chemical “pans” down and across rows in alternate years. Light harrowing combined with herbicide weed control.
- vi) Irrigation: Regular irrigation based upon evaporation and tensiometer readings especially during the critical January- June growing period.

New plantings with modern technology should adopt:

- i) Propagation: Inverted “T” shield budded nursery stock grown into a single stem up to 3 ft. and stopped with 3-4 well spread branches trained in the nursery. Seedling rootstock of rough lemon selected from known mother trees, raised in black polythene pots. Trials with “trifoliolate”, “Cleopatra” and “Sweet Oranges” to be carried out. Scion to be selected from known certified and virus free mother trees.

- ii) Planting: High density planting 3m x 3m thinning to 6m x 3m after year 12. Initial planting density 1,110/ha. Reducing to 555/ha after year 12.
- iii) Pruning: Hedge high pruning, adopting a 3 year cycle. Side A in year 1, side B in year 2, top in year 3.
- iv) Irrigation: Micro-jet, two 180° nozzles per tree.

General protocols for GAP are contained in Annex 2.

Improving Harvesting

After testing for sugars and total soluble solids (Brix) by laboratory analysis, all fruit should be hand picked with operators wearing gloves and using snub nosed scissors, clipping fruit closed to stone button. Separation of button produces rotes and such fruits will be rejected. Harvested fruit should be carefully placed in orchard boxes for transport to collection points. A Brix to Acid Ratio of 8-10 is considered the minimum. Fruit can be held for sometime on the tree where natural ripening continues. However, a B/A ratio of over 18 will be unpleasantly sweet and not acceptable for export. After picking the citrus fruit does not ripen further.

Improving Yields

Improved orchard management will lead to improvement in yield and quality of fruit. Table 8 gives comparative yield levels for traditional, improved and modern citrus fruit orchards assuming productive life at 20-25 years.

**Table 8: Comparative Yields of Traditional, Improved and Modern Orchards
Tons/ha**

Years	Traditional	Improved	Modern
3-4	Established	Established	3-6
5-8	Established	2-4	6-10
8-12	2-4	4-6	10-14
12+	4-6	6-8	14-18
Export Turn-Out	50%	60%	70%

Increase of 20% in export quality fruit turn-out for the modern orchards will certainly improve price competitiveness apart from premium on quality of fruit.

Infrastructure Development

- Pack-house facilities (HACCP certified)
- CA storage
- Quality assurance laboratories
- Efficient transport/Cold chain system

Product Promotion

- Overseas exhibitions
- Products display in super stores etc.
- Website
- International media
- Pamphlets, leaflets etc.

Awareness

- Seminars/workshops
- Printed matter (posters, leaflets)
- Media
- Videos

Training

- Professional training (ToT)
- Farmers/farm labour
- Pre-harvest contractors
- Exporters/traders
- Cold storages/processing plants operators
- Staff of line departments

Promotion of Groups

- Farmer Cooperatives/Associations
- Traders Associations

Regulation

- National grades & quality standards
- Pre-shipment inspection/branding

Others

- Inviting importers
- Joint ventures

Market Based Interventions

The feedback from the production areas estimates a bumper crop much larger than the previous years. A theoretical estimate of 2 million tins has been kept in view for the sake of planning. For the convenience of the readers, production v/s export status for the past 5 years is appended below:

Year	Production (Tons)	Export (Tons)
1999/00	1,943,205	82,750
2000/01	1,897,693	97,028
2001/02	1,830,276	121,692
2002/03	1,702,347	94,806
2003/04	1,760,346	149,587

The crop condition during 2004/05 was good. However, it was badly affected by prolonged inclement weather which also adversely affected exports. The size of the kinnow overgrew while its shelf life reduced.

In view of the anticipated extra bumper crop during 2005/06, adequate steps would have to be taken much ahead of the harvest season.

With the signing of protocols with China and Iran it has opened access to new markets for Pakistan. The positive aspects of these markets are that they are located at the vicinity of our country, which makes it easier and cheaper to transport fruit to these countries. The other side of the coin is that although there is a huge market to capitalize this potential but it has to comply with their quarantine requirements, which means adopting quality standards throughout the value chain i.e. pre-harvest and post harvest requirements.

Besides, looking at the demand potential of citrus fruit it is important to evaluate the required infrastructure to support the demand. Fortunately unlike mangoes the infrastructure for citrus fruit is relative developed and better. However, the facilities are to be examined by the Plant Quarantine organizations of the two countries to make sure that they conform to their requirements.

Looking at both aspects PHDEB opines that there is a need for two pronged marketing strategy, entering into new markets which has high potential to enter the markets irrespective to strict standards such as China, Iran and South Africa, and strengthening the existing markets with high potential such as Indonesia, Philippines, Sri Lanka, Malaysia/Singapore, and newly accessed Eastern European markets like Russian Federation & Ukraine.

China

China is a big market with population over 1.4 billion with fastest growing economy. Though China produces and export substantial volumes of citrus fruit, with time window almost same as of Pakistan, our unique product (kinnow) can find market. The Chinese delegation comprising of official of Plant Quarantine Organization visited Sargodha in April 2005 and enjoyed the taste of kinnow. They found the taste unique and excellent.

In addition, their ethnic attachment to red colour makes kinnow one of the premium fruits presented to nears & dears on the eve of Chinese New Year.

The quarantine requirements for China are reproduced below:

The fruit will be treated by cold disinfestations to mitigate the *Bactrocera dorsalis* and *Bactrocera zonata*. Cold treatment may be conducted during transit in special containers with pulp temperature 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. The facilities will be evaluated and approved by AQSIQ. The specifications of cold treatment are contained in Annex 3.

Following steps would be required to successfully enter the Chinese market:

- Management of Fruit Flies: In collaboration with CABI and provincial Agriculture Department programmes would be initiated to manage fruit flies in citrus orchards. The information documented so far leads toward no infestation due to overwintering of fruit flies in adult stage. However, inter cropping fruit fly host crops like mangoes, guava & okra, poses threat for infestation and has to be controlled thru awareness, advocacy and campaigns. In addition, corrective measures would also be taken.
- Improvement in storage facilities: Deficiencies in existing cold storage facilities like provision of data loggers, documentation etc would be rectified to the satisfaction of Chinese Plant Quarantine Organization.
- Reefers facilities for shipment by sea/road: Refrigerated containers fitted with sensors for recording pulp temperature for conducting cold treatment during transit will be arranged with the help of shipping lines to meet quarantine requirements.
- Trials by road: Trials for shipment would be arranged in association with the exporters, importers & transporters.
- EUREPGAP Certification: Farmers would be encouraged and facilitated to adopt best agricultural practices according to international standards and get their farms EUREPGAP certified.
- HACCP Certification: The pack-houses (grading, washing, waxing, pre-cooling) and cold storage owners/proprietors would be encouraged and facilitated to undergo HACCP certification.
- Pre-shipment Inspection: Pre-shipment inspection would be initiated. This process, besides conforming to quality standards of importing counties is critical

in building country's image and acceptability in the international market as a quality supplier. It would ultimately lead to branding fetching high prices. Pre-shipment would be done on voluntary basis with 25% freight subsidy. This process would also benefit exporter in term of cost providing competitive edge.

- Marketing - Delegation visit with publicity: To support commercialization it would require promotional activities which would involve:
 - Exporters' delegations to meet buyers from local chain stores, supermarkets, importers and wholesale markets.
 - Advertisement in the local newspapers, magazines
 - Development of brochures in Chinese language for distribution
 - Free distribution of samples in special small boxes (branded)

Iran

The signing of the protocol has provided Pakistan for the first time access to Iranian market with a population of about 60 million and purchasing power much higher than Pakistan. The quarantine requirements under the MOU are reproduced below:

Considering the results of research done at the Karachi Plant Quarantine Vapour Heat Treatment Station that the treatment at 5⁰C for 14 days kills all life stages of fruit flies reported in Pakistan's citrus orchards (*Bactrocera dorsalis*, *Bactrocera zonata*) in vitro, it was agreed that Pakistani and Iranian Plant Quarantine experts will jointly conduct the same research experiments for commercial consignments at cold storage houses and upon reaching the same results apply this as a treatment method for kinnow consignments' export to Iran.

OR

The Pakistan side shall provide treatment facilities required by Iranian Plant Protection Organization under Vapour Heat Treatment or High Temperature Forced Air in Pakistan.

OR

Cold treatment of kinnow fruits at 2⁰C for 22 days in conditions that cold treatment shall be carried out:

1. Exclusively in cold storage houses equipped with temperature recording instrument in which the instrument could be able to record the temperature with sensibility of 0.1⁰C every alternate hour under the supervision of Iranian Plant Quarantine Inspectors.

2. The exclusive cold storage houses should be only for storage of exporting kinnow fruit to I.R. Iran and should have suitable registering system of entry and exit of kinnow fruit consignments under the supervision of Iran Plant Quarantine Inspectors.
3. Upon confirmation of fulfilling the above mentioned requirements by Iranian Plant Quarantine Inspectors, then the concerned consignments would be approved for exportation to I.R. Iran.
4. The quality of the fruit after the application of the above mention treatment is guaranteed by the Department of Plant Protection of Pakistan.

In addition to management of fruit flies, EUREPGAP, HACCP, Pre-shipment inspection, market promotion referred to above, following specific interventions would be made:

- Certification of Cold Storages: Persuading concerned organizations (PAREP, EPB, MINFAL & PPD) to invite Plant Quarantine officials well in advance of the harvest season for evaluation of cold storages.
- Cold Treatment Experimentation: Persuading Plant Protection Department for conducting joint experiments (Iranian & Pakistani Plant Quarantine experts of cold treatment at 5⁰C for 14 days for disinfestations against *Bactrocera dorsalis* & *Bactrocera zonata* fruit fly species.
- Trials by road: Trial shipments by road in coordination with exporter, importer and transporter.

Far East

Far East including Indonesia, Philippines & Sri Lanka are among the main importing markets. The specific issues as follows would be addressed in addition to common areas like management of fruit flies, EUREPGAP/HACCP certification, pre-shipment inspection:

Indonesia

- Reduction in tariffs to zero level or 5% the maximum, level prior to increase to 25%.
- Product valuation as per invoice value for tariff calculation
- FTA

Philippines

- Invitation to Philippines Plant Protection (Quarantine) officials for verification of additional processing units

Malaysia/Singapore

- Market promotion

East Europe

- **Russian Federation**

Since the visit of a delegation in 2004 Russia has emerged as one of the leading markets for kinnow. One of the success factors has been the linkages with the leading importing and distribution companies. They are the key suppliers to main chain stores in Russia. However, regulated supplies and quality of produce strictly according to importers/consumers choice would be key to success. Over supplies and poor quality is likely to go against our hopes and may damage our credibility.

As these companies are importing all kind of fruits and vegetables all the year around for their clients it will be appropriate to use the same channels to export other products like mangoes and potatoes.

- **Ukraine & Romania**

The visit of delegation to Ukraine and Romania in February 2005 opened new markets for kinnow exports. The delegation met with some of the leading importers who were interested in trial shipments but due to non-availability of quality kinnow no export was carried out during this season. It is expected that with proper intervention there is a huge potential for kinnow exports. Some of the interventions needed to enter these new markets are:

- Trials by road: Trials for shipment would be arranged in association with the exporters, importers & transporters.
- Pre-shipment Inspection: Pre-shipment inspection would be initiated. This process, besides conforming to quality standards of importing countries is critical in building country's image and acceptability in the international market as a quality supplier. It would ultimately lead to branding fetching high prices. Pre-shipment would be done on voluntary basis with 25% freight subsidy. This process would also benefit exporter in term of cost providing competitive edge.
- Marketing:
A contacts has been built it would be appropriate to use the existing channels/contacts.

- **Poland & Czechoslovakia**

Poland and Czechoslovakia are one of the major East European countries to import citrus including mandarins, hence it is important to penetrate these new markets.

- Trials by road: Trials for shipment would be arranged in association with the exporters, importers & transporters.
- Pre-Shipment Inspection: This process is important to check kinnows shipments being exported, does conforms to the quality standards of these countries. As mentioned before this will help in brand development.
- Marketing - Delegation visit with publicity: To support commercialization it would require promotional activities which would involve:
 - Contact Pakistan embassy to get initial data on the imports of mandarins such as export countries, quantity, price, variety, etc.
 - Visit to Warsaw and Prague to meet buyers from Chambers of Commerce & Industry, local chain stores, supermarkets, importers and wholesale markets.
 - Organize displays at selected chain stores/hotel
 - Meeting with the press
 - Advertisement in the local newspapers, magazines
 - Development of brochures in local language for distribution
 - Free distribution of sample kinnows in special small boxes (branding)

South Africa (Additional)

South Africa and Pakistan can complement each other due to different production seasons. The former has well established credibility in the international market exporting up to 40% of its horticulture produce as against Pakistan exporting maximum up to 5% of national horticulture produce. The immediate issue for export direct to South Africa would be their quarantine requirements, hence it is important to initiate the process fulfilling the requirements.

A high level South African delegation visited Pakistan on the invitation of PHDEB. The main objective was to show the potential that exists for sourcing fruits from Pakistan for exports utilizing their marketing network. Couple of the leading companies has shown interest in sourcing mangoes. In order to strengthen the linkages it is important to visit South Africa which is being proposed during August.

- Marketing - Delegation visit /Publicity:

- Contact Pakistan embassy to get initial input of the potential of fruit exports to South Africa
- Visit South Africa and meet the quarantine department to initiate a dialogue in signing a protocol
- Meet the buyers from Chambers of Commerce & Industry, local chain stores, supermarkets, importers and wholesale markets. This would be arranged by Fresh Produce Exporters Forum (FPEF)
- Development of brochures for distribution
- Free distribution of samples in special packaging (branded)
- Trial shipment thru exporter

GRADES AND QUALITY STANDARDS

DRAFT STANDARDS

Concerning the market and commercial quality control of Citrus Fruits

1. DEFINITION OF PRODUCE

These standards apply to the following fruits, classified as “citrus fruits” to be supplied fresh to the consumer, citrus fruits for industrial processing being excluded:

- Lemon of varieties (cultivars) grown from the species *Citrus limonia* L.
- Mandarins, Clementine’s, Satsuma’s, tangerines, wilkings and other fruit of varieties (cultivars) grown from the species *Citrus reticulata* Blanco or hybrids of that species;
- Oranges of varieties (cultivars) grown from the species *Citrus sinensis* L. Obseak;
- Grapefruit of varieties (cultivars) grown from the species *Citrus paradisi* Macf.

II. PROVISION CONCERNING QUALITY

The purpose of the standards is to define the quality requirements of Citrus fruits at the export control stage, during preparation and packaging.

A. Minimum requirements

In all classes the citrus fruit must be:

- intact;
- sound (produce affected by rotting or deterioration such as to make it unfit for consumption is excluded);
- free from damage and/or external deterioration caused by frost;
- clean, practically free of any visible foreign matter;
- free of all abnormal external moisture; and
- free of any foreign taste or smell, (this provision does not preclude a smell which might be caused by a preserving agent used in accordance with EU/importing country provisions).

The citrus fruit must have been carefully picked and have reached an appropriate degree of development and ripeness in accordance with criteria applicable to the variety and the area/district in which it is grown. The state of ripeness must be such as to allow the fruit:

- to withstand transport and handling; and
- to arrive in satisfactory condition at the place of destination.

- The degree of colouring shall be such that, following normal development, the citrus fruits reach their normal varietal colour (subject to special conditions applicable to each class) at their destination point, account being taken of the time of picking, the growing area and duration of transport. Citrus fruit meeting this ripeness requirement may be “de-greened” (only if the other natural organoleptic characteristics are not modified).
- Depending on the variety, the colour of the fruit has to cover at least one third or two thirds of the size of the fruit, in accordance with the general characteristics of the fruit. In the case of oranges, a maximum of 20 per cent of the fruit may have a light green colour.

B. Minimum juice contents

The minimum juice contents in relation to the total weight of the fruit (extraction by means of a hand press) shall be as follows:

▪ Lemon	20-25%
▪ Oranges	30-35%
▪ Kinnow/mandarin	35-40%
▪ Grape fruit	35%

C. Classification

i) Extra Class

Citrus fruits in this class must be of superior quality. In shape, external appearance, development and coloring they must be typical of the variety. They must be free from defects, except slight superficial blemishes which must not impair the quality or the general appearance of the fruit, or the presentation of the package.

ii) Class 1

Citrus fruits in this class must be of good quality. They must display the characteristics typical of the variety or type, taking into account the time of packing and the area in which they are grown.

The following slight defects are allowed provided that they do not impair the general appearance or shelf life of the produce:

- slight defect in shape;
- slight defect in coloring;
- slight skin defects inherent in the formation of the fruit, such as silver scuffs, russets, etc.;
- slight healed defects due to a mechanical cause, such as rubbing, damage due to hail, knocks, etc.

iii) Class II

The fruit classified as Class II conforms to the minimum requirements as listed above, but does not meet the criteria for the higher classes. The quality is reasonable.

Following defects are allowed provided that they do not seriously harm the general appearance, or the shelf life of the produce:

- defect in shape;
- defect in colouring;
- rough skin;
- superficial healed skin alternations;
- slight and partial detachment of the pericarp (ripened skin) for oranges (detachment being normal for mandarins).

iv) Class III

The requirements of Class II apply, while in addition the fruit might have lost buttons.

III. PROVISION CONCERNING SIZING

Size is determined by the maximum diameter at the equatorial section of the fruit.

The minimum size requirements for citrus fruit are as follows:

A. Minimum size

Fruit of less than following dimensions are excluded:

Fruit	Minimum diameter
<u>Lemon</u>	
- Class Extra, I and II	45 mm
- Class III	42 mm
<u>Kinnow (mandarin)</u>	
- All Classes	60 mm
<u>Other mandarins</u>	
-All Classes	55 mm
<u>Oranges</u>	
- All Classes	53 mm
<u>Grapefruit</u>	
- All Classes	70 mm

B. Size scales

Oranges		Lemon	
Size	Scale of diameter in mm	Size	Scale of Diameter in mm
0	>100	0	>83
1	87-100	1	72-83
2	84-96	2	68-78
3	81-92	3	63-72
4	77-88	4	58-67
5	73-84	5	53-62
6	70-80	6	48-57
7	67-76	7	45-52
8	64-73	8	42-49
9	62-70		
10	60-68		
11	58-66		
12	56-63		
13	53-60		

Clementine, Satsuma, Kinnow (Mandarins) other Mandarins and their hybrids		Grapefruit	
Size	Scale of diameter in mm	Size	Scale of diameter in mm
1	>63	1	>109
2	58-69	2	100-119
3	54-64	3	93-110
4	50-60	4	88-102
5	46-56	5	84-97
6	43-52	6	81-93
7	41-48	7	77-89
8	39-46	8	73-85
		9	70-80

The Kinnow (mandarins), other mandarins and their hybrids of more than 63 mm in diameter will be categorized as follows:

No. 1-X	63-74 mm
No. 1-XX	67-78 mm
No. 1-XXX	78 mm and above

The fruit juice must have following minimum quality parameters

TSS	=	12%
Sugar	=	9%
Acidity	=	1.0 (Maximum)
TSS/Acid Ratio	=	10

IV. PROVISIONS CONCERNING TOLERANCES

Tolerance in respect of quality and size shall be allowed in each package for produce not satisfying the requirements indicated above, as follows:

A. Quality Tolerance

i) Extras Class

5 per cent by number or weight of citrus fruit not satisfying the requirements of the class, but meeting those of Class 1, or exceptionally coming within the tolerance of that class. In addition, no more than 5 per cent by number or weight of fruit may have lost their button.

ii) Class I

10 per cent by number or weight of citrus fruit not satisfying the requirements of the class, but meeting those of class II, or exceptionally coming within the tolerance of that class. In addition, not more than 10 percent by number or weight of fruit may have lost their button.

iii) Class II

10 per cent by number or weight of citrus fruit not satisfying the requirements of the class provided these fruits are acceptable for human consumption. A maximum of 50% of the fruit is allowed to have external damages. In addition, not more than 20 percent by number or weight of fruit may have lost their button.

iv) Class III

The quality tolerance margin is set at 15 percent of the number or weight of the fruits, excluding fruits which are affected by rot or serious damage that makes them unsuitable for human consumption.

B. Size Tolerance.

For all classes and types of citrus fruit presented for inspection 10% by number or weight of citrus fruit corresponding to the size immediately below or above that class (or those in the case of the combination of three sizes) mentioned on the packages or the transport documents is allowed.

V. PROVISION CONCERNING PRESENTATION

A. Uniformity

The contents of each package must contain only citrus fruit of the same origin variety, quality and size and appreciably of the same degree of ripeness and development.

In addition, for “Extra Class” uniformity in colouring is a requirement.

The visible part of the contents of the package must be representative of the entire contents.

B. Packaging

The citrus fruit must be packed in such a way so as to protect the produce properly.

The materials used inside the package must be new, clean and of a quality such as to avoid causing any external or internal damage to the produce. The use of materials particularly of paper or stamps bearing trade specification is allowed provided that the printing of labelling has been done with a non-toxic ink or glue. Packages must be free of all foreign matter.

VI. PROVISIONS CONCERNING MARKING OR LABELLING

Each package must bear the following particulars, in letters grouped on the same side, legibly and indelibly marked, and visible from the outside.

A. Identification

Packer	}	Name and address or
And/or	}	officially issued or
Dispatcher	}	accepted code/trade mark

B. Nature of the Produce

- “Citrus Fruit” if the contents are not visible from the outside
- Name of the variety/specie

C. Origin of the produce

Country of origin and optionally, district where grown or national, regional or local place/farm name.

D. Commercial Specifications

- Class
- Size expressed as minimum and maximum diameter in mm
- Size code (optional)
- Number of fruits
- Weight of fruits

E. Official control mark

Official mark of the national official quality certifying agency

F. Labelling

The package shall be labelled clearly indicating the country of origin, trade mark where relevant, commodity, specie/variety, weight, count, name and address of the supplier. The supplier shall be encouraged to print the name of the buyer where so demanded by them. Labelling of additional qualifications of the produce such as shelf-life, nutritional value, green/organic produce or accreditation/certification (like HACCP etc) or collective branding shall be encouraged. Labels shall be printed or stamped in waterproof ink on the outside of the package in legible form and shall be attractive. Individual fruit labelling with brand name of exporter/farm or quality parameter shall also be encouraged.

VII. PHYTO-SANITARY CERTIFICATION

The phyto-sanitary certificate is pre-requisite. It is issued by the National Plant Quarantine Department to the effect that the fruit is fit for human consumption. It will neither pose any health risk to consumers nor will transmit any insect pest or disease to the importing country.

ANNEXES

KINNOW EXPORT FROM PAKISTAN

Annex 1
 QTY IN
 '000' KG
 VAL. IN
 '000'
 DOLLARS

COUNTRIES	Jul- June	2003- 2004	Jul- June	2002- 2003	Jul-Jun	2001- 2002	Jul-Jun	2000- 2001	Jul-Jun	1999- 2000
	QTY	VAL	QTY	VAL	QTY	VAL	QTY	VAL	QTY	VAL
KINNOW	149587	30763	94806	21704	121692	20842	97028	16310	82750	13916
Afghanistan	25524	4586	14710	1975	10685	738	6982	504	3919	474
Bahrain	2344	504	1166	288	1826	303	835	143	435	83
Dubai	28788	5684	23172	5480	25220	4475	22085	3374	23034	3571
Hong Kong	873	215	806	251	1770	334	1291	302	1663	357
India	249	63	184	54	439	80	138	28	217	42
Indonesia	29042	6230	22162	5590	31348	5706	28644	4821	18592	3413
Kuwait	0	0	24	5	951	170	278	48	72	11
Malaysia	2434	509	1919	508	5117	1002	3716	813	1461	317
Netherlands	5611	1269	1669	453	1615	407	965	563	830	111
Philppine	15778	3133	6695	1626	14522	2538	13192	2220	13267	2376
Saudi Araibia	14484	2992	5752	1360	5891	1194	3878	700	3399	560
Singapore	4845	1178	4425	1116	6988	1318	5625	1075	3396	549
Sri Lanka	9115	1825	6898	1630	8716	1538	7303	1219	9636	1500
U.K	1317	377	752	219	946	124	525	164	540	91
Canada	557	106	321	80	461	86	195	40	141	23
SUB-TOTAL	140961	28671	90655	20635	116495	20013	95652	16014	80602	13478
Others	8626	2092	4151	1069	5197	829	1376	296	2148	438

General GAP Protocols

Pre-planting

- Healthy planting material
- Resistant or less susceptible cultivars
- Pest free areas, places or sites of production
- Producers registration and training

Pre-harvest

- Field certification/management (e.g. inspection, pre-harvest treatments, use of recommended environment friendly pesticides, bio-control, etc.)
- Pest mating disruption
- Cultural controls (e.g. sanitation/weed control)
- Low pests prevalence
- Use of recommended chemicals only.
- Maintenance of farm records
- Pets reporting systems

Harvest

- Harvesting plants at specific stage of development or maturity
- Removal of infested products, inspection for selection
- Sanitation (e.g. removal of contaminants, “trash”)
- Harvesting technique (e.g. using clippers). Improving harvesting and post-harvest handling especially at the farm level to avoid quality deterioration caused by bruising, blemishing, fruit puncture, pressure damage etc. will be imperative.

Post harvest treatment and handling

- Treatment to kill, sterilize or remove pests (e.g. water wash with fungicide, brushing, waxing, heat treatment, irradiation, cold storage, controlled atmosphere etc.)
- Inspection and grading (including selection for certain maturity stages)
- Sanitation (including removal of parts of the host plant)
- Certification of grading and packaging facilities
- Inspection and/or testing
- Method of packing and packaging

Use of wooden crates particularly under the International Plant Protection Convention and WTO Regime- deforestation and disposal of wooden crates direct are direct cause of environmental degradation. Disinfestations of wooden crates against potential hazard for transfer of pathogens and their disposal at the recipient end recommended under the International Plant Protection Convention is very tedious, cumbersome and costly process.

Transportation and distribution

- Treatment or processing during transportation
- Treatment or processing on arrival
- Post entry quarantine
- Inspection and/or testing
- Speed and type of transport
- Sanitation (freedom from contamination of carriers)

Requirements of Cold Treatment for Citrus Export from Pakistan to China

1. Container type

Containers must be self refrigerated (integral) shipping containers and have refrigerator equipment capable of achieving and holding the required temperatures.

2. Recorder types

Official quarantine organization of export country must ensure that the combination of temperature probes and temperature recorders are:

- (a) Sensors should be accurate to $\pm 0.1^{\circ}\text{C}$ in the range of -3.0°C to $+ 3.0^{\circ}\text{C}$
- (b) Able to accommodate the required number of probes
- (c) Capable of recording and storing data for the period of the treatment
- (d) Capable of recording all temperature sensors at least hourly to the same degree of accuracy as is required of the sensors, and
- (e) Capable of producing printouts which identify each sensor, time and the temperature, as well as the identification number of the recorder and the container.

3. Calibration of temperature sensors

3.1 Calibration must be conducted using a slurry of crushed ice and distilled water, using a certified thermometer approved by quarantine organization.

3.2 Any sensor which more than plus or minus 0.3°C from 0°C must be replaced by one that meets this criterion.

3.3 A "Record of calibration of fruits sensors" must be prepared for each container and signed and stamped by quarantine officer. The original must be attached to the Phytosanitary Certificate that accompanies the consignment.

3.4 One arrival AQSIQ/CIQ will check the calibration of the fruit sensors using the method referred to in 'Section 3.1'.

4. Placement of temperature sensors

4.1 Packed fruit must be loaded into shipping containers under quarantine officer supervision. Containers should be packed in a manner to ensure that there is equal airflow under and around all pallets and loose stacked boxes

4.2 At least three fruit sensors and two air sensors are necessary for each container. The location of sensor is:

- (a) Sensor 1 (in pulp of fruit): top layer of cartons of fruit in middle row, front of container.

(b) Sensor 2 (in pulp of fruit): approximately 1.5 meters (for 40 feet container) or 1 meter (for 20 feet container) from door, centre of load, centre of box, half way between top and bottom of load.

(c) Sensor 3 (in pulp of fruit): approximately 1.5 meters (for 40 feet container) or 1 meter (for 20 feet container) from door, left wall, half way between top and bottom of load.

(d) The other two air temperature sensors should be placed in the delivery air to the cargo and the return air respectively.

4.3 All sensors must be placed under the direction and supervision of an authorized inspector.

4.4 Fruit to be shipped must be kept in cold storage until such time when the pulp temperature is dropped to a minimum of 4⁰C.

5. Sealing of containers

(a) A numbered seal must be placed on the loaded container door by an authorized officer.

(b) The seal must only be removed by a CIQ officer at the port of arrival in China.

6. Temperature records and confirmation of treatment

(a) The in-transit agreement is for the cold treatment to be completed during the voyage between the port of export country and the first port of call in China.

(b) Records may commence at any time, however the treatment time will be deemed to have begun only after all food sensors have attend the nominated treatment temperature.

(c) The shipping company will download the computer records of the cold treatment and forward them to CIQ of first port of call in China.

(d) Some sea voyages may allow the cold treatment to be completed by the time vessel arrives at the port en-route to China. It is permissible for treatment record to be downloaded en-route and sent to CIQ for verification. It is however requirement that the treatment is not deemed to have been effected until CIQ have completed the re-calibration of the temperature sensor probes. It is therefore a commercial decision whether the fruit should be “conditioned” (i.e. gradually raising carriage temperature) prior to arrival in China.

(e) CIQ will verify that the records meet Chinese cold treatment requirement. Subject to calibration of sensors, the treatment is complete.

7. Documents

Temperature, duration of the cold treatment, container number and the seal number of the container must be included in treatment section on the Phyto-sanitary Certificate.