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International Agricultural Research**

# **ASLP Citrus Value Chain Scoping Study**

By Dr Tahir Khurshid,

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# Abbreviations

ASLP	Agriculture Sector Linkages Program
NARC	National Agricultural Research Centre
PARC	Pakistan Agricultural Research Council
UAF	University of Agriculture, Faisalabad

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# Introduction

## What the travel report is about

The overall purpose of the study tour was to scope out the opportunities for future collaborative programs to focus on value chain improvement in the Pakistani citrus industry. This included reviewing opportunities to partner with private sector participants along particular value chains.

Such partnerships can enable small farmers to engage with the market, providing an incentive to adopt improved production practices. External resources are typically needed to facilitate such collaborations. The learnings from this type of initiative can then enable such models to be scaled up across the wider industry.

Any such initiative appropriate private sector partners to be identified and engaged in improving coordination along the chain. However, success also depends on a myriad of other inter-related issues impacting on the value chain, broadly grouped as innovation (technical) issues and information issues.

This report identifies and maps the information, coordination and innovation issues applicable to the value chain for Pakistani Kinnow fruit to export markets. It identifies many of the programs and people involved in addressing these as well as highlighting the gaps.

In order to enable any future value chain program to address these issues and gaps, the report proposes a number of hypotheses that should be explored. These will provide a sound basis for developing and prioritising strategies, given the uncertainties inherent in the industry operating environment.

**Figure 1 Modern packing line preparing Kinnow mandarins for export**



**Figure 2 Roadside stalls selling local Kinnow fruit near Sargodha**



# Executive Summary

## Background

Pakistan's 2005 request for Australian assistance in agricultural development led to the Agricultural Sector Linkages Program (ASLP). This had a total budget of \$AU6.6M over four years (2005-2010), covering citrus, mango and dairy and included Market Linkages as a component. The Agricultural Sector Linkages Program Phase 2 (ASLP 2) has a budget of \$AU 12.95 M over five years (2010-2015) and included pro-poor value chains as a component.

The citrus components of ASLP I and II have focussed primarily on other components of the programs, such as Agricultural Capability. However, most of the productivity issues addressed are also fundamental to meeting value chain requirements. The 2013 mid-term review<sup>1</sup> recommended a shift in focus towards investigating postharvest losses and fruit quality issues. This was to include a scoping study for a potential Phase 3 commitment after ASLP II ends, as reported here.

## Aims/objectives

The broad objective was to identify barriers to growth of exports of Pakistani Kinnow mandarins to existing export destinations. The sub-objectives to achieve this were:

Gain an overview of the current operating environment of the Pakistani citrus value chain from the perspectives of researchers, growers, packer/marketers and importers

Identify relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies

Map relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies

Identify and map key gaps in activity and/or knowledge

## Methods used

The study group included Dr Tahir Khurshid (Citrus Physiologist and Project Leader) and Steven Falivene (Production and Extension Expert), both from ASLP Phase II citrus component, together with Gerard McEvelly, who provided horticultural value chain expertise. Dr Munawar Raza Kazmi (ASLP Implementation Manager) was also in attendance at several meetings.

During seven days of activity in Pakistan, the group met with government, research and grower personnel, visited farms and packing houses and convened a value chain forum as well as an ASLP project collaborators meeting. Two more days were spent meeting with importers in Dubai and Jakarta and visiting retailers. (Ref Itinerary Appendix 9)

## Results/key findings

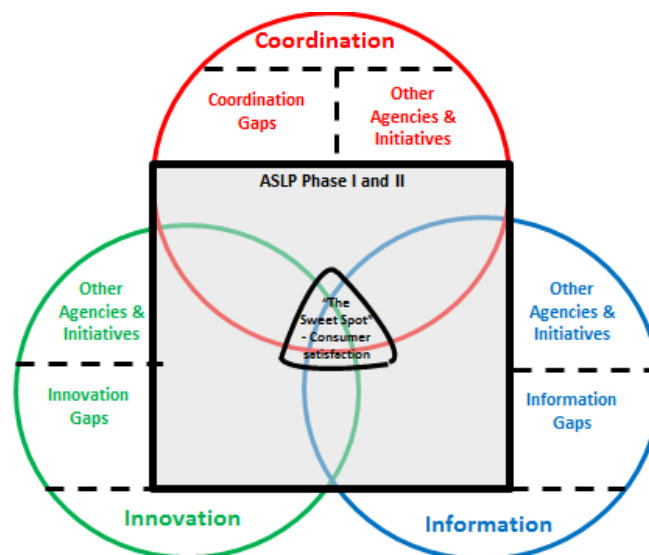
The information gained on the study tour provided a snapshot of the current operating environment of the Pakistani Kinnow industry and the key challenges from production and marketing perspectives. It also identified where some of these issues are being addressed in the current ASLP Phase II citrus program and in current and potential programs by partners and other agencies.

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<sup>1</sup> Agriculture Sector Linkages Program – Phase II Mid-term Review June 2013  
[http://aci-ar.gov.au/files/aslp\\_ii\\_mtr\\_170613\\_final.pdf](http://aci-ar.gov.au/files/aslp_ii_mtr_170613_final.pdf)

An issues-based framework for value chain analysis was used to map current activity and to identify gaps. This employs three elements, Information, Coordination and (technical) Innovation to provide a framework for identifying and understanding the myriad of issues involved in any value chain. It also recognises the overlap between these elements, providing a useful tool for analysing “what we know” and identifying key gaps in activity and/or knowledge.

**Figure 3: Mapping value chain issues addressed through ASLP and other agencies & initiatives in order to facilitate gap analysis**



## Implications

The implications of the findings from the study tour have been summarised as a set of researchable hypotheses. This reflects the limitations of the study tour approach to gathering and verifying information, much of which is necessarily qualitative rather than quantitative.

### ***Domestic Market positioning***

Hypothesis: Apparent domestic oversupply could be eased by diverting a higher proportion of crop to export markets. This could in turn strengthen domestic prices.

Hypothesis: Apparent domestic oversupply may be due in part to poor distribution systems or to the inability of part of the population to afford to buy fruit.

Hypothesis: Alternative varieties could extend the season of supply of citrus into the domestic market. This may also replace some of the Kinnow currently oversupplied.

### ***Export Market positioning***

Hypothesis: Kinnow has no outstanding features that distinguish it in the export marketplace, or that could be used to re-position it to command higher prices.

Hypothesis: Export markets (existing or new) have some capacity to absorb additional Kinnow without crashing the price.

Hypothesis: Lo-seed Kinnow selections have the potential to appeal to future consumers, who may be exposed to other lo-seed or seedless mandarins. (Higher prices are, however, not guaranteed even if effective communication with consumers occurs)

Hypothesis: Alternative varieties have the potential to extend the availability of Pakistan-grown citrus



## ***Market access***

Hypothesis: Improved market intelligence would enable growers, packers and exporters to make better-informed business decisions and enable government authorities to make best use of limited resources for market access negotiation and industry support programs. This includes decisions about potential new varieties.

Hypothesis: Postharvest research will enable better-informed decisions about the capability of Kinnow to perform satisfactorily in various supply chains, at different times of the season, from different regions and enable protocols to be optimised.

## ***From orchard to market***

Hypothesis: The orchard to market links in the Kinnow value chain may be the sector most amenable to private sector involvement. These links may reside in a single entity or with several closely aligned intermediaries (eg contractor/packer/marketer)

Hypothesis: Some existing value chain partnerships involving growers, packers and exporters are addressing fruit quality and product integrity issues. These may form the basis of a model for wider industry adoption, if they are willing to share information.

Hypothesis: Improved value chain performance will deliver poverty-reduction benefits to the overall rural community, despite the risk that the poorest farmers may be slower than average to actively engage.

## ***Production***

Hypothesis: Growers require sources of advice regarding optimising production of Kinnow and the evaluation of alternative varieties. Addressing the current fragmentation in information exchange regarding diagnosis and resolution of problems offers a major opportunity.

Hypothesis: Linking information about production practices to information about market impact and cost:benefit will increase the uptake of better practices.

## ***Pre-production***

Hypothesis: Clear, updateable information about the new varieties will assist growers to manage the risk of growing these

## **Recommendations**

Any follow-on program from the ASLP Phase II citrus component should consider the hypotheses formulated from this study as the basis for program priorities and goals. In particular, in order to maximise its value chain impact, it should be designed around private-sector engagement.

It should also build on the outcomes of the Phase I and II programs and rigorously pursue any opportunities for cross-learning and collaboration with other relevant initiatives. The program should ensure that key gaps in activities and knowledge are addressed as a matter of urgency.

# Background

This two-week scoping study was undertaken as part of the concluding ASLP (Agriculture Sector Linkages Program) Phase II citrus component. ASLP is an Australia-Pakistan program designed<sup>2</sup>:

To collaborate strategically to improve livelihood systems for the rural poor in Pakistan, and to build linkages between the agricultural sectors of Australia and Pakistan.

Phase II has three components:

- pro-poor value chains
- enabling policy
- agricultural capability

Both Phase I and Phase II citrus components have been focussed on agricultural capability. This reflected the serious constraints to productivity identified in the scoping of Phases I and II. The mid-term review of ASLP Phase II recognised that good progress had been made in addressing these citrus productivity issues.

It was recommended that any potential future Phase III Citrus project should build on this success by encompassing pro-poor value chain development. In order to help scope any such future work, a study tour was arranged to provide an overview of Pakistani citrus value chains. The study group included Dr Tahir Khurshid (Citrus Physiologist and Project Leader) and Steven Falivene (Production and Extension Expert), both from ASLP Phase II citrus component, together with Gerard McEvelly, who provided horticultural value chain expertise. Dr Munawar Raza Kazmi (ASLP Implementation Manager) was also in attendance at several meetings.

The study included inspections of orchards and packing houses, as well as research, transport, storage and shipping facilities and retail premises. The tour group held meetings with personnel at each type of facility as well as with senior provincial and federal government representatives. A forum involving fifty participants was also held to gain further insights from growers, harvesting contractors, packers, exporters and researchers.

This diverse range of facilities and people reflects the diverse range of factors impacting on value chain effectiveness and efficiency. These factors are briefly described and mapped in this report using an “Information, Coordination and Innovation” framework.

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<sup>2</sup> <http://aciar.gov.au/aslp>

# Objectives

The overall purpose of the study tour was to scope out the opportunities for future collaborative programs to focus on citrus value chain improvement.

The broad objective was to identify barriers to growth of exports of Pakistani Kinnow mandarins to existing export destinations. The sub-objectives to achieve this were:

Gain an overview of the current operating environment of the Pakistani citrus value chain from the perspectives of researchers, growers, packer/marketers and importers

Identify relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies

Map relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies

Identify and map key gaps in activity and/or knowledge

# Methodology

The scoping study included visits to Pakistan (5th to 12th January 2015), Dubai (14th January) and Jakarta (16th January) (excluding travel time). (Ref: Itinerary Appendix 9)

Activities included:

- Engagement with a number of meetings with government, research and grower personnel as well as farm and packing house visits and a project collaborators meeting. This was to build familiarity with all aspects of the industry and with the production research carried out to date in phases I and II.
- Building understanding of the level of value chain awareness in the industry and seeking briefings on any prior/current value chain related activity.
- Undertaking a Kinnow industry forum on 10th January.
- Meetings with importers and visiting retail facilities in Dubai and Jakarta.

# Chapter 1 Researcher and Grower Meetings

## Summary

A holistic approach to value chain analysis recognises that many on-farm production issues are directly related to market success or failure. Phases I and II of the citrus component of ASLP have been focused on production issues, but much of this work is highly relevant to market success. Therefore it was important to review this work in light of potential market impacts.

In addition, Phase II of the citrus component of ASLP included a major emphasis on encouraging adoption of the improved production practices through the development and delivery of Best Practice Guidelines. Information is a crucial aspect of improved value chain management and so these communication channels will also be important for improving value chain awareness and skills.

With this in mind, a pilot program is in place to test the concept of “Quality Payments”. This involves growers being paid according to the quality (export pack-out) of their crop, rather than by volume (as is current practice). This concept provides an example of the “Coordination” aspects of value chain management. It has the potential to focus both the growers and the initial purchasers of the fruit on the production practices that affect market acceptance and price.

Table 1 summarises the market implications of the various aspects of productivity-related work undertaken by the citrus component to date.

Discussions with researcher and grower collaborators provided insights to the progress made in addressing these issues. In addition, information was obtained into other aspects of the value chain including harvesting arrangements made with contractors and grower perceptions about various export markets.

**Table 1: Market implications of the innovation aspects of ASLP citrus Phases I and II**

Innovation aspect	Market implications
Varieties & Rootstocks	Enables growers to meet consumer requirements, including flavour, juice content, fewer seeds, size, colour and seasonality.
Nursery Practices	Addresses shortage of supply of preferred varieties as well as improving nursery tree quality, speed to production and productivity of replacement trees or new varieties.
Healthy Budwood	Ensures fruit produced is true to type, meeting market expectations as well as free from diseases which may limit productivity.
Topworking	Speeds up the evaluation process for new varieties in order to test market suitability.
Irrigation	Primarily a productivity issue, but may affect fruit quality characteristics
Plant Nutrition	Primarily a productivity issue, but may affect fruit quality characteristics
Blemish Diagnosis	Failure to correctly identify causes of blemish hinders steps to avoid blemish and reduces supply of fruit required by premium markets

Pruning	Inadequate pruning is a major cause of skin blemish, leading to down-graded fruit and failure to satisfy market demand
Disease (fruit & root)	Affects productivity and fruit quality and limits ability to meet market demand but some diseases are also barriers to market access
Pests	May result in blemishes which exclude fruit from premium markets. Some pests can result in withdrawal of market access.

**Figure 4 Examples of blemishes caused by physical damage and disease infection**



### **Citrus Research Institute (CRI)**

6<sup>th</sup> January. The ASLP team inspected an irrigation trial being conducted by collaborators at CRI. This compares furrow irrigation with the standard practice of flood irrigation system. After inspection, the trial blocks were harvested by a contractor. This included in-field sorting and weighing of grades.

The contractor advised that it was too soon to pick this particular block. Harvest season generally starts in late January to February. Citrus is harvested earlier in sandy soils as compared to the late harvest on heavy soils. One region (TTS – Toba Tek Singh), to the south of Sargodha, is earlier and has large fruit but poor flavour and no infrastructure available so fruit is consumed locally.

### **Mr Zubair’s property**

6<sup>th</sup> January. Mr Zubair’s brother, Aftab Bhatti, hosted the visit. The farm is 50 acres, of which 35 acres is citrus and 1 acre used “best practice” protocols defined through the ASLP project. Harvest contractors were also present, including Abid Mahmood from Agro Fruit Pakistan. There is a lead contractor as well as a harvesting contractor and sorting contractor.

They stated that the fruit from the trial block was 70% estimated A grade fruit, compared with 45% typical for the area. The price paid for the entire 35 acres was PKR 240,000. They estimated the value would have increased to PKR 400-500,000 if the entire acreage had been of the quality grown under best practice.

The grower did not want the risk of selling direct to packer. A number of contractors bid for the fruit. The sale no longer occurs at fruit set time at some grower's properties, but at colour break, providing more certainty regarding crop load and quality. Growers continue maintaining their trees after fruit sale, due to the need to maintain tree health. Growers are not generally interested in feedback from the packer as they do not necessarily trust the information provided.

Contractors state that the main factors in postharvest losses are: reduced size, unexpected rain, lack of fertiliser, hail storms, diseases and insects.

## Mr Mohammad Ilyas property

6<sup>th</sup> January. Mr Ilyas is another ASLP grower co-operator, hosting a demonstration block for the trial of the Quality Payment System.

Representatives from an Australian-based bio-fertiliser company, growgreen Technologies, were also present (Upul Gunawardena and Shahid Iqbal)

## Mr Hammad Tarar property

7<sup>th</sup> January. The ASLP team inspected the 1 acre "best practice" trial site and liaised with local staff supervising the trial.

Mr Hammad stated that Russia, Iran and Turkey are the most important markets, but access is unpredictable. Last year all three markets banned Pakistani fruit. It is difficult to get reliable information on whether these markets will be open or not.

Mr Hammad also runs a nursery with two screenhouses (screening/shading is damaged). He stated that he aims to grow true to type plants, but growth is slow in the soil-based potting media.

**Figure 5 Mr Hammad, host of Best Practice/Quality Payment trial site, with IPM advisor**



## **Dr Tariq Mahmood, Manager Supply Chain, Pakistan Horticulture Development and Export Company (PHDEC)**

7<sup>th</sup> January. Dr Mahmood referred to the initiative started in 2009-10 to access high end markets such as the EU, believed to be through the Trade Related Technical Assistance (TRTA II) Programme. He stated that there are 20,000 acres under Global GAP and 56 packhouses HACCP accredited, involving 2000 farmers. (Refer Chapter 6 re later discussion with Prof Malik re TRTA).

However, trial shipments failed due to quality problems (excessive blemish). He is compiling a report on the increasing proportion of B grade fruit, stating that from 1 acre producing 4 tonnes, only 1 tonne is exportable. He stated that some growers are leaving the citrus industry, with 10,000 acres removed in the past year.

Dr Mahmood referred to thrips (Heliothrips and “Scariothrips” – possibly Scirtothrips) as a major cause of rind blemish, along with mites (identified as “spider” and “red”) and fungal diseases scab and melanose. He believes there is sufficient extension and online services but there are financial barriers to adoption. He also referred to the questionable quality of some chemicals.

There have been some cooperative-style approach involving agronomists from packhouses. He referred to four packing houses (Roshan, Chase International, Al Rafiq Enterprises and Al Noor) providing inputs and advice via agronomists to 500 acres (total 2200 acres). Costs of inputs are then deducted from grower returns. He believes this model will expand. (Refer Roshan Enterprises visit Chapter 2)

Dr Mahmood has 103 acres of organic Kinnow, where he uses oils for pest control. His PhD thesis is based on this work.

## **Dr Iftikhar Ahmad (Chairman PARC), Dr Azeem Khan (DG NARC) and Dr Khalid (Director of Horticulture, NARC)**

12<sup>th</sup> January, Discussions focussed on operational issues regarding the ASLP variety introduction and propagation components.

It was disclosed that the farm of Zafar Abass in Bhalwal is hosting a mother block of 23 plants of each variety on drip irrigation, under the care of Suleman, for evaluation and demonstration purposes. (Ref Chapter 6)

A trial of selections from a previously unknown breeding program was noted. This consisted of one selection each from Kinnow x Salustiana (for low seeds) and Kinnow x Mosambi (for juiciness) and was conducted by Dr Mukhtar. A grower trial is also in place in Sargodha.



# Chapter 2 Packhouse Visits

## Summary

Packing houses (also described as “Processors” or “Factories”) play a crucial role in the physical role of preparing and packing fruit. Some also manage the procurement of fruit from growers and the marketing process. In other cases, fruit is purchased by harvesting contractors and sold on to packhouses, while marketing may also be handled by specialist export traders.

As may be expected, the packhouses emphasised the difficulty of obtaining sufficient fruit of a quality suitable for export. They also believed that the prices paid to growers were sufficient to motivate the adoption of improved practices to increase quality. One of the enterprises visited is investing in technical personnel to work with selected growers. This may offer a potential case study through a private sector partnership into the risks and rewards of adopting production technology to improve market performance.

**Figure 6 Kinnow in cold store at packhouse awaiting shipment**



## Packing shed visit – Roshan Enterprises

8<sup>th</sup> January. This was hosted by Mr Qaasim Ejaz, who runs the packing house. His brother Khalid (chairman, who runs export business in Karachi) was also present. Another brother runs a fruit carton business in Lahore. A brochure and company CD was provided. Field Officer Mohammad Aftab was also present.

Their approach to “quality pricing” was that there is no problem with arranging this and they do already practice it, but they consider that farmers prefer a simple approach.

Their major concern was the low supply of high quality fruit for export. Wastage is high at 30-40%. They believe this starts early, with excessive fruit drop (>90%) (This figure needs verification) Blemish, size, colour and canker are major limitations. It was noted that there is now no market for low quality fruit.

They consider that canker has become widespread in the past five years and is an important quarantine issue in all markets. Area freedom is under discussion. Orchards are examined for leaf infections in September by Department of Plant Protection. (refer Chapter 4 and Appendix 5 re forum discussions on role of DPP)

Fruit fly is also a major issue, requiring cold treatment at 2.5 degree Celcius for 16 days. All markets are also concerned with MRLs. These issues are causing major market access issues with closures or warnings occurring. (refer Chapter 4 and Appendix 5 re forum discussions on SPS/MRL issues)

To address this, 25 farmers supplying Roshan from 730 acres are receiving advice from the field officer, extending to plant quarantine protocols.

After packing, losses are low due to exclusive use of cartons as well as the care taken. Other packers compare poorly, still using wooden crates and suffering major losses both in domestic and export shipments. While wooden crates can handle rough roads better than cartons, road improvements to Kabul, for example, enable full trailer loads (3600 x 10kg boxes) to be shipped in cartons. (Also improved trucks)

Selective picking is started in mid-November to spread the harvest and marketing season. Picking costs are PKR 350/day to the contractor, who pays PKR 275 in wages. More skilled work such as sorting earns PKR 500. This compares with other highly skilled work at PKR 700. It is becoming difficult to source labour at the low rates on offer.

Russia – (small sizes) 40+ days shipping time

Dubai (large) first arrivals in first week in December with a 3-4 day shipping and 2 ships/week

Indonesia 15 days

EU 30-35 days

Iran closed for the past two years as their own fruit is good

Roshan Enterprises have an interest in research, hosting an irrigation trial as part of an Italian project. They also have developed a nursery shade house, using concepts learned in Australia. They are considering netting a production site as a trial.

**Figure 7 Traditional and modern trucks at loading bays**



## **Packing shed visit - Farhad**

8<sup>th</sup> January. Mr Farhad reported that the overall trend is a decline in quality and increasing disease problems (described as “viral disease”). However, this year is an improvement on last year, when low temperatures caused skin cracking and export markets are happier.

“A” grade fruit is required for Hong Kong, Malaysia, Ukraine and UAE. There are reduced (50%) shipments to Russia due to exchange rate risks. China suffers from SPS barriers. Domestic markets return a 50% price premium for waxed fruit due to improved appearance and longer shelf life.

The DPP is doing a good job in undertaking certification checks required to keep markets open.

Regarding the ASLP Quality Payment Project (Mr Illyas farm is to provide fruit to Mr Farhad): Mr Farhad indicated that growers are already in a strong position, with 300 processors competing for limited supplies of good fruit. The price differential of Grade A at PKR 650/40kg, vs B Grade at PKR 250 vs Grade C at PKR 80 should be sufficient motivation to grow better fruit.

A contractor present also commented. Mr Chaudhry Abu Bakar purchases PKR 50m of crop on tree for Mr Farhad and has 20 acres of his own. He believes that low input production practices result in better fruit quality. On his own orchards he applies nitrogen three times as well as potassium and also sprays in March/April and September for thrips and has seen a significant decline in quality and price.

# Chapter 3 Government Meetings

## Summary

Government policy has a major impact on value chain performance, both through the provision of resources for research and extension programs as well as through inter-governmental negotiations regarding market access. Both Provincial and Federal Government representatives indicated strong support for a greater value chain focus to future work.

Importantly, there were also suggestions of alternative sources of international support for such programs, such as the World Bank. However, it is noted that there can be a lack of continuity in some senior government roles. This creates challenges in obtaining reliable information and/or coordination between such potentially complementary programs. However, such opportunities should be pursued.

## **Rashid Mehmood, Secretary, Agriculture Department, Government of Punjab**

5<sup>th</sup> January. Attended by senior staff from UAF (Dr Jaffar Jaskani), CRI (Altaf-ur-Rahman, Abdul Rahman) and Ray Niaz (VC -Arid Agriculture University, Rawalpindi ).

Dr Tahir Khurshid (ASLP Citrus Project Leader) briefed the meeting on all aspects of the project to date and future goals. The Secretary (newly appointed) showed strong interest in many aspects of the project, including: economics of fruit thinning, irrigation management and intercropping and returns to growers; scalability of technology transfer from those currently involved to the wider industry, including use of SMS services; availability of tensiometers to reduce overwatering; ensuring value from visit of Pakistani growers to Australia in 2015; and overall approaches to evaluating the impact of the project.

## **Dr Ahmed Ali Zafar, Additional Secretary, Government of the Punjab**

5<sup>th</sup> January. Dr Ali Zafar mentioned a recent visit to Australia which included discussions on ASLP III. This was linked to Victoria University Victoria Institute of Strategic Economic Studies (VISES). (Copy of trip report requested 29 Jan). He also mentioned a planned World Bank program of PKR 50m on value chain research. (also followed up 29 Jan).

## **Mr Seerat Asghar, Secretary Federal Department of Food Security and Research**

12<sup>th</sup> January. Dr Khurshid briefed the Secretary on recent project activity, including value chain scoping.

The Secretary showed great interest and was well informed on citrus issues. He stated that the value chain for Kinnow should have been discussed twenty years ago when plantings were expanding. Also the marketing system is a major problem.

He stated that nothing has been done on industrial processing. Dr Azeem stated that the proposed NARC value chain project was to have a strong focus on processing, such as manufacturing granules from low-grade fruit to help stabilise markets.

He referred to the canker issue needing serious attention given the export barriers, such as to EU. He stated that the only canker-free farms are outside of Sargodha region, eg Gojra

He also emphasised the need for improved pruning practices and was briefed on ASLP workshop and best practice program, with FVDP input. He suggested that a three year initiative was required to thoroughly instil better practices.

The Secretary was interested in varietal options and believed that oranges were unsuited to Sargodha climate. Dr Khurshid suggested that trials are required as heat unit data indicates otherwise. Dr Azeem stated that seven varieties are under test and that sweet orange fetches PKR 170 compared with PKR 80-90 for Kinnow.

He referred to the short (2-3 month) window for Kinnow and the need for alternative varieties to expand this. He wanted to know when plants would be commercially available. Dr Hafeez stated this would be 3000 plants/year from next year (there would be 60 buds/plant from the Sept 2013 plantings (50 plants/variety) plus the greenhouse plants).

The Secretary stated this was too slow and that budwood should be imported to accelerate the process. Dr Azeem stated that NARC have established two more mother block orchards and have a record of each and every plant provided. The Secretary instructed that no plants should be given free as gifts. He said that he has hundreds of friends in Sargodha who are hungry for varieties and would want to buy 500 plants if they were available. He stated that communications with growers was very poor.

Dr Azeem stated that NARC would develop a plan for this, to calculate how much budwood was available. Also there were seven Italian varieties. It was also noted that top working requires a lot of budwood plus skilled follow up care.

**Figure 8 Screenhouse at PARC Research station, Islamabad**



## Chapter 4 Value Chain Forum

### Introduction

The forum was held at the premises of the packing company Iftikhar Ahmad & Company, Bhalwal, Punjab, Pakistan on 9<sup>th</sup> January.

**Figure 9 Value Chain forum in session**



The objective of the forum was:

**To capture industry perceptions of the problems related to fruit quality in the marketplace and likely causes and opportunities to improve.**

The forum was a key element of the scoping study and was designed to capture a range of perspectives from participants along the supply chain. This complemented the input from some supply chain participants (consumers, wholesalers, retailers, importers) captured through other meetings.

The forum itself included growers, harvesting contractors, packers, exporters and researchers and involved fifty participants. The agenda is in Appendix 1. A brief interactive session “Advantages of working in value chain” was designed to engage participants in the process and to explain that each step along the value chain can increase or decrease value.

Discussion groups were pre-arranged according to value chain role and chaired by members of the scoping study team, who also noted key points (Appendices 2-5). Each chair managed the session using discussion points (Appendix 6). These points were tailored for each group, but all groups addressed the initial question:

**“What do you think are the major factors that cause wastage in the citrus value chain?”<sup>3</sup>**

### Summary

Not surprisingly, the different perspectives provided by participants from different parts of the value chain provided a range of answers to the key question. Any approach to improving value chain performance should recognise and address these different perspectives as well as looking for shared issues. To assist with this, the key points from each group were summarised, grouped and analysed

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<sup>3</sup> “Grade A fruit is only about 45%, the other 50% goes to the domestic market and 5% to factory or thrown away. Only about 18% of production is exported” (according to packer/exporters group)



(Table 2). Given that consumer requirements drive the value chain, this analysis addresses **market issues first** and **production issues last**. However, it is recognised that many issues are inter-related.

**Market development** was recognised as a key issue by all the groups. Some were more generic, while others specified the need to meet market requirements for certification. This varies by market and may involve Sanitary/Phytosanitary (SPS) issues and/or Good Agricultural Practice (GAP). Clearly, certification starts on farm. However, requirements must be clearly communicated from the market back to the farmer and compliance must be communicated in return. This relates to the following key issue of Value Chain Coordination.

The researchers group also raised the possibility of establishing new markets for manufactured extracts and other products from reject-grade fruit. This would require technology and commercial partners.

Several varied issues have been grouped under **Value Chain Coordination**. These relate to various participants along the value chain working together to create benefits for the whole chain. For example, a clearer mechanism to value the crop at time of sale can act as an incentive to grow more blemish-free fruit and improve business along the chain. Similarly, packers (processors) assisting farmers to adopt practices that reduce blemish is beneficial to both sets of participants.

**Training** was seen as a major issue by all groups. This applies at every stage from producing the crop to harvesting and packing the fruit. As stated above, packers may have an increasing role to play in linking changes in production practices to final fruit quality and grower income. It was widely recognised that fruit blemishes originating on-farm remains a key issue and better access to reliable information and training is essential to address this.

Finally, it is vital to produce the **right varieties on the right rootstocks**, to provide a healthy basis for increasing productivity and to meet market needs for a longer season of supply.

**Table 2: Analysis of key issues shared by groups**

	Primary Issues	Including	Growers	Contractors	Packers and Exporters	Researchers
1	Need to develop markets and to meet their requirements					
1.1		HACCP, GlobalGAP, SPS etc certification, as required				
1.2		Value adding to reject fruit via processing technologies				
2	Value Chain coordination					
2.1		Need to reduce costs along the value chain				
2.2		Improved selling/buying mechanisms required				
2.3		Working through processors (packers) to facilitate improvements at farm level				
3	Training in production and harvesting required					
3.1		Production practices to reduce blemish				

3.2		Training for harvesting and packing practices				
3.3		Improved reliability & availability of information				
4	Alternative varieties to be available from high-health status nurseries					



# Chapter 5 Export Market Visits

## Summary

Pakistan exports Kinnow to many different markets, as described in interviews with packers. The study team were able to visit importers in two of these markets – Dubai and Jakarta. General impressions were as follows, based on the prepared questions (Appendix 7). These are discussed further in the Implications section.

Skin blemish is common and first grade Pakistani Kinnow is equivalent to a mixed first/second grade from other suppliers. No other out-turn problems are apparent. In existing export markets, Kinnow has been positioned as a low priced offering, competing with other Northern Hemisphere citrus. There is little information available on other consumer perceptions about Kinnow, beyond price and a general requirement for sweetness.

## Dubai: Meeting with Mohamed Ali Puthuveetil (Ali), Geant Group

14 January. This was an introduction from Roshan Enterprises. Ali is the Merchandise Manager, Fruit & Vegetables, Geant Groupe Casino and Fucom LLC (run from Al Aweer market in the evening). He has thirty years industry experience with his own business and acting for Geant, a major French retailer. With Geant, there are 70% direct imports and 30% from the central market.

The discussion was guided by the pre-arranged questions (ref Appendix 7) as far as time allowed. After this, the scoping team inspected fruit on the supermarket floor and purchased samples for photography.

Volume/value of Pakistan Kinnow? – figures not provided, but Ali has been trading Kinnow for many years and collaborating closely with Roshan in several markets, including Malaysia.

Proportion of Kinnow compared to citrus imports from other sources? – Kinnow represents 60-70% of citrus sales from December to March.

How does Kinnow compare with other citrus available at that time? – Kinnow has a distinct price advantage at 50 cents/kg, compared with other mandarins at \$1.20 (Turkish) and \$1.50 (Spanish). Other citrus sources are Californian navels, South African Valencias, Turkish navels, Spanish Navelina, Egyptian navels.

What are your major sources of citrus through the year? – Ali imports from around the world. He mentioned Blue Jay (US – Johnston Farms, Cal.). Also Santara mandarins from India (sweet, but poor appearance)(same as Ponkan). Also Clemengold from South Africa and satsumas. Oranges include Delta and Midnight seedless Valencias from South Africa plus oranges from Argentina and Australia.

Comparison of Kinnow with other sources:

Ease of purchasing & Delivery

Overall, Roshan provides good service and communication. There are no issues with regularity of supply and supermarkets such as Geant work to a program determined in advance.

Kinnow tends to be a lower grading than other citrus, equivalent to a mix of Grade 1 and 2, depending on the packer. Kinnow has a good shelf life of 20-25 days after arrival (stored in a citrus-specific cold room).

Feedback is provided to the supplier on a container by container basis, including a random carton check. Any problems are handled by an insurance broker.

In general, documentation is a big issue regarding Pakistani suppliers compared with others. In particular there needs to be consistency in the number of cartons stated in the various documents (phyto, packing list, sell certificate, country of origin, sealed and stamped invoices)

Food safety requirements such as HACCP are requested but not essential in Dubai.

Consumer feedback

What do consumers like/dislike about Kinnow? – He has never heard a complaint about the seeds in Kinnow. For example, Clementines are not promoted as seedless such as occurs with watermelon and grapes.

What categories of consumer tend to buy Kinnow by preference and why? – Kinnow is a lower/middle class fruit purchased by all ethnicities (not only Pakistani residents). This contrasts with berries, which are seen as a higher class fruit with increasing demand.

Overall

What would have to change for you to be able to:

- Sell more Kinnow
- Make more profit from Kinnow and potentially pay higher prices

He doubts that there is more than a 5% premium available for improved quality. However, Dubai experiences an ongoing 10-15% growth in retail sales, supporting future growth in Kinnow sales.

Visit to Al Aweer Central Fruit and Vegetable Market

This included a general inspection of market operations, including transfer of Kinnow imports from containers to land-based transport.

## **Dubai: Meeting with Altaf Hussain (Altaf Hussain Trading Co. LLC)**

14<sup>th</sup> January. Mr Altaf Hussain stated that he has been in business for 45 years.

He noted the importance of the exporter Arif, who developed a major operation in 2001. He stated that Arif have maintained quality, while Uni Fruit and Noon Orchards are also among the better exporters. However, there is a lack of trust of some other exporters. (Examples being cancelled orders when better prices offered elsewhere). The ease of establishing an export business without adequate knowledge and experience was also an issue.

With Kinnow shipments, Mr Altaf mentioned two major issues: failure of the cold chain when the driver turns off the fridge unit on the truck: and picking wet fruit, leading to skin damage.

Mr Altaf also raised a number of allegations regarding perceived lack of transparency of SPS certification processes.

## **Jakarta: Retail visits**

**Visit to Hypermart and IndoGrosir Cash and Carry in Kemayoran 16 January**

**1..Hypermart in Mega Glodok Kemayoran (MGK) complex.**

Jl. Angkasa Kav B-6, Kota Baru Bandar Kemayoran, Kemayoran, Jakarta Pusat

This offered a wide range of citrus of varying price and quality. Priced per kg or per 100g or per piece in Rupiah.

Kinnow. 22900

Clemenville 34900

Jeruk mikam 28000

Jeruk Shantung Burma 49900

Jeruk Ponkan 42900 individually wrapped large

Small 1485 per piece

## **2.. IndoGrosir**

Jl. Terusan Angkasa B2 Kav. 1 Gunung Sahari Selatan, Kemayoran Jakarta Pusat

IndoGrosir is a chain of convenience stores. This outlet appeared to be a distribution centre which also sold items at retail. This included a small fresh produce offering of fairly low quality.

## **Jakarta: Meeting with PT Segar Manis Mata (Importer), also trading as PT. Aneka Tunggal Perkasa**

16<sup>th</sup> January. This was an introduction from Roshan Enterprises. Ngilimin Halim (Min), Manager, Renny Lauren, Global Sourcing (Jakarta) and Anna Herliati Import Manager (Surabaya). Min stated that the business is one of two exclusive importers for Zespri. They also import Australian citrus from MFC, Vitor, BGP as well as grapes, pears and apples.

Overall, Indonesian import quotas have restricted imports. There is little opportunity for domestic supplies to fill the gap, due to seasonality, fruit fly and quality issues. (Medan produces some very sweet citrus and there are sweet Batichan oranges from Java).

Last year, Jakarta port reopened to Pakistan imports, avoiding the need to transport overland from Surabaya, which is the case with citrus from China. (\$5-6/10kg for Pakistani fruit vs \$7-8/10kg for Chinese).

Overall, Pakistani Kinnow accounts for 35% of all mandarin sales, because it is cheap.

Volume/value of Pakistan Kinnow imported? – not stated

Proportion of Kinnow compared to citrus imports from other sources? 35%

How does Kinnow compare with other citrus available at that time? – Chinese Ponkan also imported in quantity (via Surabaya so transport cost disadvantage). Indonesian consumers love Kinnow.

What are your major sources of citrus through the year? – Afourer, navels and Daisy from Mildura. (Daisy considered not sweet enough). Low-seeded Murcott (considered to be tasteless compared with seedy Murcott). Blood oranges from South Australia.

Comparison of Kinnow with other sources:

Ease of purchasing and Delivery

Depends on the exporter, eg Roshan and Chase International are good. Some decay problems in some seasons are weather-related.

Storage life in on-site cool rooms is 2-4 weeks. Early season Kinnow has better shelf life. He believes that seeds improve shelf life.

#### Consumer feedback

What do consumers like/dislike about Kinnow? Low price is major benefit. Also consumers want sweet fruit.

Global GAP is required for quota, but mainly a formality.

#### Overall

What would have to change for you to be able to:

- Sell more kinnow
- Make more profit from kinnow and potentially pay higher prices
- Opportunity to sell more is constrained by quota.
- Opportunity to increase price is limited as consumers are used to current pricing.

#### Supplementary

Would you be interested in other varieties of citrus from Pakistan?

- Would be interested in a test shipment of blood orange
- Would like to see extended season for Pakistan citrus eg Daisy would be Oct/Nov in Pakistan

# Chapter 6 Other overlapping programs

## Summary

A range of other information came to light through internet searches or other discussions during the study tour, as recorded below. These relate to other programs related to citrus that have the potential to complement any future ASLP value chain oriented citrus program. These programs are noted in the following Results section. However, information about many of these is lacking in detail and/or reliability and further verification is required.

## Dr Azeem Khan (NARC), Javed Saleem and Zafar Abass

10<sup>th</sup> January. Mr Saleem is a grower and administrator of the Punjab Co-operative Fruit Development Board. The Board plays a role in developing the industry, establishing nurseries and making recommendations regarding canal water. They are working with NARC to develop disease-free nurseries, working with progressive farmers. They act as a bridge between farmers and NARC. He suggests that each village needs one trained person to provide technical services for the area.

Mr Abass is a grower with a strong interest in new varieties, believing that there is a limited future for Kinnow. He is trialling a number of varieties on his property as well as a drip irrigation trial (for which he has established a farm dam). (Ref Chapter 1 re Islamabad meeting with NARC regarding field days on Mr Abass farm)

## Professor Aman Ullah Malik and Dr Muhammad Amin, UAF

10<sup>th</sup> January. Professor Aman Malik was unable to attend the forum and was very keen to provide a briefing on his role in the mango value chain project and also the TRTA citrus project. Dr Amin is the Postharvest Research Coordinator for the ASLP II Mango Value Chain Improvement Project. They have established a Postharvest Research and Training Centre at UAF. However, we were not able to visit this due to security restrictions.

### 1...EU TRTA project:

This was directed through UNIDO and was a supply chain-based, commercially focussed project. It used a 4+1 cluster approach (four growers and one packer) plus observer growers. It involved price transparency and cost transparency, grower/packer visits to markets and buyer visits to production areas as well as pilot shipments. There were ten exporters (including Roshan, Rafiq, National, Agro, Pakemon, Matilda, Zaid (names to be confirmed))

The university developed SOPs and identified Critical Control Points, plus training packages for each CCP. (Real –time, on the job training). There were also training modules for extension staff from the Fruit and Vegetable Development Program (to be verified with FVDP). Staff from CRI were also involved, including Abdulrahman, Aziz etc. Malik and Amin brought several examples of training posters to demonstrate. They are currently completing the Code of Practice (followed up by email)

A parallel TRTA project ran in mangoes, through MRS (Mango Research Station) as the Pakistan partner. Prof Malik described the ASLP Mango project as being R&D-focussed, complemented by the TRTA/UNIDO project which was non-R&D. He also mentioned a small USAID Ag Support Fund (ASF) project involving training and a market visit (one season only)

Malik stated that DPP certification is not acceptable as International Certification and more steps are required. He is a member of the Global GAP implementation group.

## 2...PhD scholars related to citrus value chain

Malik has supervised numerous PhD scholars in research related to value chain improvement, particularly related to skin blemishes. He described these and later forwarded a list. These could be reviewed for potential contributions. A summary of some of these PhD studies was published as a booklet<sup>4</sup>.

Some, at least, of this work studied insect pests and had input from Dr Akram from the Department of Entomology. This could provide some insights into insect identification and control vs sources of blemish. (Dr Akram is currently seconded to a mosquito control project related to Dengue virus). Regarding the use of Horticultural Mineral Oils, these were brought from WA for the experiments. They are now available in Pakistan but expensive.

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<sup>4</sup> Malik A.U. 2011 Kinnow Quality Improvement for Export to International Market – 1 (Summary). University-Industry Technology Support Program. University of Agriculture, Faisalabad

# Chapter 7 Wholesalers

## Summary

Interviews with domestic market wholesalers were undertaken by Muhammad Sohail Mazhar.

### **Al-Shafi Enterprises (Chaudhry Muhammad Naseer). Wholesale Market, Sargodha.**

### **Chaudhry Muhammad Shahbaz & Sons (Chaudhry Tahir). Wholesale Market, Faisalabad.**

Growers / contractors approach wholesalers in several markets to know the trend of the market and transport their fruit to markets where the demand is high. Kinnow fruit owned by growers and / or contractors is sold on commission in an open auction. Fruit is normally not held in the stores and is sold fresh because the storage charges would add to the cost of the supplier (grower / contractor) and the next day price cannot be guaranteed if it would be higher.

Fruit from different geographical areas fetches different prices regardless of the cosmetic look of a comparable visual quality. Kinnow from Sargodha and Oranges from Mardan (KP) are sold at highest prices.

Quality assessment is never conducted to assess the fruit condition and quality issues.

Size of the fruit is the basic grading criteria in domestic markets. Fruit are first sorted on size basis and then are segregated on cosmetic look.

Each grade of size and / or cosmetic look is sold at different prices. Juice factories buy the poor quality fruit at lowest prices. However, at one stage when the fruit supply is at peak, the factories stop buying even the low quality fruit from the market.

Sometimes, if the fruit quality is very good, the agents of wholesalers buy the fruit themselves and then sell it to pack-houses for export. Some of the wholesalers are also the exporters, so they buy fruit from the market and process in their pack-houses for export to markets where the tracing etc. is not a requirement.

Wholesalers agreed that if the proportion of good quality fruit can be increased, the profit margins of each stakeholder in the chain can be increased. It would increase export volume and even the price in the domestic market.

More facilities for Kinnow juice needs to be established so that the lowest quality fruit can be consumed.

Consumer education about quality and food safety can also be helpful in increasing the demand of good quality fruit. If quality is guaranteed, the consumers have ability to pay more.

# Chapter 8 Consumers

## Summary

Focus group meetings with domestic consumers were undertaken by Muhammad Sohail Mazhar. Haider Ali and Waqas Shafqat recorded the consumer focus group responses. The groups consisted of separate male and female purchasers of Kinnow selected from University personnel. The study was designed to provide an indication of consumer usage and attitudes but was not designed to represent population-wide opinions. The responses are general in nature and are attached as Appendix 8.

**Figure 10 Female consumer focus group in session**





## Results

**The overall purpose of the study tour was to scope out the opportunities for future collaborative programs to focus on citrus value chain improvement.**

**The broad objective was to identify barriers to growth of exports of Pakistani Kinnow mandarins to existing export destinations. The sub-objectives to achieve this were:**

*Gain an overview of the current operating environment of the Pakistani citrus value chain from the perspectives of researchers, growers, packer/marketers and importers*

*Identify relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies*

*Map relevant activity and/or knowledge in current ASLP Phase II citrus program and in current and potential programs by partners and other agencies*

### **Overview of Value Chain Mapping**

Value Chain thinking recognises the overarching goals of **consumer satisfaction** and **grower profitability** and considers the flow of information, goods and money, together with the technology and relationships required to achieve these goals.

Value Chain mapping is often represented by a diagram showing the chain of steps and intermediaries between the producer and the consumer. There may also be an estimate the margin taken at each transaction along the chain. One study exists that applies this approach to the Kinnow industry<sup>5</sup>. However, this analysis is incomplete (eg excludes packaging and storage costs) and is for domestic supply only. Significant resources would be required to develop a database capable of producing a reliable version of this type of analysis. This is important in understanding income flow and grower profitability, but sheds little light on consumer satisfaction.

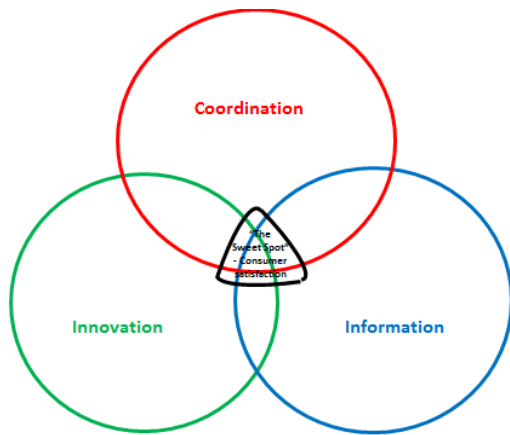
For the purpose of this scoping study, an issues-based system of analysis was used<sup>6</sup>. This employs three elements, Information, Coordination and (technical) Innovation to provide a framework for identifying and understanding the myriad of issues involved in any value chain. (Figure 2) This recognises the overlap between these elements, providing a useful tool for analysing “what we know” and identifying key knowledge gaps.

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<sup>5</sup> Sabir MH, Khan MB & Hussain Z 2010 Marketing margin of mandarin – a case study of Sargodha region, Pakistan

<sup>6</sup> McEvilly, G. 2006. Innovations in Chain Management - an Australian Perspective. Acta Hort. (ISHS) 712:75-82 [http://www.actahort.org/books/712/712\\_6.htm](http://www.actahort.org/books/712/712_6.htm)

**Figure 11: Value Chain Framework**

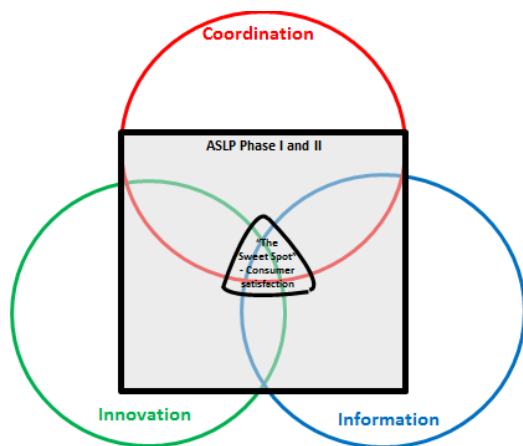


When these multiple issues are well-managed, there is an increased chance of hitting “The Sweet Spot” of Consumer satisfaction. Consumers are interested in: (i) sensory quality factors, such as eating quality, appearance (including colour, size, blemish); (ii) credentials including food safety and (indirectly) SPS protocols; and (iii) price. The issues affecting these factors occur throughout the value chain – many occurring at farm level.

**Relevant activity and/or knowledge in current ASLP Phase II citrus program**

In scoping the value chain issues for future citrus programs, the aim is to build on existing knowledge where possible. Therefore, it is important to recognise the work completed or underway under ASLP I and II. These are summarised in the following lists. Table 1 in Chapter 1 spells out the value chain significance of the productivity elements listed below under Innovation and Communication.

**Figure 12: Existing ASLP contribution to addressing value chain issues**



**Innovation**

- Varieties & Rootstocks
- Healthy Budwood
- Nursery Practices
- Topworking
- Irrigation
- Plant Nutrition
- Blemish Diagnosis

- Pruning
- Disease (fruit & root)
- Pests

**Coordination**

- Quality Payments Program
- Coordinated supply of varieties & rootstocks
- Scoping study

**Information**

Best Practice Guidelines & Delivery, including:

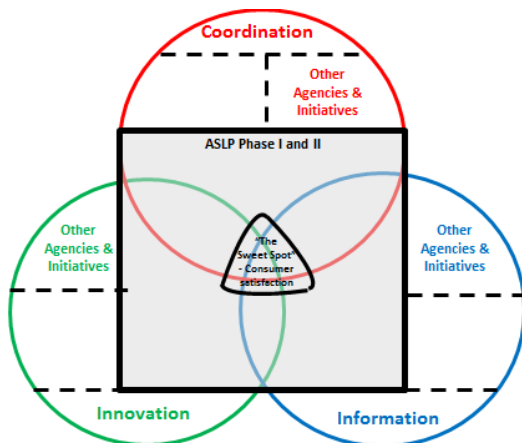
- Nursery Practices
- Topworking
- Irrigation
- Pruning
- Disease eg copper
- Pests eg oils

(via: Field Days/Factsheets/ Posters/Web-based/Mobile/ Train-the-Trainer

**Relevant activity and/or knowledge in current and potential programs by partners and other agencies**

It is also important to identify and evaluate other relevant initiatives. A number of these came to light in the course of discussions as well as through internet searches. These have the potential to enhance future value chain-focussed programs. However it should be noted that further analysis is required to confirm the existence and value of some of these initiatives.

**Figure 13: Contribution by other initiatives to addressing value chain issues**



**Innovation**

Tba

**Coordination**

- Packers/exporters
- PHDEC
- Starfarms
- NARC

Dr Azeem/Idrees Bajwa

- PKRs 1m value chain proposal
- World Bank  
Dr Ghaffar (Punjab Department of agriculture)
  - PKR 50m for value chain
- USAID  
ASF project (small, one season only)
- Italian Project  
Rawalpindi Arid Agriculture Station

#### **Information**

- Agriculture Development Bank (ref Idrees Bajwa previous role)
- Punjab co-op Development Board (ref Javed Saleem)  
NARC linkage/Nursery development

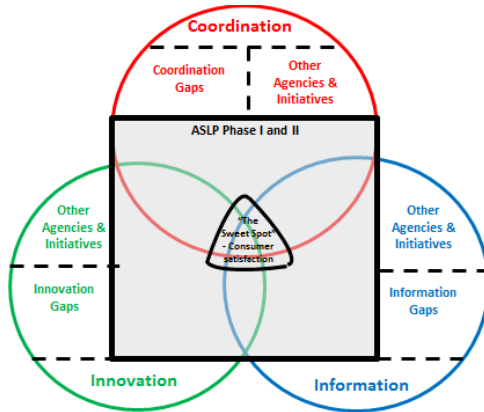
#### **Other, overlapping programs**

- FVDP  
Dr Asif Khan
  - Farmer Field Schools
  - Field Days
- NARC  
Dr Azeem/Dr Khalid
  - Kafar Abaaz farm
  - Pruning, Fruit fly, Variety evaluation, drip irrigation
- CRI  
Dr Jaskani
  - Irrigation
  - Nursery
- ARI  
Dr Nisar
- UAF theses to review  
Dr Malik and Dr Akram re pest identification thesis
- DPP  
Dr Mubarak
  - MRL & SPS issues
  - Registration of farms and packhouses
  - Provision of information to growers on how to achieve compliance
- EU TRTA project 2012-2015  
Prof Malif UAF/UNIDO/Netherlands
  - 10 exporters and clusters
  - Production Guidelines
  - Exporter/packer field officers

## Identify and map key gaps in activity and/or knowledge

Finally, it is also important to identify any major gaps in prior work. In addition there is, or may be, other related activity that provides opportunities for knowledge-sharing or collaboration.

Figure 14: Key gaps in ability to address value chain issues



### Innovation

- Variety evaluation data Kinnow maturity data (selective picking)
- Possible postharvest disorders
- Processing opportunities

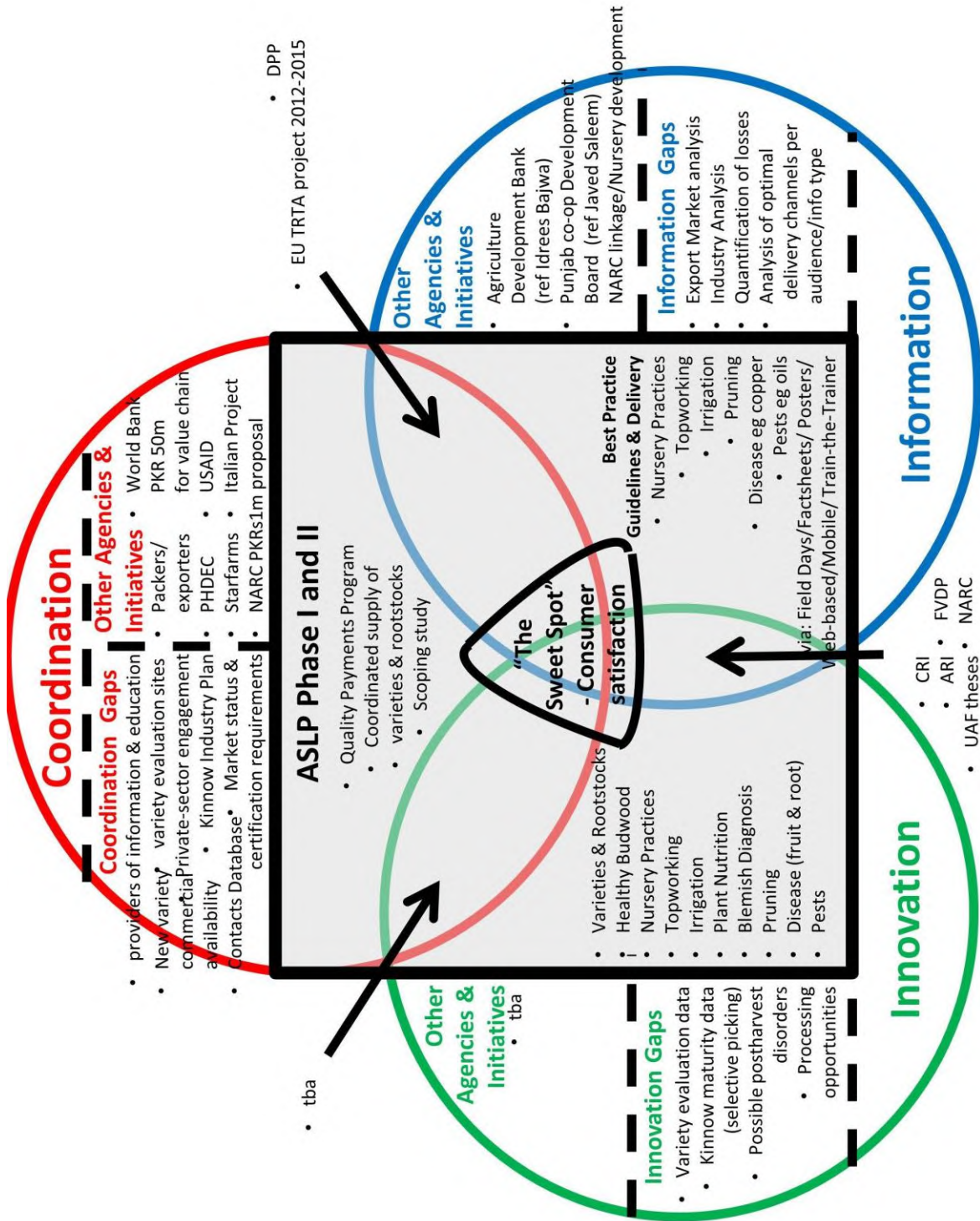
### Coordination

- Private-sector engagement
- Providers of information & education
- Variety evaluation sites
- Contacts Database
- Kinnow Industry Plan
- Market status & certification requirements
- New variety commercial availability

### Information

- Export Market analysis
- Industry Analysis
- Quantification of losses
- Analysis of optimal delivery channels per audience/information type

Figure 15: Issues map for Pakistani Kinnow Value Chain



# Implications

This is a summary of standout issues noted during the January 2015 visit. Note that it is based only on the observations made and information provided at the time and some limited review of related online information. Most of the data obtained was qualitative rather than quantitative. The insights gained have been used to frame some hypotheses about the way the Pakistan citrus value chain operates. These are designed to provide a basis for further analysis during the design or conduct of a future value chain focussed program.

## Market positioning

Overall, the domestic market appears to be over-supplied and export markets under-supplied. However, closure of some export markets has also been an issue. While export grade is in demand and provides better monetary returns, Kinnow is a low-priced commodity in both export and domestic markets.

### *Domestic*

Marketing of Kinnow is unsophisticated, with minimal grading and cleaning once export-grade fruit is removed. There appears to be little if any extension of the domestic supply window via cold storage. Focus groups indicate some level of consumer awareness of factors affecting quality, such as size and growing region, as well as the impact of poor packaging such as wooden crates and net bags. This may also contribute to reduced shelf life, also impacted by non-refrigerated storage.

Overall, it appears that the seasonal over-supply of B-grade fruit for domestic sale positions Kinnow as a low-value product and, in turn, discourages investment in value adding such as through better packing. Domestic consumers also consume low-grade fruit as juice supplied by juice factories. Kinnow fruits are apparently also juiced at home.

The private-sector engagement opportunities are low, due to the dispersed nature of domestic value chains and the apparent lack of any major players with the potential to act as partners.

**Hypothesis: Apparent domestic oversupply could be eased by diverting a higher proportion of crop to export markets. This could in turn strengthen domestic prices.**

**Hypothesis: Apparent domestic oversupply may be due in part to poor distribution systems or to the inability of part of the population to afford to buy fruit.**

**Hypothesis: Alternative varieties could extend the season of supply of citrus into the domestic market. This may also replace some of the Kinnow currently oversupplied.**

### *Export*

The product offering is Kinnow in January-February, with some extension into December and March. The product is consistently easy-peel, juicy and seedy. Sweetness increases during the season. Grading is by colour, size and skin quality.

Skin blemish is common and first grade Pakistani Kinnow is equivalent to a mixed first/second grade from other suppliers. No other out-turn problems are apparent.

In existing export markets, Kinnow has been positioned as a low priced offering, competing with other Northern Hemisphere citrus.

There is little information available on other consumer perceptions about Kinnow, beyond price and a general requirement for sweetness. Few or no complaints about seediness were reported but there is a

global trend towards lo-seed mandarins. There is also a global trend towards product integrity, including food safety. Reportedly, Russian consumers accept small Kinnow for use in an alcoholic drink.

The private-sector engagement opportunities are moderate and it is important to pursue these in future programs, given the current low level of reliable information about export markets.

**Hypothesis: Kinnow has no outstanding features that distinguish it in the export marketplace, or that could be used to re-position it to command higher prices.**

**Hypothesis: Export markets (existing or new) may have the capacity to absorb additional Kinnow without crashing the price.**

**Hypothesis: Lo-seed Kinnow selections have the potential to appeal to future consumers, who may be exposed to other lo-seed or seedless mandarins. (Higher prices are, however, not guaranteed even if effective communication with consumers occurs)**

**Hypothesis: Alternative varieties to Kinnow have the potential to extend the availability of Pakistan-grown citrus**

### **Market access**

There have been disruptions to access to some important export markets for Kinnow and there is no clear source of reliable information about which markets are open or under negotiation. There is no good source of market intelligence about these various markets, such as consumption data, competitor analysis, consumer attitudes, SPS barriers, quotas, etc (including trends).

The export markets supplied currently and/or recently also vary widely in their mode and timeframe of supply (eg seafreight 40+ days to Russia, 5-6 days to Dubai; roadfreight to Iran, Afghanistan, Ukraine). Therefore each market will have its own issues regarding timing of supply and potential out-turn issues.

The private-sector engagement opportunities are high, with this topic being an issue of concern at every level of industry.

**Hypothesis: Improved market intelligence would enable growers, packers and exporters to make better-informed business decisions and enable government authorities to make best use of limited resources for market access negotiation and industry support programs. This includes decisions about potential new varieties.**

**Hypothesis: Postharvest research will enable better-informed decisions about the capability of Kinnow to perform satisfactorily in various supply chains, at different times of the season, from different regions and enable protocols to be optimised.**

### **From orchard to market**

Generally, growers receive little or no market feedback to help them optimise production practices. For example, many growers sell their crop to a contractor soon after fruit set. This minimises any chance of a price signal related to fruit quality and market performance.

However, there are encouraging signs of change, where contractors are valuing and buying the crop much later in the season eg at colour break. Also, some packer/exporters are working with clusters of growers and providing technical support. They may also be financing production inputs such as sprays and fertiliser. Other programs such as TRTA have been involved in facilitating these developments. ASLP is trialling a quality payment program, which is also designed to improve transparency around fruit quality and grower returns.



Improved transparency is also essential in order to meet market requirements for product integrity such as SPS regulations, MRL compliance and GlobalGAP or related standards. The DPP is playing a key role in SPS/MRL certification and grower/packer education. It is unclear whether the level of GlobalGAP certification is rigorous enough to meet the requirements of all markets.

The private-sector engagement opportunities are high since this part of the value chain combines strong links to the marketplace and market access with strong links to production and potential links to pre-production.

**Hypothesis: The orchard to market links in the Kinnow value chain may be the sector most amenable to private sector involvement. These links may reside in a single entity or with several closely aligned intermediaries (eg contractor/packer/marketer)**

**Hypothesis: Some existing value chain partnerships involving growers, packers and exporters are addressing fruit quality and product integrity issues. These may form the basis of a model for wider industry adoption, if they are willing to share information.**

### **Production**

There are major issues regarding both productivity and fruit quality of Kinnow. ASLP research to date has indicated great potential for improvement in both factors, while also finding areas of ambiguity in causal factors.

The private-sector engagement opportunities are inherently high (since virtually every grower operates as a private business). However, a major culture change may be required to equip growers to develop ongoing value chain collaborations. Initial grower involvement is most likely to occur through existing channels for extension. There should also be a strong focus on marketing groups, including those currently being formed by some larger packers. There may be a risk that larger or more sophisticated growers could capture these opportunities more quickly than small/poor growers. While any rural economic development may be viewed as pro-poor, the specific poverty-reduction goals need careful definition as part of developing a value chain program.

**Hypothesis: Growers require sources of advice regarding optimising production of Kinnow and the evaluation of alternative varieties. Addressing the current fragmentation in information exchange regarding diagnosis and resolution of problems offers a major opportunity.**

**Hypothesis: Linking information about production practices to information about market impact and cost:benefit will increase the uptake of better practices.**

**Hypothesis: Improved value chain performance will deliver poverty-reduction benefits to the overall rural community, despite the risk that the poorest farmers may be slower than average to actively engage.**

### **Pre-production**

ASLP research has also begun the process of evaluating potential alternative varieties for season extension. This is linked to studies on alternative rootstocks and improved nursery management practices. These are all essential to underpin any future shift away from growing seedy Kinnow.

Some growers are apparently very keen to plant substantial trial blocks and there is some frustration at the slow rate of release of plants, as well as some confusion over what will be available and when. However, technical evaluation is essential to assess the effect of harsh summer growing conditions. As stated above, there is little information about the market potential of these alternative varieties.

The private-sector engagement opportunities are moderate to high, through linkages to nurseries as well as the need to ensure market opportunities for new varieties are well understood, through linkages with marketers.

**Hypothesis: Clear, updateable information about the new varieties will assist growers to manage the risk of growing these.**

# Recommendations

- Any follow-on program from the ASLP Phase II citrus component should consider the hypotheses formulated from this study as the basis for program priorities and goals.
- The program should also build on the outcomes of the Phase I and II programs and rigorously pursue any opportunities for cross-learning and collaboration with other relevant initiatives.
- The program should ensure that key gaps in activities and knowledge are addressed as a matter of urgency.

# Appendices

## Appendix 1: Value Chain Forum Agenda

- Tilawat Quran Shareef 10 AM
  
- Attendance Register with name and contacts
  
- Introduction to the Program – Dr Tahir Khurshid 10:05 AM  
Background to the project  
Elaboration of Phase 2  
Value chain project – stemmed from findings based on Phase 2  
Objectives  
Our expectations
  
- Advantages of working in value chain – Mr Gerard McEvelly 10:15 AM
  
- Focus group sessions (chaired by scoping study members) 10:30 AM
  - Growers
  - Researchers/Industry
  - Packers/Processors
  - Contactors/Wholesalers
  
- Chair of session reports back 12:15 PM
  
- Conclusion, Group Photo and Finish 1:15 PM
  
- Lunch 1:30 PM

## Appendix 2: Growers Group notes

**Chair:** Tauseef Tahir

**Participants:** Total 17

**KPK:** Mr. Nobat Ali Khan, Mr. Kamran & Mr. Hastam

**Punjab:** Mr. Tahir Hafeez, Mr. Aftab, Mr. M. Zulfiqar, Mr. M. Amjad, Mr. M. Usman, Mr. Rizwan Safdar, Mr. Rab Nawaz, Mr. Illyas Warriach, Mr. Hammad Tarrar, Mr. Abdul Ghafoor, Mr. Akhtar, Mr. Adeel, Ali Nawaz & Mr. M. Suleman

### **Important factor contributing to losses in citrus production, Quality & affecting the Price**

1. Growers are mainly concerned with the proper nursery establishment for the better citrus production. Because faulty nursery and nursery operations do not produce healthy plants, which adversely affects the citrus production. Growers spent a lot of money in purchasing of plants but sometimes plants are not confirmed for their actual parentage in other words they are not true to type and also they are not disease free, which not only affect the time span of growing them but also affect the financial setup of grower and production as well. (Comment: Trueness to type issues would only apply with new varieties, not kinnow, but poor plant health is a risk for all varieties)
2. Growers have no knowledge regarding modern orchard plantation i.e. High density plantation. If they had knowledge then most of them don't know how to manage the modern plantation. i.e. Pruning & Canopy management. Little growers had knowledge regarding the canopy management and pruning. They think pruning means to shape the branches from all around the trees.
3. Growers are not equipped with the modern machinery to manage the orchards, which harm them economically and adversely affect the fruit quality, which leads to the lower pricing of their commodity.
4. Growers are lacking with proper knowledge regarding caring of citrus orchards, fertilizer and pesticides application. They normally continue their usual practices or follow all the things which were being done by their forefathers. So lack of knowledge doesn't improve the production and quality of fruit, which really affect the pricing.
5. There are no proper mechanism with regard to educate the growers, if growers receive proper knowledge from the agriculture department or from any organization then they could try best to improve the things in better ways, otherwise lack of information regarding crop management affect the production and price as well.
6. There is no introduction of other varieties other than Kinnow. Alternate varieties could possibly enhance the pricing mechanism.
7. There is no efficient way of picking the fruit. Faulty picking mechanism really affects the fruit quality. Pickers do not handle the fruit properly, which reduce the quality of fruit.
8. Grading and sorting of citrus fruit is complex laborious work, while most of the labour is not trained in the sorting and grading. Thus most of fruit get damaged or its quality gets affected during on field grading and sorting mechanism.

### **Ways of Selling Orchard**

Normally 3 ways are being used for the selling of orchards

1. Growers sell their orchard to contractors after the natural fruit drop (June-July)
2. Growers sell their orchards to the Packing Sheds. It occurs in mid-November at the stage of colour change.

3. A few growers sell their orchards to packing houses or contractors (In this way packing sheds also work as contractor) soon after flowering.

The first and 2<sup>nd</sup> way of selling the orchards is very common, while the third case occurs rarely now a days.

In Sargodha normally contractors and packing houses buy the orchard earlier than Bhalwal area.

### **How growers contact buyers and when Buyers normally started to visit the orchards**

1. Growers use their personal contacts to find good contractor or packing house, who had a good reputation in term of paying the money on time. Most of the contractors and packing sheds also approach the growers themselves by observing the orchard condition and quality of fruit as well.
2. If grower had also have a good reputation due to his crop management practices then contractors and packing sheds prefer that grower.
3. Contractors started to visit the orchards after the natural fruit drop and also at the colour change stage in November.

### **How growers develop their mind for certain price limit**

Growers use visual observation to fix final limit of selling their orchard.

1. The most important thing that growers keep in mind is the expenses, which they have made on the orchard throughout the year.
2. They compare the fruit quality and yield with the previous year and also with the nearby orchards as well.
3. They consider orchard health, fruit size, Colour change and less diseases to develop their rough idea for the selling of their orchards
4. In certain cases growers also take suggestions from the experts as well.

### **Considerable points by buyers and discussion with the owner of orchard**

Buyers normally visualize the orchard to give their estimation. The important things, which they keep under observation and do discuss with the owner are

1. They observe fruit size and overall health of the orchards.
2. They ask about the application of different fertilizers, insecticides and pesticides.
3. They randomly select a trees and calculate the rough number of fruits from that trees and multiply it with total number of trees in the orchard with similar age. In this way they roughly estimate the yield and give options (Price limit) on the basis of the yield, less infestation, Quality and Size. But size is more important than numbers.
4. Usually growers ask, my orchard is of that much worth, while your are offering little, then contractors (Buyers) told them it has size, quality and yield problems.
5. Normally buyers indicate lot of issues in the orchards so farmers get upset and they could be able to take more benefit of it by offering less price.

### **Good Way of selling orchard (Growers view)**

Growers suggest that best way of selling the orchard is to sell the orchard at time of colour change, when crop is ready. Prior to this selling of orchard is not the better way.

## **Mechanism of price/ money instalments & Issues**

The most common way of money instalment is that

1. 1/4<sup>th</sup> of total get paid by buyer at the time of deal finalization, 1/4<sup>th</sup> at start of first picking, 1/4<sup>th</sup> at the middle of harvesting and last 1/4<sup>th</sup> at the end of harvesting.
2. But in most of the cases contractors & Packing sheds do not pay last instalment. They usually say that this issue happened, we estimated that but your fruit is not of that quality as we assumed. In this way they give loss to growers and take benefit. Sometimes growers had to leave their some money.
3. On time instalment does not take place. Contractors/Buyers deceive the growers many time. And growers remain in waiting for the money. Even next harvesting season reaches and they have not successful in finding the previous amount.

## **Problems in Pricing Fixation & Market Issues**

1. There is monopoly among the biggest packing houses, they develop their own prices and then everybody had to follow that price limit. Government do not play its role in the price fixation of Kinnow orchards like other crops (Cotton, Sugarcane, Rice & Wheat).
2. 05 years ago buying price of "A" quality fruit was 1200PKR/ 40 kg, which has been reduced now at the lowest level of 600. Middle of the season it also drops down to 500 as well.
3. Contractors normally share the loss with farmers not the profit.
4. There is no link between Grower and market, which adversely affect the growers, while contractors and packers take benefit from this. Growers had to rely upon the contractor.
5. Direct approach to market is not easy, while involvement of middle man put an extra pressure on growers and grasp lot of money from grower's pocket. Middle man contribute a lot to take a lot of money from the profit of the growers.

## **Ways of Marketing**

1. Growers normally sell their orchards to contractors and packing houses. Because in this way they had no headache about any arrangement of harvesting their fruit and transportation as well.
2. Few of the growers tried previously to sell their fruit by themselves in the local market. They get profit as well. But they feel that selling fruit by themselves in the local market is very hectic and tough as well. Because they had to arrange transportation, labour and had to engage themselves in the local market at the time of auction. While selling of orchard to the buyer keep them relax and tension free.

## **Other Issues Shared by Growers**

1. There is no diversification among citrus varieties (Alternate varieties)
2. There are no industries, which could consume raw material.
3. Picking, transportation & Packing costs are very high.
4. There are no potential export markets
5. Fertilizers, Pesticides and Insecticides are not pure. (No proper way of usage)
6. Local markets are not of good standard, fruit is handed very badly.

## **Solutions**

1. Establishment of healthy and disease free citrus nursery
2. Knowledge about Modern Orchard Plantation/ Management should to be extended up to smaller growers.
3. Diversification of Citrus varieties
4. On time application of fertilizers, pesticides and insecticides should to be adopted with good quality products.
5. Growers should to be trained, how to implement Best orchard management practices (Pruning, Canopy Management and Irrigation). Which could reduce blemish, canker, scab and other diseases.
6. Reduction in picking, transportation and packing cost.
7. Elimination of middle man from marketing system
8. Monopoly elimination among big packing house to introduce better price.
9. Improve the linkages between growers and market
10. Demand creation: Introduction of new export potential markets
11. As loss is shared with growers, the profit should also to be shared.
12. On time instalment of amount should to be happened, it will encourage the growers to do more efforts for more betterment.
13. Price should to be fixed in proper way not by monopoly of big packing houses.
14. Helping material in local language should to be provided having all information to produce fruit for export market, this will enhance personal sense towards the improvement of their orchards health.
15. Educate the growers that what is requirement of international market, if you want to get more money then we had to follow it.
16. There is need to strengthen the extension wing, so farmer can receive better information.
17. Most important is that grower should to take interest by himself in all operations of his orchard and should to be in touch with extension material and experts for the betterment.

(Summarised by GMc as:

Need for alternative varieties to be available from high-health status nurseries

Plants are not true to type and also they are not disease free, which not only affect the time span of growing them but also affect the financial setup of grower and production as well.

Alternative varieties could be more profitable.

Need for training in production and harvesting

Growers have no knowledge regarding modern orchard plantation i.e. Pruning & Canopy management, mechanisation, nutrition, pest and disease management

There are no proper mechanisms to educate the growers

Pickers do not handle the fruit properly, which reduce the quality of fruit.

Fruit damage during in field grading and sorting.

Need to understand costs along the value chain

Middle men services eg harvesting, transport etc perceived to be expensive and consuming grower profits (but advantages of outsourcing these are recognised)

Concerns over cost and quality of fertiliser and pesticide inputs

Need improved selling mechanisms

Price paid for A grade fruit has halved over past five years (price paid to contractors, not growers?)



There has been a shift from selling the crop to a contractor soon after flowering to selling the crop at fruit drop June/July or colour break in mid-November, particularly in Bhalwal. Growers would prefer not to sell before colour break

Reputation is an important factor in determining grower-contractor agreements. However, payment instalments are reportedly late or may be denied altogether due to stated quality issues.

“There is monopoly among the biggest packing houses, they develop their own prices and then everybody had to follow that price limit.” (Government sets prices in some other crops)

Need to develop markets and to meet their requirements

Additional export markets are required

Fruit size, estimated yield and quality determine the price offered for a grower's fruit

## Appendix 3: Contractors Group notes

Chair: Mr. Wajid

Participants: Mr. Jhangir (Roshan), Mr. Haider

### Introduction

Contractors were invited to highlight their role in citrus industry, information exchange and sharing problem faced by them in whole citrus supply chain. Further discussion was invited on the overall topic of:

“What do you think are the major factors that cause wastage in the citrus value chain?”

Contractors identified number of reasons that cause wastage in citrus value chain.

- Fruit size is reducing day by day and deshape fruits
- High severity of blemishes
- Increase of disease incidence
- Physical injury during harvesting
- Canker is most severe problem
- Quarantine insect and disease management
- Poor harvesting techniques, field loading, transportation, road infrastructure.
- Uneducated and untrained labour (80-90%). Same labour use for mango harvesting and same for citrus harvesting.
- Growers, contractors and all other members of supply chain don't like to give proper attention to their crop and show less interest for good management, although they have idea.

Contractors do transactions in four splits. 10 % contractors used own payment, while 90% contractors used bank loan

- ¼ payment before harvest.
- ¼ payment at start of harvesting
- ¼ payment at ¾ of harvest completed
- ¼ payment at the end of harvest.

Due to poor quality less orchards are sell before fruit ripening.

- 20-25% contractors purchased orchards during June-July
- 20-25% contractors purchased orchards during Sep-October
- 30-40% contractors purchased orchards in November-December

Different fruit quality standards

- 20-25% A grade fruits = 650 rupees/40 Kg
- 35-40% B grade fruits = 200 Rupees/40 Kg
- 30-35% C grade fruits = 50 Rupees/40 Kg

Risk and advantages of early orchard purchased

- Risk of fruit drop
- Risk of disease attack.
- Increase of work load (management of orchard labour)
- Chances of increase of rate

- Increase of fruit size.

#### Suggestions

- Develop strategies against disease and blemishes of citrus.
- Conduct trainings of harvesting, packing and processing industry labour
- HACCP and SADAX certification of orchards and packers, processors and exporters
- Explore new export markets.

## Appendix 4: Packers and Exporters Group notes

Chair: Steven Falivene

Participants: Quasim (Roshan), Rizwan (Agro industries), Haji Azam (domestic grower packer), Gufran (exporter Karachi), Abid & Ijaz (Agro fruit - export packer), Shehahid (export packer), Shoaib (export packer), Badar (MDS export packer, grower, Karachi), Noor (export packer) & Shamsher

### **Most important factor contributing to losses in the value chain is the high level of blemish on fruit.**

Blemish is a mixture of Scab, Melanose, Canker, thrip, mites and wind blemish. Grade A fruit is only about 45%, the other 50% goes to the domestic market and 5% to factory or thrown away. Only about 18% of production is exported. The domestic fruit floods the market. It was recognised that Pakistan A grade is a mixture of international 1st and 2nd grade. Pakistan fruit is of lower quality than other "A" grade fruit at the market place. If the blemish of fruit is reduced, more fruit is available for export and the packed fruit will have less blemish (standards of grade A will increase).

Growers do not have a reliable source of information and advice. There is conflicting information provided by experts (chemical resellers, extension and researchers) and other people (other growers). Sometimes chemicals are not registered for citrus and some chemicals are decanted and diluted.

### **Discussion was then directed to look at other parts of the value chain where losses can occur**

#### **Harvesting**

Most problems occur in the beginning of the season. This occurs because new people are employed and they are not adequately trained. By the first week or so most problems are rectified because the pickers are trained. Some of these problems include

- Pickers climbing trees and damaging fruit in their bags as they climb (need ladders). Sometimes they also pass fruit bags down, fruit is damaged as it bumps on branches and fruit also falls out the bag
- When fruit is transported from the tree to the truck the 20kg crates are bumped during lifting onto the head and dropping down.
- Fruit is handled too rough by pickers, they squeeze it too much when they hold it
- Fruit from the ground is harvested. Either it is dropped and picked up or naturally dropped fruit is picked up
- Stems are too high and damage other fruit
- Fruit clippers damage fruit when cutting stems
- Fruit clippers are not sharp and rip the stem
- Top of tree is harvested before the bottom of the tree and tree on the bottom of the tree is damaged

#### **Transport to Packing house**

- Crates are thrown too hard into the truck
- Too much fruit is put into the crate and fruit is squashed

#### **Packing house**

- The packing line is old and outdated. Markets are asking for labels on every fruit, but the old finger sorting machines are difficult to modify to incorporate this machinery
- Lack of technical support to fine tune and rectify problems - chemicals and line use (i.e. brushes)
- Some packing houses do not pre-cool and fruit are put in containers too warm
- There is no regulation on what chemicals can be applied in the orchard and packing house, there is a fear that MRL will be breached overseas and shut down markets
- After the packing line there is only 1-4% breakdown, not a problem

### **Transport and ship loading**

- Generally not a problem

### **Shipping**

- No problems with shipping apart from Russia does not allow truck route and shipping route is very long

### **Export clearance**

- Export markets are becoming more aware of quarantine pest and disease issues. They are requesting fruit free of number of pest and there is great concern that containers will be rejected at great cost and possibly shut down the whole market.
- Some markets also have high duty costs on Pakistan fruit that put Pakistan at a disadvantage, Russia has a duty , but Egypt has no duty

### **Wholesaler retailer**

- Only feedback is when there are problems, not much visionary feedback is provided or positive feedback when things are well, no news is good news.
- Only feedback is demand for seedless fruit

### **How are contracts determined between the grower and packer/contractor ?**

Previously orchard buyers would visit orchards in June/July. Now contracts are being made in Sept/Oct. The contracts have been moved forward because it became difficult to predict the quality and quantity of fruit in June/July. Some growers also lost interest in growing the fruit after the contracts were determined. In Sept/Oct they would walk in the orchard (10-15 min 1 ac, 30-40min 5 ac) and look at the trees (no quantitative assessment, only visual). The buyer would estimate the yield, fruit size and blemish. The buyer would have an estimate of market prices for the season based on:

- Potential volume of the present crop in Pakistan (on or off year)
- Current prices at export markets for fruit from other countries
- Previous season prices

The grower is paid 25% of the total agreed price

Traditionally the orchards fruit were purchased, now there is a recent trend to pay on a per kg basis. Fruit crates are weighed in the field. The final price is calculated by the buyer based on an estimate of A,B and C grade. For example if A grade fruit is worth 650rs/mun (40kg) and B grade 450rs/mun and C 80rs/mun, then an average price of 500rs/mun is offered.

Packers are willing to pay growers based on weight of A, B and C grade. A problem with this system is that arguments can occur on the definition of A and B grade.

### **Extra comments**

Seedless mandarin varieties are needed in Pakistan

Need more varieties to spread the harvest of fruit

## Appendix 5: Researchers Group notes

Chair: Gerard McEvelly

Participants: Aftab (Roshan), Dr Hafeez (NARC), Dr Mubarak (DPP DG), Dr Khalid, Dr Allah (DPP), Dr AbdulRahman (CRI), Dr Nisar (ARI), Dr Azim Khan (NARC Director), Dr Ehsan (CRI), DrAkbar (CRI), Dr Ishfaq (DPP), Tariq Mahmood (PHDEC)

### Introduction

Each participant was invited to provide a short summary of their role in citrus research and development. Further discussion was invited on the overall topic of:

“What do you think are the major factors that cause wastage in the citrus value chain?”

There was clear recognition of the wide range of pre-harvest factors that result in down-grading of fruit. It was felt that researchers already know the issues and can offer many solutions. However, compared with other farmers, the majority of citrus growers were considered to be less knowledgeable and less interested in adopting improved practices.

This slow rate of change threatens the future viability of the industry, given the combined impact of increasing disease problems and stricter SPS protocols (particularly canker and fruit fly) In this region there were 280 processing plants six or seven years ago now there are only 80. It was felt that urgent action is required to drive necessary change. A different approach is needed that involves partners along the value chain.

### 1. Working through processors (packers) to facilitate improvements at farm level

Provision of grower training alone is not enough there needs to be clear price signal to motivate change. Importantly, in order to achieve adoption by Growers is important to work through processors and the clusters of Growers linked with them. This is particularly relevant regarding managing risk to export markets from SPS issues.

Although GlobalGAP is widespread there is a risk it could become a paper activity that does not reflect reality. It is important to work with processors in order to achieve meaningful GAP The example of chilies in Sind province was given

Some other useful lessons could be gained from the mango industry where the strategy has been to register pest free farms. In the first year 100 farms gained pest free registration for this resulted in a price increase for these Growers.

As a result there are now 2000 applicants for pest free registration

DPP tried this approach in citrus but from 300 farms inspected not one was pest free

### 2. The sweet orange industry in KP – control of root diseases

Here the issue of tree decline from root diseases of the sour orange rootstock is paramount. This is being addressed through the ASLP project component on root stocks

However post harvest issues related to processing and handling of citrus are also relevant

### 3. Value adding to reject fruit via processing technologies

There are increasing problems in maintaining export markets for fresh fruit due to SPS issues as well as general quality issues. As it is 60% of the crop is non-export grade

They could be opportunities to convert this into value added products such as essential oils, preserved peels, candies and powdered concentrate similar to Tang.

This could operate as a cottage industry level although there would need to be commercial partners for coordination and marketing.

A national project is currently under development including investigation of this opportunity

#### **4. Mechanisation of pruning**

Given the widespread problem of skin blemish derived from wind rub and secondary infections, pruning is a key issue. Mechanisation is used effectively in Australia and should be investigated here.

## Appendix 6: Discussion topics for forum

### 1. Growers

*Introduction: Discussions with growers and with contractors have identical structure.*

**Purpose:** *to clarify and document the contracted sale process and to compare perspectives from both sides of the transaction.*

**Why:** *we have a fair idea of how this works from discussion and hearsay only. The sale transaction is crucial for understanding how growers could be rewarded for growing better fruit and therefore motivated to adopt better technology and to increase supply for export.*

#### **What do you think are the major factors that cause wastage in the citrus value chain?**

Thinking about wastage from production problems, we would like to explore how this affects the price received by the grower:

#### **How does the sale transaction occur with your contractor?**

Prompts: How do you choose which contractor to work with each year?

Do different contractors come in and make offers for your fruit?

When does this happen?

How do quality factors affect the price ?

How do you decide on the quality of the crop and agree this with the buyer?

How do yield factors affect the price both yield per acre and fruit size? How is this assessed?

How does payment carried out?

When do you get paid?

How much do you get paid?

What is the range of prices and what causes price to vary?

What do you think are the risks of selling the fruit in advance of harvest?

What do you think are the benefits of selling the fruit in advance of harvest?

Are you aware of or have you tried any other methods of selling your crop?

What do you think about the system where you are paid after harvest according to the quality of fruit (assessed by the volume of each grade that is suitable for sale)?

How would this work in the Pakistan citrus industry?

Supplementary:

1. What contact if any do you have with other people along the value chain?



## 2. Contractors

*Introduction: Discussions with growers and with contractors have identical structure.*

***Purpose:** to clarify and document the contracted sale process and to compare perspectives from both sides of the transaction.*

***Why:** we have a fair idea of how this works from discussion and hearsay only. The sale transaction is crucial for understanding how growers could be rewarded for growing better fruit and therefore motivated to adopt better technology and to increase supply for export*

### **What do you think are the major factors that cause wastage in the citrus value chain?**

Thinking about wastage from production problems, we would like to explore how this affects your ability to get the fruit you need:

### **How does the sale transaction occur with your growers?**

Prompts: How do you choose which growers to work with each year?

How do quality factors affect the price ?

How do you decide on the quality of the crop and agree this with the grower?

When does this happen?

How do yield factors affect the price both yield per acre and fruit size? How is this assessed?

How does payment carried out?

When do you pay ?

How much do you pay?

What is the range of prices and what causes price to vary?

What do you think are the risks of buying the fruit in advance of harvest?

What do you think are the benefits of buying the fruit in advance of harvest?

Are you aware of or have you tried any other methods of selling your crop?

What do you think about the system where you pay after harvest according to the quality of fruit (assessed by the volume of each grade that is suitable for sale)?

How would this work in the Pakistan citrus industry?

Supplementary:

1. How do you organise marketing through the season regarding quality changes and market demand changes
2. What are the most important problems with fruit when it arrives from the farm but causes you problems with packing and selling? How have these changed over time?
3. What contact if any do you have with other people along the value chain?

## 3. Packers/exporters

### **What do you think are the major factors that cause wastage in the citrus value chain?**

What are the problems with fruit when it arrives from the farm that causes you problems with selling? What are the problems that arise with the fruit after you have sold it?

What feedback do you get from your customers in the marketplace?

Prompt: there are reports of food wastage high levels between picking and consumer purchase what do you know about this?

How do you organise marketing through the season regarding quality changes and market demand changes (including market destination changes as the season progresses)

### **3a. For exporters**

What problems do you face in getting fruit to export markets?

Prompt: eg quality issues after exporting, freight issues, packaging, tariffs, quarantine issues etc

#### **How does the sale transaction occur with your growers?**

Prompts: How do you choose which growers to work with each year?

How do quality factors affect the price ?

How do you decide on the quality of the crop and agree this with the grower?

When does this happen?

How do yield factors affect the price both yield per acre and fruit size? How is this assessed?

How does payment carried out?

When do you pay ?

How much do you pay?

What is the range of prices and what causes price to vary?

What do you think about the system where you pay after harvest according to the quality of fruit (assessed by the volume of each grade that is suitable for sale)?

How would this work in the Pakistan citrus industry?

Supplementary:

1. What contact if any do you have with other people along the value chain?

### **4. Researchers**

#### **What do you think are the major factors that cause wastage in the citrus value chain?**

Please summarise your key area of current research in 2 mins

What other key areas of research have been done or are now underway?

Prompt:

A. eg factors that cause fruit loss or damage in the orchard (before picking)

B. eg factors that cause fruit to be rejected after picking before packing

C. eg factors that cause fruit to be rejected between packing and consumption

Where there are solutions to these factors, what are the barriers to growers or other members of the supply chain adopting these solutions?

Supplementary:

1. What are the main markets for Pakistani citrus? What are the barriers to these markets?
2. What do you believe to be the major issues relating to citrus varieties that affect the acceptability of Pakistani grown fruit to consumers in domestic and in export

### **Appendix 7 Discussion topics for importer interviews**

#### **Importance of kinnow in your business**

Volume/value of Pakistan kinnow imported?

Over how many years? Increasing/decreasing?

Proportion of Kinnow compared to citrus imports from other sources?

How does Kinnow compare with other citrus available at that time?

What are your major sources of citrus through the year?

### **Comparison of Kinnow with other sources:**

#### **Ease of purchasing**

- Ability of suppliers to realistically forecast volumes, timing, quality and price
- Compliance with requirements for Global GAP, ISO or other certifications
- Order placement and communication about order status

#### **Delivery**

- Communication about delivery status
- Delivery in full on time
- Quality on arrival (records if possible)
  - o Temperature
  - o Quarantine issues
  - o Out-turn percentage/repacking required
  - o Reasons for rejection (rots, blemish, maturity etc)

#### **Distribution in-market**

What categories of resellers do you supply? (wet market, specialist fruit shops, catering, supermarkets)

What drives them to purchase Kinnow for reselling? eg price, quality, shelf life

What puts them off Kinnow?

How does storage and distribution take place and is this the same for all citrus? eg are there quality management processes in place

#### **Consumer feedback**

What do consumers like/dislike about Kinnow?

What categories of consumer tend to buy Kinnow by preference and why?

Is there any promotion of Kinnow or other citrus types to consumers in your country?

Are you aware of any research on consumer preferences for citrus in your country?

Would consumer research be of any value to you as an importer?

If so, what would you like to know and how would this help?

## **Overall**

What would have to change for you to be able to:

- Sell more Kinnow
- Make more profit from Kinnow and potentially pay higher prices

## **Supplementary**

Would you be interested in other varieties of citrus from Pakistan?

## **Appendix 8 Consumer Focus Group responses**

### **FEMALES GROUP**

**Notes By Waqas Shafqat**

#### **Kinnow source:**

Kinnow is purchased from hawkers, fruit retail shops, from mandi (wholesale market), or the orchards. Most convenient source is buying in bulk from mandi. It allows price saving. Good quality fruit is used for fresh consumption and moderate to poor quality fruit is used for juice. If low volume is required, consumers buy it from venders or fruit shops.

#### **Quality:**

Orchard quality is better fresh and good colour fruit is available. Good quality Kinnow fruit is available at super store. Grading is not carried out in mandi.

#### **Shelf life:**

One week shelf life in winter. It can be stored up to fifteen days but fruit rots start in some fruit. Some spoil during post-harvest handling. If we do not remove branches from fruit it rapture the surface of other fruits during storage. One Kinnow out of ten show spoilage after few days. Waste products can be protected by proper handling at selling time, at harvesting time, at farm level or at home. Grading not done properly. No packaging container commercially available. Kinnow not stored in the fridge. We sored mostly outside the fridge.

#### **Purchasing time issue:**

Main issues or factor at the purchasing time are Price, quality, color of fruit, appearance of fruit. Price and quality both are equally important. Retailor make sticker at the fruit where there is a spot on the fruits. Boxes should be available for packaging. Affordability is also a major and main factor for the purchaser. Quantity also affect the price. If you buy 6 fruits or 4 fruit no matter price is somewhere high. For juice extraction, fruit quality does not matter. For edible fruit all characters of fruit are judged by the shopper.

Retailers tell 25% more price than original price and then gives 25% discount. Mandi price low as compare to retailers. Big size stores gives us good quality product as compare to the METRO. Soft fruit has low market value as compare to firm fruit. Eye and touch sense are used to check the fruit at the time of purchasing. Big size fruit does not taste good as compare to small size fruit. Thick peeled fruit has no taste.

25% additional cost can be paid / afforded is fruit are free from blemishes.

#### **Cost of Improved Packaging**

25% extra cost can be paid by purchaser for good packaging. Polishing in Kinnow also increase the value of fruit.

#### **Global gap certification:**

Affordability is the major factor. Availability of safe fruit is a major issue. Awareness of consumer about the global gap certification can increase the demand of good quality. Cheating

in this matter has no trust about the certification, though. Health, ethics and price is major factor which effects its selling. Company and brand name is also preferred.

### **Family member preference:**

Big size fruits prefer by the family member. No spot should be on the fruits.

### **Internal characters of the fruits:**

Softness of the fruits can be checked at the time of buying. Bright colour the fruits has good taste sweetness. Otherwise some retailers cut the fruits in pieces and offer consumers to taste the fruits. Skin peel also effects the fruits internal characters. Spotted fruits also effects quality of fruits. One plants has different type of fruits variation in their size and characters. Maturity not at the same time. Faisalabad and Sargodha has different of fruits characters.

### **Home delivery:**

Home delivery of good quality fruit can be accepted if it comes with money back guarantee, like pizza. Can pay 25% additional cost for this convenience.

### **How can improve?**

Post-harvest handling of Kinnow is not appropriate. Government, grower, market men, wholesaler and retailer can bring improvement to the system. It can be improved by grading, sorting, quality, purchasing and market value. Good market should be available. Low price, good quality and good characters also improve the value of market. At the peak of the season price of Kinnow is low. Government policies should construct coordination between the government, market, grower and consumer. Kinnow quality can be improved by taste, juice content and acidity. By value addition we can improve the system of our Kinnow fruit.

### **Notes By Haider Ali**

- Purchase fruit from retailer, hawkers, wholesale market and orchards. Retailers are more convenient as compared to other sources, but with respect to price direct purchase from orchards is most convenient way with benefits of fresh produce and good quality.
- Kinnow purchase from super stores have different advantages i.e. sorted, graded fruits with good quality.
- 10% fruits go in waste, if the produce bring in bulk quantity. Reasons shriveling, softness and increase of bitterness in taste.
- Kinnow in wholesale markets are unsorted and non-graded.
- Diseased fruits cause infestation to healthy fruits.
- If the fruit bought from hawkers, most of the fruits found infested. The hawkers mix up the poor quality fruits with good one.
- Proper sorting and grading should be done in field just after harvesting.
- Shoppers purchase the Kinnow fruit keeping in view the size, fresh look, firmness and price.
- Mostly sticker is placed on blemishes.
- Price depends on quality and for better quality, have to pay higher price, so they decrease the quantity, but for juice low quality fruit can be used.

- 25% above the local price can be given for export quality fruit.
- Most of consumers use to bargain up to 20-25% less price.
- Most of the consumers purchase fruits on general observation and firmness, peel thickness and size.
- 25% price can be affected due to skin blemishes.
- Season of availability affects the price.
- Don't like to purchase from bicycles hawkers.
- Purchase of Global GAP, SADAX and HACCP certified fruits depend upon price and income of the consumers.
- Some consumers don't have satisfaction on certification.
- If the confirmation of certification will be done, the consumers will like to purchase the export quality fruit.
- Late season crop is sweeter than early season crop.
- In family members, good quality produce consumed earlier than poor quality produce.
- Internal fruit characters depend on firmness, peel colour and size.
- If the retailer will give poor quality fruit, consumer will change the retail shop.
- Fresh bright colour is associated with taste, skin thickness and juice percentage.
- The sweet taste depends on climate and locality.
- They will like to buy the fruits, if home delivery facility will be available.
- Proper method of handling and packaging should be done.
- Need of improvement at government level (Rate check and balance) and grower level (proper sorting and grading) is required.
- There should be coordination between researchers, producers, wholesalers, exporters and retailers.
- Independent society should be develop without involvement of government.
- In recent years availability of Kinnow in domestic market has increased, but quality and price remain same.
- Set up some quality standards.
- Market distribution should be increased.
- Value addition should be done.
- Farmer markets should be developed.

## **MALES GROUP**

### **Notes by Waqas Shafqat**

#### **Kinnow source:**

Kinnow is purchased from SP stores, road side, mandi, market or vender. Most convenient are venders. Which come near our home.

#### **Kinnow characters at buying:**

In character the size of fruit, colour of fruits, freshness of fruits, maturity, normal size not too big fruits used by the consumer choice. Peel size also affect the quality of the fruits thick peel size has less sweetness in taste. Normal size is better in taste.

#### **Price:**

Price with respect to quality is imported. More important are juice character of fruit. Some of the consumer (families) use 80 to 100 Kinnow fruit weekly. If we buy for juice more number of fruit are purchased. If we buy low no of fruit low incidence of rots and spoilage. Consumers decrease fruit consumption when price goes above their budget, whatever good quality the fruit are.

### **Global gap certification:**

In our country it is difficult to evaluate. If price of certified fruit is more than normal fruit consumer does not buy the certified fruit. If good quality fruit is available in the market it will leave good effect to our health. Awareness of the good quality product should be given to the consumer. Basic education about the packing and handling should be given to the labour at farm level.

### **Internal characters of the fruits:**

Softness of the fruits can be check at the time of buying. Bright colour the fruits has good taste sweetness. Retailors offer cut fruit to taste to assure the internal quality is good.

### **Packaging:**

At the packing time pack the material by random order. Proper packing material should be available in the market. 10 % price added with respect to the packing material. Quality also matters with packing. Display in packing increase the value of the product.

### **Improvement:**

Proper packing, size of fruit, grading of fruit, awareness to the consumer, these all factors affect the value of the product. Variation in fruit size affect the value of the product. No standard canopy management is practiced, there should be prescribed strategy about the canopy. Awareness to the farmer with respect to the management proper guides and post-harvest handling.

### **Spotty fruit affect purchasing:**

Spots / blemishes affect the growth of fruit and taste of the product. Appearance is the basic matter for the consumer. Rootstock is the major issue in our climate. By rootstock improvement we can improve the system of Kinnow production. Certified fruit by global gap should be available at 20% more price than normal fruit. Mandi system should be evaluated which mix all type of fruit. We should keep in mind the paying capacity of consumer.

### **Notes By Haider Ali**

- Fruit purchase from retailers, super markets, road side stalls, wholesale market, and hawkers.
- Street hawker is the easiest way to purchase fruits.
- Size, colour is associated with taste, juice percentage and flavor.
- If size increase peel thickness also increase.
- Medium size have less peel thickness, but more sour taste.
- Price is associated with quality and demand is associated with price, so if quality will be improved the demand will decrease.



- Price is more important than quality. In general 20% people prefer physical quality over price.
- Consumers prefer to purchase fruits from wholesale market on weekly basis.
- Consumption depends upon quantity, fruits in bulk, the chances of waste will increase. In general 12% waste have been noticed.
- Consumers will pay more for Global GAP certified fruit.
- Green leaves along with twigs, peel colour, time of harvest is associated with taste.
- If fruit size increased bitterness will decreased. Geographical location is also associated with taste.
- Retailers mostly mix up the fresh and old harvested fruits.
- 10% fruits were noticed bitter and odd quality.
- 50-60% people does not like to change retailers, in case of any bad experience w.r.t quality.
- 80-90% consumers prefer packaging.
- Improve packing, grading, sorting and handling of fruits.
- Avoid sprays.
- Provide awareness and certification to farmers.
- Canopy management practices should be adopted.
- Standardize the production practices, for farmers.
- 80% people prefer blemish free fruits.
- 50% price of fruits depend on blemishes.
- Grading should be done properly.
- Seedless or less seeded kinnow should be introduced.

## Appendix 9 Itinerary

Proposed date of departure: Sat 3 Jan 2015

Return: Sun 18 Jan 2015

<b>Crop Management (trial harvest) and value chain scoping study in Pakistan</b>		
<b>Date</b>	<b>Location (Country/City)/</b>	<b>Activity</b>
3 Jan (Sat)	Travel to Melbourne/Bangkok	Mildura-Melbourne 10:05-11:10(QF 2079)  Melbourne – Bangkok 00:30 – 5:40 (TG 462).
4 Jan (Sun)	Travel to Lahore  Travel by road using AV to hotel  Accommodation: Awari Hotel Lahore	Bangkok-Lahore – 11:00 -14:15 (TG 345)
5 Jan (Mon)	Lahore Meetings  Accommodation: Avari Hotel Lahore	<ul style="list-style-type: none"> <li>• Meet Secretary Punjab/project briefing and progress</li> <li>• Travel to Faisalabad</li> <li>• CRI Visit and harvest arrangements</li> </ul>
6 Jan (Tue)	Travel by road using AV  Accommodation: Serena Hotel Faisalabad	<ul style="list-style-type: none"> <li>• Visit to Mr Illyas property</li> <li>• Harvest of growers trials</li> </ul>
7 Jan (Wed)	Travel by road using AV  Accommodation: Serena Hotel Faisalabad	<ul style="list-style-type: none"> <li>• Best practice and irrigation site visit (Hamad)</li> <li>• Meeting with irrigation provider</li> </ul>
8 Jan (Thu)	Travel by road using AV Accommodation: Serena Hotel Faisalabad	Packing shed visit and value chain scoping study - Farhad
9 Jan (Fri)	Travel by road using AV  Accommodation: Serena Hotel Faisalabad	Packing shed visit and value chain scoping study - IAC (Waheed Ahmad)  Iftikhar Ahmad and Co Bhalwal Sargodha
10 Jan (Sat)	Travel by road using AV  Accommodation: Serena Hotel Faisalabad	<ul style="list-style-type: none"> <li>• Kinnow Industry Forum (Serena hotel, Faisalabad)</li> <li>• Collaborators Meeting at Dinner at Serena hotel</li> </ul>

11 Jan (Sun)	Accommodation: Serena Hotel Islamabad	Travel to Islamabad
12 Jan (Mon)	Travel by road using AV  Accommodation: Serena Hotel Islamabad	<ul style="list-style-type: none"> <li>• Meet Dr Iftikhar Ahmad (Chairman PARC)/ Dr Azeem Khan (DG NARC) and Federal Secretary (Seerat Khan) (Project briefing and future projects by Tahir Khurshid to Federal Secretary)</li> <li>• website staff Meeting (Steven and Tahir in afternoon)</li> </ul>
13 Jan (Tue)	Travel by road using AV to airport  Travel to Dubai  Accommodation: Dubai TBA	Islamabad-Dubai 9:00-11:35 EK 613
14 Jan (Wed)	Accommodation: Dubai TBA	Check markets and fruit condition / survey
15 Jan (Thu)	Travel to Jakarta  Accommodation: Jakarta TBA	Travel Dubai-Jakarta 10:45-22:08 EK 358
16 Jan (Fri)	Accommodation: Jakarta TBA	<ul style="list-style-type: none"> <li>• Preparation for meetings</li> <li>• Meet collaborates from previous mango project</li> </ul>
17 Jan (Sat)	Travel to Melbourne	Jakarta-Singapore 17:15 -19:55 (EK 778)  Singapore – Melbourne 22:25 – 8:50 (EK 404)
18 Jan (Sun)	Travel to Mildura	Melbourne-Mildura 15:15 -16:20 (QF 2082)

# Glossary

Optional

# Bibliography

A full literature review was not factored in to the scoping study. Some limited internet searching was undertaken, with a focus on seeking commercial and market information as well as general information about the Pakistani Kinnow industry. This also uncovered information about related value chain initiatives apparently undertaken by other agencies including some papers and articles. .

The information reviewed has been sorted according to the following themes and by topics within these themes. It should be noted that the quality of this local information and analysis is variable and requires verification in many cases. However, this may act as a starting point to a more detailed review to determine “what we know” and ascribe confidence limits to this.

While the entries have been truncated for space reasons, the file containing these is available from the author

Theme no.	Theme	Theme no.	Theme
1	ASLP		
2	Policy	7	Pre-production
3	Other Agencies	8	Production
4	Industry background	9	Orchard to Market
5	Related R&D	10	Market Access
6	Value chains	11	Export

Theme no.	Theme	topic	Title	URL	Comments
1	ASLP	Background	Agriculture Sector Linkages Program – Phase II Mid-term Review June 2013	<a href="http://aciarc.gov.au/files/aslp_ii_mtr_170613_final.pdf">http://aciarc.gov.au/files/aslp_ii_mtr_170613_final.pdf</a>	includes CITRUS PROJECT HORT/2010/002 AUD 1.288M MANGO PRODUCTIVITY PROJECT
1	ASLP	Background	Australia Pakistan Agriculture Sector Linkages Program Phase 2, 2010-2015	<a href="http://aciarc.gov.au/aslp">http://aciarc.gov.au/aslp</a>	To collaborate strategically to improve livelihood systems for the rural poor in Pakistan, and to build linkages between
1	ASLP	Background	Pakistan Citrus Industry Challenges: Opportunities for Australia-Pakistan	<a href="http://aciarc.gov.au/files/node/739/ASLP%20citrus%20scoping%20study%20report.pdf">http://aciarc.gov.au/files/node/739/ASLP%20citrus%20scoping%20study%20report.pdf</a>	Citrus Industry Survey and Workshops, Pakistan, July 2006
1	ASLP	Background	Pakistan agriculture	<a href="http://aid.dfat.gov.au/countries/southasia/pakistan/Documents/pakistan-agricultural-sector-">http://aid.dfat.gov.au/countries/southasia/pakistan/Documents/pakistan-agricultural-sector-</a>	
1	ASLP	Background	ACIAR 2011 ASLP PARTners June –August	<a href="http://aciarc.gov.au/files/node/14028/the_farmer_needs_a_market_17250.pdf">http://aciarc.gov.au/files/node/14028/the_farmer_needs_a_market_17250.pdf</a>	
1	ASLP	Background	ABC 2012 interview	<a href="http://aciarc.gov.au/content/australia-and-pakistan-share-citrus-knowledge">http://aciarc.gov.au/content/australia-and-pakistan-share-citrus-knowledge</a>	
1	ASLP	Background	2011 Benefits from Australia-Pakistan agriculture program	<a href="http://aciarc.gov.au/content/benefits-australia-pakistan-agriculture-program">http://aciarc.gov.au/content/benefits-australia-pakistan-agriculture-program</a>	
1	ASLP	Background	ACIAR Pakistan Mangoes and Citrus	<a href="https://www.youtube.com/watch?v=H0UVwqeJ27I">https://www.youtube.com/watch?v=H0UVwqeJ27I</a>	
1	ASLP	citrus	The enhancement of citrus value chains production in Pakistan and Australia through	<a href="http://aciarc.gov.au/project/hort/2010/002">http://aciarc.gov.au/project/hort/2010/002</a>	Project Leader Dr Tahir Khurshid
1	ASLP	Economics	ACIAR Economics programs	<a href="http://aciarc.gov.au/ACIARs-research-programs">http://aciarc.gov.au/ACIARs-research-programs</a>	Economics The Agribusiness Program is linked to the Australian Aid-funded Support for Market-Driven Adaptive
1	ASLP	Enabling policies	Enabling agricultural policies for benefitting smallholders in dairy, citrus and mango	<a href="http://aciarc.gov.au/project/adp/2010/091">http://aciarc.gov.au/project/adp/2010/091</a>	Victoria University Project Leader Professor Peter Sheehan

1	ASLP	Mango	Mango value chain improvement	<a href="http://aciar.gov.au/project/hort/2010/001">http://aciar.gov.au/project/hort/2010/001</a>	
1	ASLP	mango	2006 A constraints analysis of mango supply chain improvement in Pakistan	<a href="http://aciar.gov.au/project/plia/2005/159">http://aciar.gov.au/project/plia/2005/159</a>	Professor Ray Collins Email
1	ASLP	mango	Mango value chain improvement	<a href="http://aciar.gov.au/project/hort/2010/001">http://aciar.gov.au/project/hort/2010/001</a>	Professor Ray Collins Email
1	ASLP	mango	Mango supply chain partner organisations (some will also apply to citrus)	<a href="http://aciar.gov.au/article/mango-supply-chain-partner-organisations">http://aciar.gov.au/article/mango-supply-chain-partner-organisations</a>	
1	ASLP	Social research	Social research to foster effective collaboration and strengthen pro-poor value	<a href="http://aciar.gov.au/project/asem/2010/003">http://aciar.gov.au/project/asem/2010/003</a>	University of Canberra, Australia Project Leader Professor John Spriggs
2	Policy	Food security	Moir B. and Morris P. (2011) Global food security: facts, issues and implications.	<a href="http://www.agriculture.gov.au/abares/publications">http://www.agriculture.gov.au/abares/publications</a>	
2	Policy	private sector engagement	ACIAR private sector engagement workshop	<a href="https://www.youtube.com/watch?v=h4LnPpSUepU&amp;list=PL5-wYcyMyLz_J9YdqCwyVSN215rsA">https://www.youtube.com/watch?v=h4LnPpSUepU&amp;list=PL5-wYcyMyLz_J9YdqCwyVSN215rsA</a>	
2	Policy	private sector engagement	ACIAR Partners in R&D Issue 1 2015	<a href="http://aciar.gov.au/publication/pmg047">http://aciar.gov.au/publication/pmg047</a>	Case studies
2	Policy	private sector engagement	ACIAR Annual report 13-14	<a href="http://aciar.gov.au/files/aciar_annual_report_2013-14.pdf">http://aciar.gov.au/files/aciar_annual_report_2013-14.pdf</a>	private-sector engagement, pp 7–8, 9, 21, 29, 32, 34, 48, 62, 63
2	Policy	private sector engagement	Baxter, L.B. 2013. ALLIANCE BY COERCION OR VOLUNTARY PARTNERSHIPS: THE ROLE OF	<a href="http://www.ishs.org/ishs-article/1006_10">http://www.ishs.org/ishs-article/1006_10</a>	
2	Policy	scalability	Holcombe S 2012 Lessons from Practice: Assessing Scalability. World Bank	<a href="http://siteresources.worldbank.org/INTARD/Resources/Scalabilityfinal.pdf">http://siteresources.worldbank.org/INTARD/Resources/Scalabilityfinal.pdf</a>	Scaling up has multiple definitions, but it is generally agreed that scaling up
2	Policy	scalability	Impact Investment: A Primer	<a href="http://ita.doc.gov/td/finance/publications/Impact%20Investment%20Primer.pdf">http://ita.doc.gov/td/finance/publications/Impact%20Investment%20Primer.pdf</a>	As sustainability and scalability continue to gain precedence in the context of international
2	Policy	scalability	New Assessment Tool Builds the Case for Scalability February 27, 2014	<a href="http://www.feedthefuture.gov/article/new-assessment-tool-builds-case-scalability">http://www.feedthefuture.gov/article/new-assessment-tool-builds-case-scalability</a>	Through the U.S. Agency for International Development's (USAID's) Enabling Agricultural Trade project,
3	Other Agencies	ADB/USA ID	Exporting Pakistan's 'Kinnow' Fruit	<a href="http://www.adb.org/results/exporting-pakistans-kinnow-fruit">http://www.adb.org/results/exporting-pakistans-kinnow-fruit</a>	Agribusiness Support Fund, a not-for-profit company established by the Ministry of Food and Agriculture in
3	Other Agencies	Citrus Processors and Exporters Association	Citrus Processors and Exporters Association	-	Does organisation exist? Was involved in ACIAR workshop 2005
3	Other Agencies	Finance sector	Banking needs for Meat, Fruit, Vegetables, Oils and Fats sector. International Finance	<a href="http://www.sbp.org.pk/departments/ihfd/Sub-Segment%20Booklets/Meat.%20">http://www.sbp.org.pk/departments/ihfd/Sub-Segment%20Booklets/Meat.%20</a>	eg refrigeration leasing to reduce wastage. This segment booklet provides indicative business
3	Other Agencies	Germany	Freshplaza 2012 UAF assistance for kinnow export	<a href="http://www.freshplaza.com/article/103338/Pakistan-UAF-assistance-for-kinnow-export">http://www.freshplaza.com/article/103338/Pakistan-UAF-assistance-for-kinnow-export</a>	Publication date: 11/21/2012 University of Agriculture Faisalabad (UAF) will provide technical assistance for the
3	Other Agencies	Netherlands	Boosting Sustainable Kinnow Export	<a href="http://trtapakistan.org/wp-content/uploads/2013/03/Trade-Time_Vol-2-Issue-4.pdf">http://trtapakistan.org/wp-content/uploads/2013/03/Trade-Time_Vol-2-Issue-4.pdf</a>	EU-funded Trade Development Authority of Pakistan journal, See editorial and article on p8 re Dutch
3	Other Agencies	Pakistan Citrus Fruits	Pakistan Citrus Fruits and Persimmons Processor's Association	-	Does organisation exist? Rana Muhammad Sadiq President PAKISTAN CITRUS FRUITS & PERSIMMONS
3	Other Agencies	PHDEC	Pakistan Horticulture Development and Export Company (PHDEC)	<a href="http://www.phdec.org.pk/">http://www.phdec.org.pk/</a>	Corruption by Bashir Hussain CEO and associates at PHDEC, Ministry of Commerce
3	Other Agencies	PHDEC	Kinnow Export Coaching Program 2010	<a href="http://www.phdec.org.pk/topstoriesEvents/indexKECP.php">http://www.phdec.org.pk/topstoriesEvents/indexKECP.php</a>	(Sohail was involved) Kinnow Export Coaching Program (ECP) from 10 to 11 November, 2010 at Orange Research
3	Other Agencies	Punjab Dept of Agriculture	Agriculture Department, Government of Punjab	<a href="http://www.agripunjab.gov.pk/oursecretaries">http://www.agripunjab.gov.pk/oursecretaries</a>	
3	Other Agencies	SMEDA	Small and Medium Enterprises Development Authority - SMEDA	<a href="http://www.smeda.org">http://www.smeda.org</a>	HEAD OFFICE Address: 4th Floor, 3rd Building, Aiwan-e-Iqbal
3	Other Agencies	SMEDA	SMEDA Sector Brief - Horticulture	<a href="http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=36:horticultureagri">http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=36:horticultureagri</a>	Brief and apparently outdated...SMEDA has developed a comprehensive horticulture export strategy. Detailed

3	Other Agencies	SMEDA	SMEDA Agricultural pre-feasibility studies	<a href="http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=124:agriculture&amp;Itemid=118">http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=124:agriculture&amp;Itemid=118</a>	
3	Other Agencies	SMEDA	SMEDA Industry support program includes food processing	<a href="http://smeda.org/index.php?option=com_content&amp;view=article&amp;id=16&amp;Itemid=118">http://smeda.org/index.php?option=com_content&amp;view=article&amp;id=16&amp;Itemid=118</a>	
3	Other Agencies	SMEDA	SMEDA Cluster development	<a href="http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=40&amp;Itemid=167">http://smeda.org/index.php?option=com_phocadownload&amp;view=category&amp;id=40&amp;Itemid=167</a>	SME Cluster Development.... See report on potato cluster (incorrect one posted)
3	Other Agencies	SMEDA	SMEDA Prime Minister's Youth Business Loan	<a href="http://www.smeda.org/index.php">http://www.smeda.org/index.php</a>	Prime Minister's 'Youth Business Loan', for young entrepreneurs between the age group of 21 - 45 years, is designed
3	Other Agencies	TDAP	TDAP REPORT ON PAKISTANI KINNOW Division: Food & Agro	<a href="http://www.tdap.gov.pk/product_report_presentations.php">http://www.tdap.gov.pk/product_report_presentations.php</a>	Report by: Mr. Muhammad Ashraf (Commercial Counselor) Commercial Wing, Embassy of Pakistan
3	Other agencies	TRTA	TRTA Kinnow product overview	<a href="http://trtapakistan.org/sector-products/horticulture/kinnows">http://trtapakistan.org/sector-products/horticulture/kinnows</a>	
3	Other Agencies	TRTA	New codes of practice improve the quality of mango and kinnow supply chains	<a href="http://trtapakistan.org/wp-content/uploads/2015/01/TRADE-TIME-September-2014-vol-4-">http://trtapakistan.org/wp-content/uploads/2015/01/TRADE-TIME-September-2014-vol-4-</a>	Trade Time – Issue September 2014 p9
3	Other Agencies	TRTA	TRTA Stakeholder Database	<a href="http://trtapakistan.org/business-directory">http://trtapakistan.org/business-directory</a>	
4	Industry background	Citrus Strategy	PHDEC 2005 CITRUS MARKETING STRATEGY	<a href="http://www.phdec.org.pk/MktStrategies/Citrus.pdf">http://www.phdec.org.pk/MktStrategies/Citrus.pdf</a>	Some useful overview to industry but outdated stats. Amounts to a wish-list with no implementation plan
4	Industry background	Harvest Calendar	PHDEC Harvest Calendar	<a href="http://www.phdec.org.pk/harvest_calendar.php">http://www.phdec.org.pk/harvest_calendar.php</a>	Kinnow from mid-Dec to end-March
5	Related R&D	mango	Mazhar, M.S., Collins, R., Campbell, J.A., Malik, A.U., Johnson, P., Dunne, A., Sun, X.	<a href="http://www.actahort.org/books/880/880_12.htm">http://www.actahort.org/books/880/880_12.htm</a>	MANAGING MANGO FRUIT QUALITY THROUGH THE SUPPLY CHAIN: A PAKISTAN CASE STUDY.
5	Related R&D	mango	Professor Ray Collins Dr. Ximing Sun and Mr. Muhammad Sohail Mazhar	-	FINAL REPORT Optimising mango supply chains for more profitable horticultural agri-enterprises in Pakistan
5	Related R&D	mango	Mango value chain improvement	<a href="http://aciarc.gov.au/project/hort/2010/001">http://aciarc.gov.au/project/hort/2010/001</a>	
6	Value chains	Kinnow	TRTA Kinnow value chain analysis	<a href="http://trtapakistan.org/wp-content/uploads/2010/11/DMAIC-Kinnow_v4.pdf">http://trtapakistan.org/wp-content/uploads/2010/11/DMAIC-Kinnow_v4.pdf</a>	Largely subjective statements and recommendations lacking cohesion. Some statistics. No sources cited.
6	Value chains	Kinnow costs	Sabir MH, Khan MB & Hussain Z 2010 Marketing margin of mandarin – a case study of	<a href="http://www.bzu.edu.pk/PJSS/Vol30No22010/Final_PJSS-30-2-08.pdf">http://www.bzu.edu.pk/PJSS/Vol30No22010/Final_PJSS-30-2-08.pdf</a>	summarises marketing channels...see review
6	Value chains	Kinnow costs	Khan M 2010 TRTA Report on Enterprise Based Survey of Horticulture Sector	<a href="http://trtapakistan.org/wp-content/uploads/2011/01/Sector-Report-Horticulture.pdf">http://trtapakistan.org/wp-content/uploads/2011/01/Sector-Report-Horticulture.pdf</a>	Analysis of the value chain reveals that the average purchase price of kinnow ranges from Rs 14-22/Kg. The
6	Value chains	Methodology	Collins, R.J. and Dunne, A.J. 2008. A RAPID SUPPLY CHAIN APPRAISAL APPROACH FOR	<a href="http://www.ishs.org/ishs-article/794_8">http://www.ishs.org/ishs-article/794_8</a>	This paper outlines a framework for Rapid Supply Chain Appraisal (RSCA) and describes its application to a
6	Value chains	Methodology	Nissen, R.J., George, A.P., Hofman, P., Tucker, B. and Rankin, M. 2008.	<a href="http://www.ishs.org/ishs-article/794_33">http://www.ishs.org/ishs-article/794_33</a>	We have developed a new process to assist farmers, traders and extension agents to improve horticultural supply
6	Value chains	Methodology	Shepherd, A.W. 2008. EXPERIENCES WITH THE "LINKING FARMERS TO	<a href="http://www.ishs.org/ishs-article/794_38">http://www.ishs.org/ishs-article/794_38</a>	Linking farmers to new institutional markets invariably requires farmers to be organized into formal or informal
6	Value chains	Methodology	Mapping the Value Chain	<a href="http://valuechains4poor.pbworks.com/w/page/12518345/Mapping%20the%20Value%20Chain">http://valuechains4poor.pbworks.com/w/page/12518345/Mapping%20the%20Value%20Chain</a>	Welcome to the Making Value Chains Work Better for the Poor toolbook wiki. This is a 'living document' using PBWiki
6	Value chains	research	IV International Symposium on Improving the Performance of Supply Chains in the	<a href="http://www.ishs.org/ishs-book/1006">http://www.ishs.org/ishs-book/1006</a>	
6	Value chains	research	III International Symposium on Improving the Performance of Supply Chains in the	<a href="http://www.ishs.org/ishs-book/895">http://www.ishs.org/ishs-book/895</a>	
6	Value chains	research	II International Symposium on Improving the Performance of Supply Chains in the	<a href="http://www.ishs.org/ishs-book/794">http://www.ishs.org/ishs-book/794</a>	
7	Pre-production	kinnow	Kinnow mandarin hybrid Citrus reticulata Blanco	<a href="http://www.citrusvariety.ucr.edu/citrus/Kinnow.html">http://www.citrusvariety.ucr.edu/citrus/Kinnow.html</a>	

8	Production	Any	Much material available through ASLP I and II	-	
9	Orchard to Market	Capture of benefits	Shearer D 2011 The Supermarket Revolution in Food: Good, Bad or Ugly?	<a href="http://ageconsearch.umn.edu/bitstream/125327/2/Shearer2011.pdf">http://ageconsearch.umn.edu/bitstream/125327/2/Shearer2011.pdf</a>	While market intervention in farm practices is expected to increase further, there is currently very little
9	Orchard to Market	Capture of benefits	Dunne, A. and Johnson, P. 2011. THE RAPID SUPPLY CHAIN APPRAISAL APPROACH:	<a href="http://www.ishs.org/ishs-article/895_13">http://www.ishs.org/ishs-article/895_13</a>	Unfortunately, there has been no appreciable improvement in market prices or commitment from the
9	Orchard to Market	citrus	Awan 2012 Experts link kinnow industry growth with removal of middlemen	<a href="http://agrinfobank.blogspot.com.au/2012/12/experts-link-kinnow-industry-growth.html">http://agrinfobank.blogspot.com.au/2012/12/experts-link-kinnow-industry-growth.html</a>	The kinnow exports reached to \$100 million in the fiscal year 2010-11," Chief Executive Officer Harvest Tradings
9	Orchard to Market	Generic paper	Aujla et al 2007 Marketing System of Fruits, Margins and Export Potential in Pakistan	<a href="http://www.pjlss.edu.pk/sites/default/files/Khalid%20Aujla%20%2834-39%29.pdf">http://www.pjlss.edu.pk/sites/default/files/Khalid%20Aujla%20%2834-39%29.pdf</a>	
9	Orchard to Market	HACCP/GlobalGAP	HACCP_GlobalGAP Certified & Approved Kinnow Processing Units for Russia, Iran, China	<a href="http://www.phdec.org.pk/download/certifiedKinnowExportUnits.pdf">http://www.phdec.org.pk/download/certifiedKinnowExportUnits.pdf</a>	
9	Orchard to Market	Irradiation	Paras Foods Irradiation facility, Lahore (disused?)	<a href="http://www.phdec.org.pk/projects/Details/paras.php">http://www.phdec.org.pk/projects/Details/paras.php</a>	The plant started operations in June, 2008. A reasonable relevant R&D work has been initiated and contact with
9	Orchard to Market	Kinnow article + stats +	Call to adopt practice of tracking farms, trees to enhance kinnow export	<a href="http://www.agricorner.com/call-to-adopt-practice-of-tracking-farms-trees-to-enhance-kinnow">http://www.agricorner.com/call-to-adopt-practice-of-tracking-farms-trees-to-enhance-kinnow</a>	He suggested that we should learn from Australian Citrus Board who developed a vibrant citrus industry in shortest
9	Orchard to Market	Kinnow paper + stats	Mazhar, M.S., et al 2007 POTENTIAL ISSUES OF THE CITRUS INDUSTRY OF	<a href="http://www.geocities.ws/philip2007proceedings/PHIP2007/24-75-82.pdf">http://www.geocities.ws/philip2007proceedings/PHIP2007/24-75-82.pdf</a>	2007
9	Orchard to Market	mango	Malik Postharvest Management of Mango in Pakistan	<a href="http://aciarc.gov.au/files/node/774/01%20Malik%20Postharvest%20Management%20of%20Mango">http://aciarc.gov.au/files/node/774/01%20Malik%20Postharvest%20Management%20of%20Mango</a>	ppt for ACIAR shows issues along the chain
9	Orchard to Market	mango/Indonesia	Eastern Indonesia agribusiness development opportunities - analysis of mango value chains	<a href="http://aciarc.gov.au/project/agb/2012/006">http://aciarc.gov.au/project/agb/2012/006</a>	Agribusiness development options for at least five agricultural value chains in
9	Orchard to Market	research	Malik A.U. 2011 Kinnow Quality Improvement for Export to International Market	-	Summary booklet of quality-related PhD theses
10	Market Access	EU	Boosting export of kinnow & mango to EU: exporters asked to comply with international	<a href="http://www.agricorner.com/boosting-export-of-kinnow-mango-to-eu-exporters-asked-to">http://www.agricorner.com/boosting-export-of-kinnow-mango-to-eu-exporters-asked-to</a>	Chief Technical Advisor, Trade-Related Technical Assistance Programme (TRTA-II), Bruno Valanzuolo, has warned that
10	Market Access	Indonesia	Agribusiness to Indonesia	<a href="http://www.austrade.gov.au/export/export-markets/countries/indonesia/indonesia">http://www.austrade.gov.au/export/export-markets/countries/indonesia/indonesia</a>	
10	Market Access	Indonesia	Indonesia quotas	<a href="http://www.agriculture.gov.au/biosecurity/export/plants-plant-products/ian/2013/2013-42">http://www.agriculture.gov.au/biosecurity/export/plants-plant-products/ian/2013/2013-42</a>	2013-42 - Horticulture Exports - Amendment to Indonesia's Ministry of Trade regulations for the importation of
10	Market Access	Indonesia	Export Industry Advice Notices - Plant Export Operations	<a href="http://www.agriculture.gov.au/biosecurity/export/plants-plant-products/ian">http://www.agriculture.gov.au/biosecurity/export/plants-plant-products/ian</a>	Plant Export Operations issue Industry Advice Notices to inform exporters of changes and updates affecting the
10	Market Access	Indonesia	Indonesia raises produce import quotas Jan 2014	<a href="http://95.138.158.26/asiafruit/article/160345/indonesia-raises-produce-import-quotas">http://95.138.158.26/asiafruit/article/160345/indonesia-raises-produce-import-quotas</a>	he Indonesian government will more than double the import quota for fruits and vegetables in 2014 to try and meet
10	Market Access	Russia	Russian ban pushes quality focus in Pakistani citrus	<a href="http://www.freshfruitportal.com/2014/02/17/russian-ban-pushes-quality-focus-in">http://www.freshfruitportal.com/2014/02/17/russian-ban-pushes-quality-focus-in</a>	February 17th, 2014 Following a temporary trade ban in October, Pakistani citrus exporters have
10	Market Access	Russia	Russia bans Pakistani fruit	<a href="http://www.freshfruitportal.com/2013/10/03/russia-bans-pakistani-fruit/?country=australia">http://www.freshfruitportal.com/2013/10/03/russia-bans-pakistani-fruit/?country=australia</a>	October 3rd, 2013 Russia's Federal Service for Veterinary and Phytosanitary Surveillance
10	Market Access	Russia	Russia lifts ban on Pakistani plant products	<a href="http://www.freshfruitportal.com/2014/03/03/russia-lifts-ban-on-pakistani-plant">http://www.freshfruitportal.com/2014/03/03/russia-lifts-ban-on-pakistani-plant</a>	March 3rd, 2014 While Pakistan's kinnow mandarin industry had gained re-entry to the
10	Market Access	TRTA	Sanitary and Phytosanitary (SPS) - Pakistan	<a href="http://trtapakistan.org/wp-content/uploads/2015/01/SPS-NEWSLETTER-issues-131415.pdf">http://trtapakistan.org/wp-content/uploads/2015/01/SPS-NEWSLETTER-issues-131415.pdf</a>	A quarterly Newsletter published by Trade Related Technical Assistance (TRTA II) Programme
11	Export	China	Sun, X., Collins, R., Dunne, A., Bajwa, B., Mazhar, S. and Iqbal, M. 2011. A WHOLE OF SUPPLY	<a href="http://www.ishs.org/ishs-article/895_34">http://www.ishs.org/ishs-article/895_34</a>	Results indicate that Pakistan mangoes have potential in the Chinese market. They are particularly attractive to
11	Export	citrus	kinnow exporters	<a href="http://www.tradekey.com/suppliers/kinnow-export.htm">http://www.tradekey.com/suppliers/kinnow-export.htm</a>	
11	Export	Dubai retailer	Geant hypermarkets and supermarkets	<a href="http://www.geant-uae.com/contact-us">http://www.geant-uae.com/contact-us</a>	Dubai visit 14/1/2015 Mohamad Ali (Fucom)



11	Export	Duty and Tax Remissio	DTRE approvals suspended: kinnow exporters approach FBR against MCC move	<a href="http://www.brecorder.com/taxation/181:pakistan/1241101:dtre-approvals-suspended-kinnow-exporters-approach-fbr-against-mcc-move">http://www.brecorder.com/taxation/181:pakistan/1241101:dtre-approvals-suspended-kinnow-exporters-approach-fbr-against-mcc-move</a>	Exporters have approached the Federal Board of Revenue (FBR) against the Collector Model Customs Collectorate
11	Export	exporter	Naqshbandi Enterprise, FAISALABAD	<a href="http://www.nbepk.com/#data">http://www.nbepk.com/#data</a>	It is grown on the area of 160,000 hectares with production of 1.5 million tons annually. Therefore Citrus is the
11	Export	exporter	KARACHI JMB Exporters is one of the largest exporter of Citrus Export. We have a record of	<a href="http://www.imbexporters.com/fruits/orange/">http://www.imbexporters.com/fruits/orange/</a>	Our Major Exports are in Central Asian States, Russian Federation, Iran, Philiphines, Sri-lanka, Bahrain, Dubai,
11	Export	exporter	Pakistan Kinnow Exporters	<a href="http://pakistancitrus.com/index.php">http://pakistancitrus.com/index.php</a>	Our company is 100% export oriented company, it's total export of citrus is about 10 million US dollars.
11	Export	exporter	Location not clear. Landline num : +924235221433	<a href="http://citrus.pk/contact.html">http://citrus.pk/contact.html</a>	Has an Australian office
11	Export	exporter	Harvest Tradings	<a href="http://www.sitrus.eu/nl/nieuws/14/01/17/kinnow-becomes-major-export-item-icci">http://www.sitrus.eu/nl/nieuws/14/01/17/kinnow-becomes-major-export-item-icci</a>	Ahmed Jawad, Harvest Tradings and Islamabad Chamber of Commerce and Chairman Standing Committee on
11	Export	general	Cargo Services,Cargo Companies in FAISALABAD-Pakistan	<a href="http://www.faisalabad.ebizpk.com/cargo-companies-faisalabad.htm">http://www.faisalabad.ebizpk.com/cargo-companies-faisalabad.htm</a>	
11	Export	Generic article/exporter	Fatter fruit exports Mohiuddin Aazim	<a href="http://www.dawn.com/news/1126069">http://www.dawn.com/news/1126069</a>	Fruit growers, particularly of citrus fruit say some of them have individually approached PCSIR and agricultural
11	Export	Indonesia trade	Agreement with Indonesia has opened trade doors for Pakistan April 9, 2013	<a href="http://tribune.com.pk/story/532919/agreement-with-indonesia-has-opened-trade-doors-for-pakistan">http://tribune.com.pk/story/532919/agreement-with-indonesia-has-opened-trade-doors-for-pakistan</a>	
11	Export	Indonesia trade	The citrus market in Indonesia - an Eastern Indonesian	<a href="http://aci.gov.au/publication/fr2007-13">http://aci.gov.au/publication/fr2007-13</a>	
11	Export	Jakarta - general	Kramat Jati market to be trade center The Jakarta Post, Jakarta   Jakarta   Wed, July 28	<a href="http://www.thejakartapost.com/news/2004/07/28/kramat-jati-market-be-trade-center.html">http://www.thejakartapost.com/news/2004/07/28/kramat-jati-market-be-trade-center.html</a>	
11	Export	Jakarta - general	Market Capacity Model for the Supply Chain of Fruit and Vegetables in Indonesia - A	<a href="http://iufost.edpsciences.org/articles/iufost/pdf/2006/01/iufost06000797.pdf">http://iufost.edpsciences.org/articles/iufost/pdf/2006/01/iufost06000797.pdf</a>	
11	Export	Jakarta - general	Banana Supply Chains in Indonesia and Australia: Effects of Culture on Supply	<a href="http://www.eco-negocios.com/files/Banana_suply_chains_in_Indonesia_and_Austr">http://www.eco-negocios.com/files/Banana_suply_chains_in_Indonesia_and_Austr</a>	
11	Export	Jakarta - general	California Tablegrape 2011 TRIP REPORT Indonesia, Philippines,Hong Kong	<a href="http://www.tablegrape.com/docs/TripReportIndonesia-Philippines-Asiafruit2011.pdf">http://www.tablegrape.com/docs/TripReportIndonesia-Philippines-Asiafruit2011.pdf</a>	
11	Export	Jakarta - market informati	Product and Country Report - Indonesia fruit & nut imports	<a href="http://www.sciu.com.au/site/media/emi_pc/PC%20Report_Indonesia_057.pdf">http://www.sciu.com.au/site/media/emi_pc/PC%20Report_Indonesia_057.pdf</a>	SITC: Standard International Trade Classification <a href="http://unstats.un.org/unsd/cr/registry/r">http://unstats.un.org/unsd/cr/registry/r</a>
11	Export	Jakarta - market informati	Institute for Supply Chain and Logistics (ISCL)	<a href="http://www.sciu.com.au/site/media/emi_pc/PC%20Report_Indonesia_056.pdf">http://www.sciu.com.au/site/media/emi_pc/PC%20Report_Indonesia_056.pdf</a>	Victoria University 300 Flinders Street, Melbourne, Vic
11	Export	Kinnow article	Pakistan: Citrus exports exceed yearly target	<a href="http://www.freshplaza.com/article/119359/Pakistan-Citrus-exports-exceed-yearly-target">http://www.freshplaza.com/article/119359/Pakistan-Citrus-exports-exceed-yearly-target</a>	3/31/2014 The availability of Pakistan's citrus fruit at a comparatively low price in the world markets, helped the
11	Export	Kinnow article + stats	Noor 2014 Market potential for Pakistani Citrus fruit (Kinnow) in world	<a href="http://www.foodjournal.pk/2014/Jan-March-2014/PDF-Jan-March-2014/Dr-Noor-Kinnow.pdf">http://www.foodjournal.pk/2014/Jan-March-2014/PDF-Jan-March-2014/Dr-Noor-Kinnow.pdf</a>	January - March 2014 contains stats
11	Export	Kinnow paper	Mahmood & Sheikh 2006 Citrus export system in Pakistan	<a href="http://www.jar.com.pk/upload/1374671556_87_Microsoft_Word_-_229-239.pdf">http://www.jar.com.pk/upload/1374671556_87_Microsoft_Word_-_229-239.pdf</a>	
11	Export	Kinnow review	Naseer M 2010 TRADE DEVELOPMENT AUTHORITY OF PAKISTAN REPORT ON EXPORT	<a href="https://www.tdap.gov.pk/doc_reports/TDAP_REPORT_ON_EXPORT_%20OF_KINNOW.pdf">https://www.tdap.gov.pk/doc_reports/TDAP_REPORT_ON_EXPORT_%20OF_KINNOW.pdf</a>	
11	Export	Mango biosecurity	Pakistan's mango exports in hot water	<a href="http://www.freshfruitportal.com/2014/05/05/pakistans-mango-exports-in-hot-">http://www.freshfruitportal.com/2014/05/05/pakistans-mango-exports-in-hot-</a>	
11	Export	Mango/Australia	Mango industry shocked by Pakistani imports	<a href="http://www.abc.net.au/news/2013-09-03/pakistan-mangoes-come-to-australia/4931512">http://www.abc.net.au/news/2013-09-03/pakistan-mangoes-come-to-australia/4931512</a>	
11	Export	Mango/Australia	Durrani Facebook Pakistani Mangoes in Australia	<a href="https://www.facebook.com/pakistanimango">https://www.facebook.com/pakistanimango</a>	
11	Export	market informati on	Links to kinnow trade articles	<a href="http://www.agricorner.com/?s=kinnow">http://www.agricorner.com/?s=kinnow</a>	

11	Export	produce	All Pakistan Fruit & Vegetable Exporters, Importers and Merchants Association	<a href="http://www.pfva.net/">http://www.pfva.net/</a>	website appears out of date
11	Export	stats	EXPORT FROM PAKISTAN JULY-SEPTEMBER 2014-15 (PROVISIONAL)	<a href="http://www.tdap.gov.pk/tdap-statistics.php">http://www.tdap.gov.pk/tdap-statistics.php</a>	
11	Export	stats	CITRUS FRUIT FRESH AND PROCESSED ANNUAL STATISTICS 2012	<a href="http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Citrus/Documents">http://www.fao.org/fileadmin/templates/est/COMM_MARKETS_MONITORING/Citrus/Documents</a>	
11	Export	stats	Tahir 2014 FORECASTING CITRUS EXPORTS IN PAKISTAN Pakistan J. Agric. Res. Vol. 27	<a href="http://www.cabi.org/gara/FullTextPDF/2014/20143294451.pdf">http://www.cabi.org/gara/FullTextPDF/2014/20143294451.pdf</a>	
11	Export	stats	International trade in goods - Exports 2001-2013	<a href="http://www.intracen.org/itc/market-info-tools/statistics-export-product-country/">http://www.intracen.org/itc/market-info-tools/statistics-export-product-country/</a>	
11	Export	stats	FAO STATISTICAL YEARBOOK 2013 World Food and Agriculture	<a href="http://www.fao.org/docrep/018/i3107e/i3107e.PDF">http://www.fao.org/docrep/018/i3107e/i3107e.PDF</a>	
11	Export	stats	cia World Factbook	<a href="https://www.cia.gov/library/publications/the-world-factbook/geos/pk.html">https://www.cia.gov/library/publications/the-world-factbook/geos/pk.html</a>	
11	Export	stats - produce	Fruit, vegetable exports jump to \$625m	<a href="http://business92.com/Markets/Commodities/Fruit,-vegetable-exports-jump-to-\$625m-">http://business92.com/Markets/Commodities/Fruit,-vegetable-exports-jump-to-\$625m-</a>	The spokesman further told that during 2012-13, Pakistan has made recorded export of potato, onion and Kinnow and