Agriculture Sector Linkages Program – Phase II

Mid-term Review

June 2013

Australian Centre for International Agricultural Research & Australian Agency for International Development

Acknowledgments

The organisation of an intensive Mid-Term Review is always a huge logistical and administrative challenge. Sincere thanks are thus due to Dr Manawar Raza Kazmi (ASLP Project Officer) and Dr Greg Johnson (ASLP Assistant Project Coordinator), for collaboratively developing a rigorous schedule, as well as to Les Baxter (ASLP Coordinator and Research Program Manager, ACIAR) for providing oversight and guidance throughout the process. The Review team would also like to extend its sincere thanks to ASLP Partners (particularly the teams in the field) for providing all the support necessary to make the visits successful. Government and local partners also willingly and openly shared their experiences, which significantly contributed to the richness of the whole exercise. Last but by no means least, the Team also wishes to thank the communities that have been partners with ASLP, and benefitted from its interventions. The Review Team wishes for you a stable future and every opportunity for the growth you desire and deserve.

Review Team Details

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Figure 1: A neighbour has adopted ASLP Dairy practices and his neighbour again is starting to now convert his livestock yards.

Contents

SECTION 3: ANNEXES

Agriculture Sector Linkages Program – Phase II

Aid Activity Summary		
Aid Activity Name	**Agriculture Sector Linkages Project - Phase II**	
Delivery organisation(s)	**Overall Management** Australian Centre for International Agricultural Research GPO Box 1571, Canberra, ACT 2601 Australia **SOCIAL: Social Research to Foster Effective Collaboration and Strengthen Pro-Poor Value Chains (ACIAR HORT/2010/003)** Commissioned Organisation: Australian Institute for Sustainable Communities, University of Canberra Duration: 4 years (1 Jan 2011 – 31 Dec 2014) **DAIRY: Strengthening Dairy Value Chains in Pakistan through Improved Farm Management & More Effective Extension Services (ACIAR LPS/2010/007)** Commissioned Organisation: Charles Sturt University Duration: 4 years (1 Jan 2011 – 31 Dec 2014) **CITRUS PRODUCTIVITY: The enhancement of citrus value chains production in Pakistan and Australia through improved orchard management practices (ACIAR HORT/2010/002)** Commissioned Organisation: New South Wales Department of Primary Industries Duration: 4 years (1 April 2011 – 31 March 2015) **MANGO VALUE CHAINS: Mango Value Chain Improvement Project (ACIAR HORT/2010/001)** Commissioned Organisation: The University of Queensland Duration: 4 years (1 Dec 2010 – 30 Nov 2014) **MANGO PRODUCTIVITY: Integrated Crop Management Practices to Enhance Value Chain Outcomes for the Mango Industry in Pakistan & Australia (ACIAR HORT/2010/006)** Commissioned Organisation: Queensland Department of Agriculture, Fisheries and Forestry Duration: 4 years (1 Dec 2010 – 30 Nov 2014)	
Commenced	July 2010 (see above for individual project timing)	
Proposed Completion	June 2015 (see above for individual project timing)	
Budget Australian $	Social	AUD 1,386,609
	Dairy	AUD 1,599,857
	Citrus	AUD 1,288,710
	Mango Value Chain	AUD 1,958,551
	Mango Production	AUD 1,301,468
	Additional Projects	AUD 1,785,000
	Capacity Development	AUD 2,198,541
	Other (Mgmt, Staff & studies)	AUD 1,459,712
	TOTAL	**AUD 12,978,448**[1]

[1] Based on the 2011/12 ASLP Annual Report

Executive Summary

This is an independent Mid-term Review of the second phase of the Agricultural Sector Linkages Program (ASLP II) in Pakistan. The overall AusAID funding of ASLP II amounts to $12.98m, while ACIAR contributes management costs estimated at about $1.0m. This report includes three sections:

1. Section 1: A review of the ASLP II as a whole;
2. Section 2: A specific technical review for each project; as well as
3. Section 3: Annexes

The second phase of ASLP continues much of the significant work that led to the success of the first phase. Overall ASLP II is rated as very satisfactory by the review team and it continues to be a high profile agricultural program in Pakistan. The management tools and practices currently defined by the four value chain research teams demonstrate significant capacity to improve the productivity, product quality and market access of the target farming systems. Yet the long-term challenge, extending well beyond the life of ASLP, is to turn this potential into large scale beneficiary achievement. Examples of the achievements so far include:

Productivity gains: A range of improved mango and citrus disease free multiplication and nursery practices have demonstrated their potential to deliver significantly improved planting material. Disease free, faster tree establishment will improve the longevity and productivity of orchards. Already a small number of citrus and mango nurserymen have shown interest in adopting the systems and have received appropriate training.

In addition, a range of integrated on-farm tree management practices for mango and citrus have demonstrated their potential to limit disease incursions, reduce alternate bearing, increase productivity, increase fruit quality and reduce water usage. Initial adoption surveys in mango show significant interest with early adoption rates of about 50% amongst beneficiaries, in and around research and demonstration sites[2].

Finally, a range of simple integrated dairy technologies, combined with an innovative whole-of-village extension approach, shows potential to significantly improve the productivity and health of smallholder dairy herds. Approximately 1300 participating farmers are directly engaged, and current adoption of the nine key modules is promising (e.g. adoption of improved fodder practices almost doubled between 2011 and 2012 – and now averages almost 40%). Adoption beyond the target beneficiaries is also apparent.

Marketing and quality gains: Management of mango harvesting, handling, blemish and the expression of post-harvest diseases has demonstrated the potential to significantly reduce wastage, increase shelf life and present the consumer with a much better quality product. Commercial growers working with the research teams have quickly adopted the improved techniques. Other commercial growers and commercial harvesting agents also show significant interest.

In addition, protocols have been developed to ensure mango quality and market access for export markets, and key domestic markets. Export protocols are in place for Europe, China and the Middle East. Commercial pack houses have successfully sent trial shipments to each of these markets, and buyer response has been positive, with significant interest shown in future sales. Commercial pack houses are gearing up to supply these markets continuously.

Furthermore, the second phase of ASLP has aspired to go beyond its research base by:

- identifying and pro-actively addressing the key constraints that limit adoption by poor farmers; and
- ensuring that technologies and approaches are embedded with appropriate long-term delivery programs of Government, donors, academia, and the private sector.

Six inclusive principles capture ASLP's approach:

[2] adoption has been averaged across all technologies

1. Research is focused on key factors that limit productivity within pro-poor value chains;
2. Research is focused on those 'linkages' where Australia has comparative advantage, and where Australian industry-based teams are already established;
3. Research targets those who can innovatively partner in technology development;
4. A multi-disciplinary, integrated team approach to research overcomes cross institutional barriers;
5. Capacity and skills are embedded with key delivery partners to facilitate the scaling up of relevant outcomes; and
6. Adoption constraints are clearly understood, so that ASLP outcomes are as appropriate and as applicable as possible.

As can be seen, ASLP is clearly an agricultural research initiative with potential to develop and pilot appropriate 'proof of concept' or 'fit for purpose' technologies or approaches. Thus, ASLP is an incubator of ideas and approaches rather than a mechanism to deliver broad scaling up.

The biggest challenge confronting ASLP's **effectiveness** is its need to clearly think through the approach to achieving its pro-poor agenda. Current trends of working directly, and only, with the poor compromise some aspects of research and miss opportunities to grow the value chain overall – equitable growth throughout the value chain will also deliver pro-poor benefits. A more nuanced approach is needed.

It also became clear to the reviewers that the **efficiency** of ASLP can be improved by AusAID and ACIAR resolving management tensions in three key areas:

1. The management of logistical needs, particularly security movements when in Pakistan;
2. The limited capacity of AusAID to engage with the program, especially when compared with the resources available within ACIAR; and
3. The tension that AusAID is the 'donor', and thus ACIAR's mandate is somehow subservient to AusAID's.

Similarly, efficiency can be improved by clarifying the functions of the Reference Committee and broadening the oversight mechanisms to include opportunity for sub-national dialogues.

Four issues need to be addressed in order to strengthen ASLP II's ***monitoring and evaluation*** and ensure it appropriately and relevantly reflects program achievements.

1. Clarification of the status of the APARDS as the strategic intent of Australia's assistance to agriculture and rural development in Pakistan;
2. The need to simplify program level and project level performance indicators, and incorporates CAPF requirements;
3. The unrealistic expectations for development impact and timeframes placed on ASLP; and
4. The inadequate synthesis and reporting of higher order achievements by the projects and ASLP overall.

Finally, ASLP ***sustainability*** is well on track to embed research skills with Pakistan's research agencies and develop strong linkages with appropriate extension and delivery programs. Pakistani research teams are not only collaborating effectively, but are proud of their achievements, can readily articulate their approaches, and – in many cases - have had their skills recognised (and services sought) by other donors, the private sector and other Pakistan stakeholders. Ongoing capacity building must now focus on the remaining gaps within national institutions that limit their capacity to maintain and enhance the technologies and approaches developed by ASLP.

A second area of sustainability is the need to clearly understand the adoption constraints on the technologies and practices ASLP has developed. While there has been progress in this regard, the Social Research component of ASLP is still new, and still coming to grips with the complexity of this task. In addition, multiple expectations exist within the ASLP teams and its partners, particularly with regards the most appropriate entry points, and the

expectations of success. The review appreciates that coming to grips with this element of ASLP has proven difficult but stresses the need for this to be a focus of the remaining phase.

For the ***future***, ASLP proposes a range of new initiatives during its current phase. All of these are supported but for the proposed vegetable initiative - this needs deeper consideration as it currently does not adopt the value chain approach used within the rest of the program.

The review appreciates that planning for a future phase of ASLP must commence soon if continuity is to be maintained and agreements put in place. The review considers that the ASLP model has proven both viable and valuable. It is a relatively small investment that delivers significant profile. While expectations on the program are large, and even unrealistic at times, the outcomes of ASLP have clear merit. ASLP has built linkages, expanded local research capacity, and tested innovative and relevant technologies and approaches, many of which have been widely adopted by direct beneficiaries and other interested parties. While ASLP admittedly has not capitalised on, and communicated its success as well as it should, the demand from relevant agencies and programs supporting scaling up clearly shows that the outcomes achieved thus far are widely perceived as beneficial. Needs and challenges still remain, of course, but the review considers that AusAID and ACIAR should give positive consideration to continuing their partnership in Pakistan through ASLP. The Review has summarised ideas for future work from each of the project teams.

Section 2 of the review assesses in detail each of the component projects in accordance with ACIAR review guidelines. The performance of these individual projects is summarised in Table 1, along with the overall performance of ASLP II.

Table 1: Summary evaluations of ASLP II

Evaluation Criteria	ASLP Overall	Social	Dairy	Citrus	Mango Value Chain	Mango Product'y
Relevance	5	5	5	5	5	5
Effectiveness	4	4	5	5	6	5
Efficiency	5	4	5	5	5	5
Sustainability	4	4	4	4	5	4
Gender Equality	5	5	6	5	4	5
M&E	3	4	4	4	4	4
Analysis & Learning	4	4	5	5	5	5

Rating scale: 6 = very high quality; 1 = very low quality. Below 3 is less than satisfactory.

Recommendations

Project specific recommendations

Specific recommendations for the five current projects are included in Section 2 of this Review, and summarised below. These recommendations will need further consideration and mutual agreement between AusAID and ACIAR. In addition, Section 2 includes comments that ACIAR should note carefully and take up with the individual project teams. In particular, Recommendation 10 above is an area for urgent direct action.

Social Research to Foster Effective Collaboration and Strengthen Pro-Poor Value Chains	Integrated Crop Management Practices to Enhance Value Chain Outcomes for the Mango Industry in Pakistan & Australia
1. Clarify the processes and logic by which integrated outcomes will be defined and focus interventions decided at the cluster village level. 2. Not only consider constraints at village level but also those higher in the value chains as these may offer greater pro-poor impact. 3. Working relationships between the Dairy and Social teams need to be improved. 4. Consider the on-the-ground presence required and mechanisms to improve communication with communities so they are clearly	1. The proposed Project Extension activities are endorsed. 2. The Social and Mango Production teams must assess current adoption and refine interventions to capture quicker impacts. Consider using the ADOPT software to assist this process. 3. Continue assessing economic impacts of technology introductions to quantify the interventions and flag potential economic benefits. 4. Work with ACIAR and AusAID to identify 3 Impact /potential impact indicators that meet Australian CAPF requirements. 5. Work with the Policy team to identify policy constraints and associated remedial initiatives and strategies.

informed about when and what to expect as a result of surveys undertaken.
5. Define and prioritise researchable areas based on what can be achieved in the remaining time for the project.
6. Annual reporting must be clear concise, and linked to activities/outcomes for each objective. Reports should clearly list numbers of persons trained and publications for the year.
7. Work with ACIAR and AusAID to identify 3 Impact /potential impact indicators that meet Australian CAPF requirements.

6. Support the development of SPS and Food Safety protocols and facilities including biological security as well as residue issues for mango and mango products.
7. Support for the Information/Training/FFS Extension model should continue to help embed the pilot processes in the National and Provincial institutes and universities.
8. Consider expanding support to domestic marketing in consultation with other ASLP teams.

Mango Value Chain Improvement Project

1. The proposed Project Extension activities are endorsed.
2. Emphasis should move to domestic market identification and the development of smallholder models to profitably supply these markets. Models should integrated production options with improved quality payment systems.
3. Work with other ASLP teams to explore and expand develop mango value added products (e.g. green mango, mango chutneys and pickles, mango puree and juice, canned mango, frozen mango, mango leather, crystallised mango products etc.).
4. Enhance collaboration with other donors (including FIRMS and UNIDO) to expand opportunities for both the export and domestic markets.
5. Explore ways to utilise the AusAID Market Development facility to support further domestic and export market development and capture.
6. Support the development of SPS and Food Safety protocols and facilities including biological security as well as residue issues for mango and mango products.
7. Work with ACIAR and AusAID to identify 3 Impact /potential impact indicators that meet Australian CAPF requirements.
8. It is recommended that simple adoption studies be initiated to assess adoption and potential impacts.
9. Work with the Policy team to identify policy constraints and associated remedial initiatives and strategies.

The enhancement of citrus value chains production in Pakistan and Australia through improved orchard management practices

1. Assess the Gross Margins and economic impacts of new technologies to foster adoption and improve impact. It is particularly important to demonstrate that the establishment of disease free orchards is a viable undertaking.
2. Consider other mandarin varieties (such as Emperor) to fill the gap between Daisy and Kinnow - and not just rely on oranges.
3. Re-think the irrigation systems necessary to flexibly accommodate farmer needs for summer or winter intercrops including vegetables, other row crops, berseem clover etc.
4. Consider a future focus on:

a. quality payment systems that improve market responsiveness and deliver improved benefits to smallholders;
b. value-added markets for existing and potentially new citrus products

5. ACIAR should re-engage with Citrus Greening research including impact assessment, resistance, and Psyllid bio-control.
6. Work with the Policy team to identify policy constraints and associated remedial initiatives and strategies.
7. Work with ACIAR and AusAID to identify 3 Impact /potential impact indicators that meet Australian CAPF requirements.
8. The request for additional funding for post-harvest support of AUD 150,000 should be approved.

Strengthening Dairy Value Chains in Pakistan through Improved Farm Management & More Effective Extension Services

1. Work with ACIAR and AusAID to identify 3 Impact /potential impact indicators that meet Australian CAPF requirements.
2. Work with the Policy team to identify policy constraints and associated remedial initiatives and strategies.
3. The proposed Project Extension activities are endorsed.

Background

Introduction

This is an independent Mid-term Review of the second phase of the Agricultural Sector Linkages Program (ASLP II) in Pakistan. ASLP II is an aid initiative of the Australian Government, primarily funded by the Australian Agency for International Development (AusAID), and managed by the Australian Centre for International Agricultural Research (ACIAR). The overall AusAID funding of ASLP II amounts to $12.98m, while ACIAR contributes management costs estimated at about $1.0m.

In January 2005, Shaukat Aziz, the then Prime Minister of Pakistan, requested Australian expertise to support agricultural development in Pakistan. In response, Australia developed ASLP as a four year initiative to be funded through AusAID[3]. This first phase of ASLP was reviewed in late 2008, and ended in mid-2010. The review determined that ASLP was held in high regard as a flagship program by both the National and Provincial institutions of Pakistan, by the Australian High Commission, and by AusAID and ACIAR themselves. As ASLP was achieving significant results, with substantial remaining potential, the review recommended that the program be extended. The design for the second phase of ASLP was subsequently approved, and a Record of Understanding[4] between AusAID and ACIAR signed, in mid-2010. However, implementation was then delayed by almost twelve months because of:

1. Difficulties in finalising the component projects – most were not in place until mid-2011; and
2. Significant delays in the signing of the bilateral MOU between the Governments of Australia and Pakistan.

These delays placed significant pressure on in-country teams to maintain activities with very limited resources.

ASLP II design logic

The goal of ASLP II is:

> *To collaborate strategically to improve livelihoods of the rural poor in Pakistan*

The design document for ASLP II confirmed the ongoing engagement with the mango, citrus and dairy industries, but aimed to build off ASLP I in three key areas by:

1. Enhancing its focus on the social constraints to adoption, and improving the ability of the poor to equitably share in the benefits;
2. Building and sustaining the capabilities of Pakistani scientists in both agricultural and social research; and
3. Strengthening Pakistani agency capacity to analyse and develop policy and regulatory frameworks.

The resulting three objectives of ASLP II are:

> 1. **Pro-poor value chains:** *To support 'keystone' interventions to sustainably enhance selected value chains, and increase understanding and delivery of benefits to the rural poor through productivity improvements and market and employment opportunities.*

[3] The ASLP I MOU was signed in in June 2005 during the visit of then President Musharraf to Australia. Jahangir Tarin, the then Minister of Industries and Special Initiatives of the GoP was instrumental in negotiating the ASLP partnership with Australia.
[4] ROU 14376/023

2. **Agricultural capability:** *To enhance agriculture capability and sustainably improve agricultural value chains by providing short-term 'smart linkages', scoping studies and other initiatives, as well as longer-term formal training, that are demand driven and catalytic, and complement the initiatives supported under other components of the program.*

3. **Enabling policy:** *To support policy analysis and interventions which improve or enable better economic and natural resource management, particularly where they underpin or strengthen pro-poor value chains and more sustainable farming systems.*

ASLP II also aimed to demonstrate that it was an integrated Program (i.e. more than just a cluster of research projects) by:

1. Introducing an M&E Framework that consolidated outcomes and reported directly against the draft *Australia Pakistan Agriculture and Rural Development Strategy* (APARDS); and
2. Allocating significant management resources to integrated program reporting.

However, due to a range of circumstances, AusAID has yet to approve and release the APARDS – a decision that has resulted in significant confusion amongst the ASLP team and stakeholders, given that it is integral to the structure of ASLP outcomes and reporting (see Monitoring and Evaluation on Page 13). ASLP II's above three objectives however remain aligned with those of the APARDS.[5] To achieve these objectives ACIAR has designed and approved a suite of collaborative research and development projects using its standard processes. Both current and proposed projects are shown in Figure 2.

Currently five projects are in place – all under Component 1 (pro-poor value chains). These include:

1. *Mango value chain improvement* led by the University of Queensland;
2. *Integrated crop management practices to enhance value chain outcomes for the mango industry in Pakistan & Australia* led by the Queensland Department of Agriculture, Fisheries and Forestry.
3. *Strengthening dairy value chains in Pakistan through improved farm management & more effective extension services* led by Charles Sturt University
4. *The enhancement of citrus value chains production in Pakistan and Australia through improved orchard management practices* led by the New South Wales Department of Primary Industries; and
5. *Social research to foster effective collaboration and strengthen pro-poor value chains* lead by the Australian Institute for Sustainable Communities at the University of Canberra;

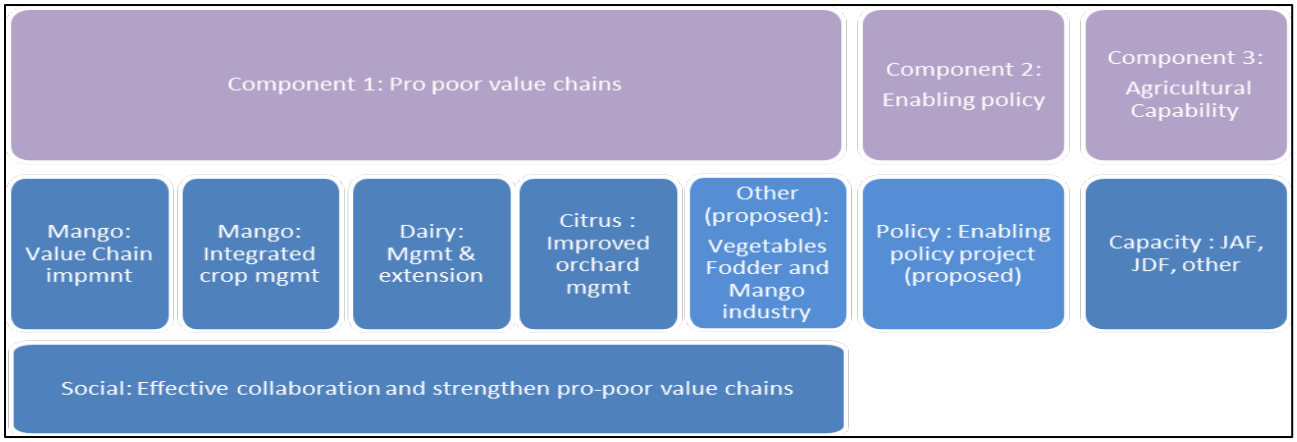


Figure 2: Alignment of individual project activities (blue) under the three Components of ASLP II.

Also under Component 1 are three smaller projects, currently in preparation and likely to commence in 2013/14. These are:

1. *Heat stress alleviation in summer vegetables* to be led by the University of Sydney[6];
2. *Fodder seed systems for enhanced dairy production* to be led by ICARDA[7]; and
3. A project on mango industry institutional strengthening potentially led by the Australian Mango Industry Association[8].

Under Component 2 (*Agricultural Capability*), provision is in place for a range of long and short term scholarships under ACIAR's *John Allwright Scholarships* and *John Dillon Fellowships* respectively. A range of ad hoc short term training, studies and tours have also been undertaken, in response to additional priority needs during implementation.

Finally, under Component 3 (*Enabling Policy*) preliminary work has commenced on one project - *Improving Agricultural Policy Environment for Benefiting Smallholders in Dairy, Citrus and Mango Industries of Pakistan*.[9]

Overall, the resource allocation against individual projects is quite even (Figure 3), although on a Component basis almost two thirds of resources are assigned to Component 1 - Pro-poor value chains (65%). Overall management costs are approximately 11%.

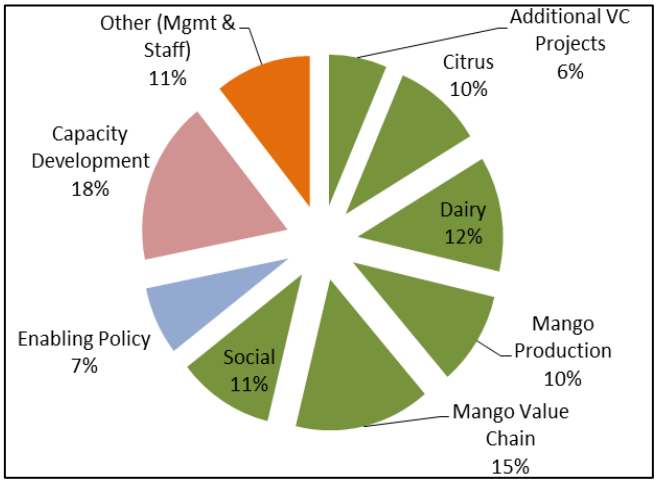


Figure 3: Resource allocation across ASLP II – Comp 1 (green) Comp 2 (blue) and Comp 3 (red).

ASLP II Mid-term review

To undertake the Mid-term Review (MTR) of ASLP II, as outlined in the Design Document and in accordance with standard practices, AusAID and ACIAR each

[6] Proposed funding of $385K
[7] Proposed funding of $300K
[8] With a potential budget of $150K.
[9] With a proposed budget of $950k

engaged an external reviewer.[10] This report reflects the combined opinions of both team members.

The analytical work for the mission involved three stages:

- *Document review:* included a review of all project documents and commenced on 1st April 2013 and continued throughout the mission;
- *Consultations in Australia:* included discussions with AusAID, ACIAR and Australian collaborating scientists in Canberra on 3 April 2013 and in Brisbane on 5 April 2013. Time constraints precluded on-site visits to Australian collaborating institutions; and
- *Consultations in Pakistan:* included visits with Government of Pakistan partner agencies, team members and project stakeholders in Islamabad from 18 – 20 April 2013. In particular, the review attended the third meeting of the ASLP Reference Committee on 18 April. In addition, field visits were made to selected sites in Faisalabad, Multan and Lahore between 21 and 24 April. However, more extended visits were not possible due to security and time constraints.

A mission itinerary is shown in Annex 5, while the list of persons met with is provided in Annex 6.

Documents were provided by ACIAR and AusAID as requested. Content analysis of interview notes and documents identified themes relevant to an abbreviated suite of DAC criteria[11] for evaluating development assistance (efficiency, effectiveness, monitoring and evaluation, and sustainability), as outlined in the Terms of Reference in Annex 1.

The focus of the TOR is on the overall performance of ASLP (rather than on its component projects), and thus is more closely aligned with the higher order outcomes of the Program. The MTR of the individual ACIAR projects was not included under the TOR - however the ACIAR member of the team was engaged for this purpose. As such this report is in three sections:

4. Section 1: A review of the ASLP II as a whole against the agreed TORs;
5. Section 2: A specific technical review for each project using ACIAR's standard review format; as well as
6. Section 3: Annexes

The inclusion of the more specific assessments of each project has proven beneficial in synthesising program level issues, and has thus added significant rigor, depth and insight to the overall assessment.

Tables were prepared of the key review questions included in the TOR. ACIAR and AusAID were asked to respond to these independently to supplement the field visits and stakeholder interviews. From the responses it is clear that tensions have arisen between AusAID and ACIAR over ASLP management – these are discussed further under 'Efficiency' on page 11.

[10] Keith Chapman was engaged by ACIAR; David Swete Kelly was engaged by AusAID.
[11] http://www.oecd.org/dac/evaluation/daccriteriaforevaluatingdevelopmentassistance.htm

Section 1: Review of the overall ASLP II initiative

Effectiveness

Overall ASLP II is rated as very satisfactory by the review team. The second phase of ASLP continues the significant work that made the first phase so successful. The management tools and practices currently defined by the four value chain research teams demonstrate significant capacity to improve the productivity, product quality and market access of the target farming systems. Yet the long-term challenge, extending well beyond the life of ASLP, is to turn this potential into large scale beneficiary achievement. A number of initial indicators of beneficiary achievements are, however, already evident, a selection of which are shown in Table 2.

Table 2: Beneficiary achievements and adoption constraints faced by ASLP

Technology Achievement	Adoption	Ongoing work to address key adoption constraints and pro-poor benefit
Productivity gains		
A range of improved mango and citrus disease free multiplication and nursery practices have demonstrated potential to deliver significantly improved planting material. Disease free, faster tree establishment will improve the longevity and productivity of orchards.	A small number of citrus and mango nurserymen have shown interest in adopting the systems and have received appropriate training.	i. Confirm the competitiveness and viability of the improved nursery practices; ii. Define the on-farm practices that limit the reintroduction of diseases; iii. Quantify and communicate productivity, longevity, labour and economic cost/benefits to increase farmer demand for improved disease-free trees; iv. Embed practices within appropriate programs of Government, donors, academia, and the private sector.
A range of integrated on-farm tree management practices for mango and citrus have demonstrated their potential to limit disease incursions, reduce alternate bearing, increase productivity, increase fruit quality and reduce water usage. Example practices include: ring mounding to limit trunk inundation; furrow irrigation; canopy management; wound and trunk treatments; scheduled spraying; weed and orchard floor management; water and nutrient analysis.	Initial adoption surveys in mango show significant interest and early adoption rates of about 50% amongst beneficiaries in and around research and demonstration sites (adoption has been averaged across all technologies).	i. Adaptively develop integrated technology packages suitable for the smallholder; ii. More rigorously monitor acceptability and adoption; iii. Quantify and communicate productivity, longevity, labour and economic cost/benefits; iv. Embed practices within appropriate programs of Government, donors, academia, and the private sector.
A range of simple integrated dairy technologies, combined with an innovative whole-of-village	Approximately 1300 participating farmers are directly engaged, and current adoption of the nine key	i. Adaptively develop integrated technology packages suitable for the smallholder;

Technology Achievement	Adoption	Ongoing work to address key adoption constraints and pro-poor benefit
extension approach, shows potential to significantly improve the productivity and health of smallholder dairy herds. Example practices include: free access to feed and water; fodder and feed calendars; calf rearing; improved artificial insemination; silage production; vaccination and mastitis control.	modules is promising (e.g. adoption of improved fodder practices almost doubled between 2011 and 2012 – and now averages almost 40%). Adoption beyond the target beneficiaries is also apparent.	ii. Quantify and communicate productivity, longevity, labour and economic cost/benefits iii. Embed technology and extension practices within appropriate programs of Government, donors, academia, and the private sector.
Marketing and quality gains		
Management of mango harvesting, handling, blemish and the expression of post-harvest diseases has demonstrated the potential to significantly reduce wastage, increase shelf life and present the consumer with a much better quality product. Example practices include: stem trimming, de-sapping, gentler handling, pre and post-harvest control of rots; and packaging.	Commercial growers working with the research teams have quickly adopted the improved techniques. Other commercial growers and commercial harvesting agents also show significant interest. Adoption amongst smallholder growers is limited as most forward sell their crop to commercial harvesting agents. Little evidence of benefit flow to the smallholder exists.	i. Quantify and communicate the quality, labour and economic cost/benefits; ii. Improve feedback mechanisms within the market chain. Smallholder farmers need an economic incentive if they are to adopt those practices that deliver improved fruit quality. The prime bottleneck is the forward selling of produce (e.g. mango and citrus) – a practice that reduces farmer risk and supplies forward credit, but curtails market incentives for productivity and quality improvements. iii. Embed practices within appropriate programs of Government, donors, academia, and the private sector.
Protocols have been developed to ensure product quality and market access for export markets, and key domestic markets. Export protocols are in place for Europe, China and the Middle East.	Commercial pack houses have successfully sent trial shipments to each of these markets, and buyer response has been positive, with significant interest shown in future sales. Commercial pack houses are gearing up to supply these markets continuously. Little evidence of benefit flow to the smallholder exists.	i. Quantify and communicate the quality, labour and economic cost/benefits for both domestic and export mangos; ii. A better understanding is needed of market differentiation and market potential within the Pakistan domestic market for mangos as this is the market most likely to be accessible to smallholders. iii. Embed practices within appropriate programs of Government, donors, academia, and the private sector.
Preliminary work has commenced on the complex milk marketing system	Streamlining of milk collection and handling offers significant potential for smallholders to capture financial benefit if they can ensure consistent supply (quality and	i. Quantify and communicate the quality, labour and economic cost/benefits

Technology Achievement	Adoption	Ongoing work to address key adoption constraints and pro-poor benefit
	quantity).	

As can be seen, ASLP is clearly an agricultural research initiative with potential to develop and pilot appropriate 'proof of concept' or 'fit for purpose' technologies or approaches. Thus, ASLP is an incubator of ideas and approaches rather than a mechanism to deliver broad scaling up.

Nevertheless, the second phase of ASLP has aspired to go beyond its research base by:

- identifying and more pro-actively addressing the key constraints that limit adoption by poor farmers; and
- ensuring that technologies and approaches are embedded with appropriate long-term delivery programs of Government, donors, academia, and the private sector.

The following four issues (along with the discussion on 'Sustainability' on page 17) capture the principles common to both the individual project activities, and ASLP II as a whole. These principles also provide a framework from which to consider those areas in which the effectiveness of ASLP II could be further strengthened.

Research is focused on key factors that limit productivity within pro-poor value chains;

The ASLP II focus in Pakistan is on three significant agricultural industries (dairy, citrus, and mango) showing:

- a largely smallholder base;
- the potential for both domestic and export expansion; and
- the potential for relatively simple production and marketing interventions to lift productivity, quality and returns, thereby significantly impacting on smallholder incomes.

The selection of specific target interventions within these industries has flexibly evolved over the life of ASLP. For example, the success of research into Mango Sudden Death Syndrome in ASLP I, has enabled ASLP II to now shift focus onto other research needs.

The selection of research targets has taken place in close consultation with senior officials of the Ministry for Food Security and Research (and particularly the Pakistan Agricultural Research Council and the National Agricultural Research Council), as well as the Provincial Governments of the Punjab, Sindh and (to some extent) Khyber Pakhtunkhwa. Selection has also been influenced by a broad cross-section of national and provincial industry stakeholders. The review noted the strong ownership by all stakeholders in the identified initiatives.

Research is focused on those 'linkages' where Australia has comparative advantage, and where Australian industry-based teams are already established.

A further feature of ASLP is that the research only targets issues shared by Pakistan and Australia, for which there is a skilled Australian team to share their experience. For example, the skills of UQ and DAFF in Queensland are highly respected by the Australian mango industry and the International Mango Organisation. The application of these skills in the Pakistan context has thus had immediate benefits. Similar commodity benefits have arisen from the engagement of Charles Sturt University with the dairy industry, and the NSW Department of Agriculture with citrus.

Clearly then, one of the key benefits of ASLP is the 'linkages' that have developed with these highly relevant Australian research institutions. ASLP II has hosted an increasing number of visits of Australian research personnel to Pakistan, especially when compared with the latter part of ASLP I, when security concerns curtailed most

Australian travel[12]. So far during ASLP II, Australian visitors have been on-the-ground extensively (250 days in 2012/13 alone) - visits that have not only contributed significantly to project direction and execution, but have been essential to the development of long term sustainable relationships between institutions. This high level of visits is expected to continue for the remainder of the ASLP.

Furthermore, these linkages are by no means one way. Pakistani scientists have, for example, assisted their Australian counterparts both professionally and technically by:

a. identifying an outbreak of Mango Malformation Disorder on the east coast of Australia. Previously, MMD had only been identified in the Northern Territory;
b. defining export protocols for markets that are equally relevant to Australia as Pakistan; and
c. the refinement of Australian techniques, processes and methodologies through their application in the Pakistan context.

Research targets those who can innovatively partner in technology development

The review of ASLP I noted the need to better ensure that the poor and vulnerable equitably benefitted from the outcomes of the research work. ASLP II therefore aimed to include mechanisms within the commodity projects, and through the introduction of targeted social research, that would help it understand the adoption/access constraints faced by smallholders and the poor. Yet while the initial findings certainly suggest that improvements have been made, some within AusAID have apparently interpreted the ASLP I review as meaning that ASLP II should no longer work with either larger growers or enterprises well up the value chain. ASLP II was thus pressured to disengage with these wealthier stakeholders, and instead work only with poor smallholders and with village-based enterprises. There is an essential, significant, distinction between undertaking research *for* the poor, and undertaking research *with* the poor. To obtain pro-poor outcomes, then, does not necessarily mean that one must work **only** with the poor – this has been an unfortunate interpretation of the ASLP I recommendations. A more nuanced approach would be for:

- ASLP II to undertake the adaptive verification of technologies, and the development of appropriate integrated production packages with those farmers who have the capacity to allocate resources, accept risk, and engage effectively with the participatory adaptation of research findings. This usually means that at least part of the adaptive research process can only occur with larger farmers, i.e. with those who are less poor;
- However, ASLP II should at the same time be working directly with the poor, in order to:
    - Identify those constraints inherent to smallholder production that limit the potential for poor farmers to adopt new technologies, integrate practices into their mixed farming systems, gain more power in the marketplace, and capture benefit (such constraints would include: scale, labour, quality, quantity, consistency, finance, market access and input supply); and
    - Identify how the poor can better access employment and value adding opportunities within the market chain. This would include opportunities for village and home based enterprises; employment within the harvesting/collection, packing and (potentially) processing sectors; and engagement for farm input or advisory services[13].

  The Social Research team will help leverage individual project team initiatives to improve adoption and impacts for smallholders.

[12] A new security plan introduced by ACIAR in 2011 has alleviated concerns held by most Australian collaborating agencies.
[13] For example Leghari Frams have engaged and trained local youth as farmer outreach technicians to work with their smallholder suppliers.

Recommendation 1. It is recommended that the ASLP research teams purposefully adopt the more nuanced approach to pro-poor research and development, as outlined.

However, many of the above features are already inherent in ASLP II, at least to some extent. For example:

- Mango and citrus production technologies continue to be developed with willing and able farmers. Nevertheless, there has been some unnecessary disengagement with larger farmers. In addition, some of the research expectations now placed on the integrated research sites established on the blocks of poorer smallholders are overambitious, especially given that any research outcomes are likely to be compromised by the risk adverse and inconsistent management applied on many poorer farms.
- The Social Research team is now beginning to work with the teams to find ways to address the critical adoption constraints apparent during both phases of ASLP. Village-level constraints must be informed by detailed on-the-ground data collection. However, the Social Research team also needs to consider constraints higher in the value chains. The 'contractual' relationships associated with milk marketing, as well as the forward selling of orchard produce, are clear disadvantages for poor farmers, and need social research in order to develop effective ways for moving forward.
- The value chain teams have carried out good work on niche and export market potential for mango. However, the greatest scope for the poor lies in the expansion of, and better price differentiation within, the domestic market – currently insufficient attention is given to this[14].

A multi-disciplinary, integrated team approach to research that overcomes cross institutional barriers.

As ASLP matures, its effectiveness will not just be defined by its beneficiary impact, but by the improvements it elicits in Pakistan's capacity to sustainably undertake and collaborate in agricultural research and development. One of the benefits of ASLP has been its ability to create connections between the various R & D agencies and other donor programs within Pakistan. Partners concur that, in general, little opportunity exists in Pakistan for scientists from different agencies, or different parts of the country even, to exchange ideas, this being in part due to funding and communication constraints, and in part to a culture of inter-agency rivalry, suspicion and competition. Furthermore, Pakistani agencies are strongly hierarchical, and thus the limited inter-agency interaction that does occur inevitably involves bureaucrats, rather than working scientists and development staff.

Although the integration of multi-disciplinary teams around industry-specific problems has been a real strength of ASLP, the opportunity for cross-industry integration has, in reality, only been limited. Many of the issues faced by the projects are similar (e.g. security management, extension linkages, training approaches, capacity building, and inter-agency linkages), and hence the sharing of experiences - what works; what doesn't work - has real benefits. In addition, smallholder farmers almost invariably integrate livestock and cropping options, making it is essential that the commodity specific teams work together to address the needs of the poor in an integrated fashion. One of the objectives of the Social Research program is, therefore, to provide opportunities for projects to exchange outcomes, lessons and experiences, in order that more relevant and integrated outcomes are delivered. Already, the teams have agreed to establish Cluster Villages in order that research work be conducted in parallel.

[14] . Future studies are planned to address the domestic market with mango and a future extension of ASLP may incorporate value chain work for the domestic and export markets for citrus.

Nevertheless, the processes by which this will lead to integrated outcomes are not yet clear, and thus need clarification.[15]

[15] See Additional Funding Requests - one of which aims to address increased linkages

Efficiency

AusAID and ACIAR Management

It became clear to the reviewers that the efficiency of ASLP has been compromised by tensions that have arisen between AusAID and ACIAR over ASLP management, and that the level of mutual frustration is sufficient to pose a significant risk. Many of the frustrations are, however, not unique to ASLP. Rather, they reflect ongoing tensions between the two federal agencies, each of which has a unique culture, approach, resource allocation, and accountability mechanisms. Nevertheless, it appears that in the specific case of ASLP, the frustration has been multiplied beyond usual levels. It is, of course, well beyond the scope of this review to resolve such concerns. All the same, it is recommended that AusAID and ACIAR undertake ongoing discussions to resolve management frustrations in three key areas:

1. ***The management of logistical needs, particularly security movements when in Pakistan***; All ASLP teams appreciate that security concerns in Pakistan are such that their travel requirements may, at times, be delayed or cancelled. They also appreciate that security resources are limited at the Australian High Commission. Nevertheless, the pressure that ASLP's significant schedule of visitors places on AusAID and DFAT's capacity to respond is significant[16]. Furthermore, in some circumstances DFAT, AusAID and ACIAR each have different security protocols in place. It is inevitable, therefore, that security resourcing is a source of tension and the differing protocols may result in security lapses.

> *Recommendation 2. Rationalisation and simplification of security protocols between AusAID, DFAT and ACIAR is urgently needed.*

2. ***The limited capacity of AusAID to engage with the program, especially when compared with the resources available within ACIAR***; It was very clear to the review that the strong coordination and capable management of ACIAR's ASLP Coordinator and Deputy Coordinator, along with the focused in-country support of the ASLP Program Officer, have been instrumental in lifting the profile of ASLP within the Pakistani Agencies - considerable counterpart commitment has been leveraged, and linkages between otherwise introverted and somewhat ossified organisational structures have been facilitated. The management team has also been instrumental in buffering the individual teams from the administrative issues associated with security and logistics in Pakistan, and the evolving needs of AusAID and ACIAR for additional project information. This review considers such a model of faciliatory program management to be one of the key drivers of ASLP success.

   Conversely, AusAID has very limited resources at the post in Islamabad, where three A-based appointments oversee almost $100m in spending each year. It is inevitable then that A-based engagement in ASLP – which accounts for $3m per year (or 3% of the overall budget) - is, and always will be, very limited. Yet this said, it is important to realise that ASLP is a high profile respected engagement, and one of the initiatives in AusAID's Pakistan portfolio that presents an on-the-ground Australian face to the aid it is giving. With this in mind, AusAID's A-based staff all agreed that they should be doing more to engage with ASLP delivery.

[16] Given AusAID's limited pool of armoured vehicles, ACIAR has had to make additional arrangements with DFAT.

Recommendation 3. It is therefore suggested that AusAID aim for a minimum of two scheduled field visits per year (totalling 5-6 days) to ASLP activities, in order to increase both its understanding of, and engagement with ASLP.

3. ***The tension that AusAID is the 'donor', and thus ACIAR's mandate is somehow secondary to AusAID's***; This issue is central to many of the tensions between AusAID and ACIAR in Canberra. AusAID and ACIAR need to see themselves as equal development partners – not in a donor/contractor relationship. Yet while many within AusAID and ACIAR would prefer to work this way, the complication is that AusAID's systems and practices are crafted to a contractor model with their research partners, and 'default' to procedural and reporting requirements that are difficult to manage on a partnership basis.

ASLP Oversight and Collaboration

The review team was given the opportunity to attend the third ASLP Reference Committee meeting, and to engage with participants. This well attended meeting was chaired by the new Federal Secretary of the *Ministry of Food Security and Research* - a demonstration not only of the GoP's ongoing interest in, and commitment to its partnership with ASLP, but a confirmation of the high profile achieved by what is, in the Pakistan context, a very small donor engagement. PARC was also engaged very heavily with the review, the national director accompanying the team for three days, as well as joining numerous discussions. PARC and NARC definitely see great value in ASLP - they are strongly supportive of the significant technical linkages and exchanges that ASLP has facilitated, and see this as the most important element of ASLP - thus they are not concerned that the overall funding is relatively modest.

The Director of PARC, as well as attendees at the Reference Committee meeting, confirmed three key areas needing improvement:

1. The need for ASLP II to develop a mechanism that allows better cross-team engagement and sharing within Pakistan. A biannual (or, at the very least, an annual) sub-national technical meeting of all teams was suggested, at which issues and outcomes could be shared and discussed.
2. The need for ASLP oversight mechanisms to better engage with Provincial government stakeholders. Annual provincial meetings are therefore necessary, and should be timed in advance of the national Reference Committee meeting. This would allow Provincial stakeholders to be sufficiently briefed on the detail of ASLP engagement at the local level, prior to discussions at the national level.
3. The need for a more focused agenda at the national Reference Committee meetings, so that key issues have time to be adequately debated. The national meetings should also be attended by fewer, but more appropriately briefed, representatives of Provincial stakeholders and the teams.

Recommendation 4. It is recommended that ASLP discuss the format and structure of cascading operational and oversight meetings with PARC. ASLP engagement should align with PARC recommendations so that ownership is more clearly embedded with the GoP as they themselves come to grips with their changing consultation mechanisms under devolution.

Value for Money

The ASLP model (and in fact the ACIAR model more broadly) represents strong collaboration and leveraging of resources. The review of ASLP I provided significant detail regarding the co-contributions provided by all partners: ACIAR, Australian collaborating institutions, and Pakistan partner agencies. The ASLP I findings remain valid today, and are endorsed by this review. In short, AusAID's investment in ASLP II leverages significant direct resourcing from all partners.

ACIAR has engaged ICARDA to manage the financial distribution and reconciliation of ASLP funds in Pakistan. Pakistan agency systems are not considered appropriate for ASLP, given the significant time delays, the bureaucracy involved, and the risk of corruption. However, during the early stages of ASLP II, ICARDA's administration was in significant upheaval (its central office was based in Aleppo, Syria), causing problems with fund releases. ICARDA systems are, however, again operative.

Even so, the ASLP teams raised a number of concerns with the funds flow through ICARDA. Some of these reflect shortcomings of ICARDA's processes. However, many are the result of poor communication, poor understanding, and inappropriate expectations amongst the Australian and Pakistani members of the teams themselves, the most important of these being:

- the need for Australian partners to inform ICARDA in writing of the timing and size of international transfers so that they are aware of when funds have been credited;
- the unavoidable reality that new tranches of funds will not be released to partner organisations while unreconciled funds are outstanding;
- the need to engage the ACIAR Program Coordinator (Dr Manawar Kazmi) if there are any difficulties communicating with ICARDA.

It is important to note that ICARDA in Pakistan is offering this service to ACIAR and ASLP for very little gain. The management fee charged is small, and barely covers the accounting and administration costs of providing the service. Moreover, the ICARDA Country Manager's time commitment has sometimes been significant. This review therefore strongly endorses the current arrangements, and congratulates ICARDA for the generosity of its services.

Recommendation 5. ACIAR should resolve the confusion regarding funds flow through ICARDA by circulating to Project Team administrators a set of Standard Operating Procedures that meet ICARDA accounting standards.

Finally, the review team has been asked to comment on the introduction of a 10% management fee to be levied by ACIAR on the management of AusAID-funded initiatives. This has apparently been agreed between AusAID and ACIAR at a corporate level, and thus the review has no alternative but to endorse the move. However, in so doing, the review team would like to stress that if AusAID and ACIAR wish to engage in development as mutually relevant and respected partners, and avoid the ongoing perceptions of a manager/contractor relationship, then such a move does little to encourage this thinking.

Monitoring and Evaluation

The review of ASLP I noted that the ASLP engagement was more than "the sum of its parts". While each research project contributed to the overall outcomes, there were also significant 'emergent' outcomes at the overall program level. Hence in the design of ASLP II, ACIAR established an overall program logic that could capture these 'program level' properties, and thereby demonstrate the direct contribution that ASLP was to make to the

APARDS. As a result, ASLP II's higher order logic was framed to capture outcomes related to its 'goal' (e.g. collaboration, poverty) and its outcomes (value chains, capability and enabling policy).

The ASLP I review also recognised that 'higher-order development' rarely happens spontaneously without dedicated resources. For this reason, ASLP II has been significantly resourced above the project level, in order to synthesise its integrated outcomes against the APARDS. AusAID and ACIAR also worked together to agree an M&E framework that reflects this. In fact, ACIAR committed significantly more time and effort to developing the M&E Framework - in line with AusAID expectations – than is usual for an ACIAR project-focused M&E system. The resulting M&E Framework was then approved by both AusAID and ACIAR. Yet in the absence of the APARDS, the M&E Framework loses a lot of its relevance.

In addition, in 2011 the Australian Government responded to the Independent Review of Aid Effectiveness by agreeing to recommendations for a four year budget, and a performance monitoring cycle known as the Comprehensive Aid Policy Framework (CAPF). CAPF requirements have since been rolled out across AusAID and ACIAR, requiring that new 'performance' elements also be integrated into all initiatives.

Four issues need to be addressed in order to strengthen ASLP II monitoring and evaluation and ensure it appropriately and relevantly reflects program achievements.

1. ***Clarification of the status of the APARDS as the strategic intent of the aid program.*** The APARDS was developed by both AusAID and ACIAR, and as such was one of the first sector strategies in the Pakistan program that reflected 'whole of government' ownership. However, continuing uncertainty as to its status and role are creating confusion in both agencies. Yet there is good evidence that the APARDS has been the 'default' strategy even while its official endorsement has been lacking. Its thinking has obviously influenced the selection of activities in Pakistan - the current suite of AusAID and ACIAR engagements clearly align with its intent. All the same, it is three years now since the APARDS was drafted. Over this time AusAID expectations of 'sector strategies' have evolved, and even despite its update in early 2012, the APARDS still falls short of evolving expectations.

> *Recommendation 6. AusAID and ACIAR should come to a clear decision that either confirms the APARDS as an adequate (but not perfect) strategy, or sets a timeframe for the development of a new strategy to guide Australia's support to agriculture and rural development in Pakistan.*

2. ***The need to simplify program level and project level performance indicators, and incorporates CAPF requirements:*** The exhaustive suite of M&E indicators contained in the current Framework are proving unnecessary for the requirements of any partners - AusAID, ACIAR or the project teams. AusAID and ACIAR have already proposed that these be reviewed.

> *Recommendation 7. AusAID and ACIAR need to simplify the M&E Framework to reflect the minimum suite of indicators needed to consolidate reporting for the requirements of CAPF and the APARDS (pending the decision on its ongoing relevance).*

3. ***The unrealistic expectations for development impact and timeframes placed on ASLP***; As noted, ACIAR can and should be clearer about the potential impact implications of ASLP projects. Even though there is little probability of significant industry wide adoption occurring within the lifetime of ASLP, its

projects must still provide clear outlines of pathways and constraints, some estimates of timeframes for adoption, and some indication of potential impacts over time. If nothing else, it will then be much clearer whether current research efforts and partnerships are fulfilling their expected contributions to a logical *Impact Pathway*[17].

AusAID expectations, on the other hand, are often too high – while all parties agree that ASLP is an incubator, and will not deliver widespread change within its lifetime, AusAID's reporting system - and Australia's broader CAPF expectations, more generally - are constructed in such a way that broad adoption and productivity improvements are the expected outcomes of <u>every</u> agricultural aid initiative. Yet in the case of ASLP, its purpose is fulfilled if it contributes the <u>initial</u> building blocks to an agreed and logical *Impact Pathway*.

> *Recommendation 8. Each ASLP project needs to better articulate the Impact Pathway underpinning its engagements, while subsequent reporting should note if the project is on track to deliver its agreed steps in this process. All stakeholders need to understand this distinction and resist the demand for ASLP to demonstrate widespread impacts.*

4. ***The inadequate reporting of higher order achievements***; Perhaps the most significant source of dissatisfaction with ASLP II's M&E, however, is the style of reporting against the M&E Framework. ASLP Reports are not a synthesis. Instead, they amass outputs and activities from each of the five projects, making for reports that are almost impenetrable. For example, this review drew information from the individual presentations, visits and project Annual Reports, rather than try and decipher the consolidated reporting. It would be so much easier for all parties, if ASLP high level reporting provided a much shorter synthesis – rather than a collection of current outputs - drawing out evidence of progress (against the anticipated impact pathways), and highlighting both key achievements and Program level risks.

> *Recommendation 9. ASLP high-level reporting should focus on synthesising the key achievements that demonstrate ASLP is on track to deliver the necessary foundation for long-term change, along with any constraints it is facing.*

Also at the project level, greater consistency in the individual project reporting would aid the process of synthesising program level achievements and risks.

> *Recommendation 10. ACIAR should consider introducing a standard ASLP project reporting template, as per the example given in Annex 3. This incorporates potential adoption and impact as well as constraints.*

Finally, the limited resources applied to clearly synthesising project and program level achievements diminish stakeholder appreciation of the significant work undertaken. Much of the profile and attribution earned by ASLP is compromised by the limited efforts placed on public profile by the program. There is

[17] ACIAR expects that its research projects identify the *Impact Pathway* by which research outcomes will eventually, and logically, influence impact. This is the same basic concept as used by AusAID when it refers to a project's *Theory of Change*. Thus, in this review, *Impact Pathways* and *Theory of Change* are interchangeable terms.

no doubt that this takes time. ASLP teams call for more resources in order to achieve this, but this is not seen as the crux of the problem by the review. The core issue is that the teams themselves are not putting sufficient effort into synthesising their achievements and corroborating the likely impact they have made. Only once this is in place will additional resources help in communicating these messages.

Recommendation 11. The ASLP overall as well as individual projects need to significantly increase their synthesis and reporting of key achievements (not just outputs). This would further strengthen the public profile of ASLP and its contribution to Pakistan agriculture.

Sustainability

There are two areas of sustainability that are central to securing the long term benefits of ASLP:

Embedding of capacity and skills with key delivery partners to facilitate the scaling up of relevant outcomes

To bring about change in any system, the key drivers of change need to work closely together, including: people, policy, technology, resources and institutions. It is important to note then that a major focus of all the ASLP II projects has been on building the capacity of people - farming families, extension workers, researchers, policy makers – many of whom will be key to ensuring the sustainability of ASLP's initiatives and benefits into the future. In regard to sustainability, two aspects of ASLP's work are essential:

1. ***Embedding research skills*** – thereby ensuring that Pakistan's research agencies (both Government and Academia) have the research skills (technological knowledge/processes) to continue to support their industries. Overall, it was evident to the review that this is area in which ASLP has worked very effectively with both national and sub-national government agencies (e.g. PARC, NARC and local research institutes), as well as key universities (UAF, SAU and UVAS). Pakistani research teams are not only collaborating effectively, but are proud of their achievements, can readily articulate their approaches, and – in many cases - have had their skills recognised (and services sought) by other donors, the private sector and other Pakistan stakeholders. It is quite clear then that as future needs arise, there will almost certainly be an appropriate research skills base to meet industry needs.

   The one engagement that requires further attention is Dairy. The team, who have been working extensively at the sub-national level, needs to re-engage once again with NARC and other national bodies to ensure that the significant achievements at the local level have advocates at the national level to promulgate outcomes as widely as possible.

   The capacity building component of ASLP has been a hugely important factor in its success. ASLP II has delivered a suite of long and short term trainings for its key research partners and other stakeholder, and needs to continue this solid work. While it is appropriate that there is no single delivery mechanism – needs are dynamic, and flexibility is needed in response – as it stands, capacity building is being delivered through each of the five projects, as well as through the specific Capacity Building Component. This makes the outcomes of training difficult to consolidate and report on. To help identify any remaining skills gaps and focus future training on these needs, it would help if the teams carefully reviewed current achievements against carefully thought through training expectations. In addition, some training can be delivered in common across projects (e.g. irrigation, biometrics and design of experiments, soil and leaf analysis, survey design, cost/benefits analyses, etc.).

> *Recommendation 12. ASLP should consider developing in common the logic, principles and standards associated with the program's diverse training activities. While unnecessary for all forms of training, there are certain key areas that would benefit from greater consistency and common standards. In particular, there should be strategies in place that ensure the long-term capacity of national institutions to maintain and enhance the technologies and approaches developed by ASLP.*

2. ***Delivery Partnerships:*** Each of the ACIAR teams has developed strong linkages with appropriate extension and delivery programs that can be responsible for the scaling up of technology and extension practices in the long-term. This includes programs of Government, donors, academia, industry and the private sector (see Table 3).

Table 3: ASLP collaboration

Discipline area	Linkages with national partners responsible for long-term engagement and delivery
Citrus and mango Research	PARC: national coordination of research priorities NARC: direct research partnerships and capacity building UAF: direct research partnerships and capacity building SAU: direct research partnerships and capacity building
Mango market research	UNIDO[18]: direct use of export protocols in trial shipments Pack houses: direct use of export protocols in trial shipments FIRMS: ASLP remodelling of FIRMS pack houses to improve performance with mango, direct use of export protocols in trial shipments PHEDC: direct use of export protocols in trial shipments
Citrus and mango extension:	Punjab F&V Project: directly using ASLP skills and material in areas of overlap Sindh Government: directly using ASLP skills and material in areas of overlap KPK Government: directly using ASLP skills and material in areas of overlap USAID ASF: directly using ASLP skills and material in areas of overlap FAO AusABBA: directly using ASLP skills and material in areas of overlap
Dairy extension	UVAS: direct hosting of ASLP team and discussions regarding embedding the ASLP approach as part of its extension mandate Nestle: direct use of ASLP extension material with 1,000 of farmers; close linkages with team to assess approaches Punjab Livestock Department: direct use of ASLP material and protocols especially for animal health and nutrition; engagement of extension staff with the ASLP team. FAO AusABBA: directly using ASLP skills and material in areas of overlap

As can be seen, ASLP collaboration has been extensive - the program seems to have maintained an "open door" policy across the board. While some specific relationships have been difficult (e.g. FIRMS) and appropriate mutual recognition may not always have been achieved, overall the teams are doing a solid job.

The real challenge for ASLP – and this despite it being both well-known and highly regarded for the technologies and skills it has developed - is that it can only work from its basis of kudos and credibility. It has no capacity to force agencies or partners to adopt the practices it develops, or integrate them into appropriate extension programs. Nor can it control the priorities of partner programs. As a result, many of its partnerships ebb and flow according to the needs of the partners. The teams appreciate the need for ongoing perseverance in this regard.

Recommendation 13. It is recommended that AusAID, ACIAR and the project teams should be more proactive in promoting ASLP II and highlighting it's linkage benefits in-country

[18] Under the European Union funded Trade Related Technical Assistance (TRTA) II Program

Clearly understanding the adoption constraints so that ASLP outcomes are as appropriate and as applicable as possible

The second area of sustainability key to securing the long term benefits of ASLP is its need to clearly understand the adoption constraints on the technologies and practices it has developed. While there has been progress in this regard, the Social Research component of ASLP is still new, and still coming to grips with the complexity of this task. In addition, multiple expectations exist within the ASLP teams and its partners, particularly with regards the most appropriate entry points, and the expectations of success. The review appreciates that coming to grips with this element of ASLP has proven difficult. In this regard it may be useful for the Review to articulate the challenges, as well as some of the constraints confronting such social research.

1. Adoption constraints and pro-poor engagement is a huge (and contentious) area of ongoing research, with a scope that could clearly subsume the whole of ASLP combined. The Social Research team needs to help ASLP partners appreciate the immensity of the task being faced.
2. Focus is needed – as mentioned previously, the decision to choose cluster villages is supported. However, many other opportunities are also available to address pro-poor adoption constraints throughout the value chain[19]. Hence the Social Research team needs to clarify why they have selected particular issues for attention rather than others. Again, the logic underpinning the currently chosen focus is not yet clear.
3. A collaborative approach is essential – the identification and resolution of adoption constraints is beyond the capacity of a single Social Research team. Good integration with the current commodity teams is needed, as well as a mutual respect for the skills and the knowledge already attained. Yet while this seems to be the case with mango and citrus, some tension is evident between the Dairy and Social Research teams, which lacking resolution, has instead resulted in a significant degree of parallel implementation – a situation that is clearly not helpful at all.

Finally, in helping to think through the issues of pro-poor adoption, the teams may find it useful to use the ADOPT decision support tool developed by CSIRO, and enhanced through ACIAR funding. The tool is not perfect, but would still be useful in thinking through probable adoption constraints, and in developing a more realistic appreciation of the likelihood and timeframes of eventual adoption.

Expansion

Expansion of ASLP is considered on two levels: expansion within the current phase, and expansion potential to a third phase.

Expansion within ASLP II

ACIAR has proposed three new initiatives to be funded during the current implementation of ASLP II. These relatively small engagements are detailed in Section 8 (Additional Projects), and include:

1. *Heat stress alleviation in summer vegetables - Characterisation and utilization of heat tolerant germplasm in central Punjab, Pakistan* costing A$549,724, to be implemented by the University of Sydney. The review considers that, as it stands, this proposal is *not* in keeping with the nature and profile of current ASLP II engagements. While a worthwhile piece of research in itself, it fails to capture the key principles of ASLP II. Unlike ASLP's other pro-poor value chain engagements, it is not based on a study of the vegetable value chain that identifies priority bottlenecks, and best opportunities for value chain research to deliver

[19] For example: The 'contractual' relationships associated with milk marketing, as well as the forward selling of orchard produce, are clear disadvantages for poor farmers, and need social research in order to develop effective ways for moving forward.

pro-poor benefits. Instead, the proposal is quite research driven. While its outcomes may eventually be of benefit to the vegetable value chain, the fact remains that so many issues constrain vegetable production in the Punjab, the proposed research is unlikely to be of central significance. The review therefore recommends that ACIAR with AusAID and GOP agencies look at the formulation of a vegetable project based on a study of the vegetable value chain that identifies priority bottlenecks, and best opportunities for value chain research to deliver pro-poor benefits. Based on this assessment, the current proposal may be justified as one element of the needed response.

2. *Establishing Village-based Seed Enterprise (VBSE) for Sustainable Forage Seed Production to improve availability of fodder for better livestock Production:* This is an adjunct to the Dairy project already in place, and identifies a key opportunity not yet covered by current research. It will cost A$300,000 and will be implemented by Charles Sturt University. The review endorses the proposal.
3. Organisational structures for the Mango Industry in Pakistan. This is currently under design as an adjunct to the Mango projects already in place. It addresses a key issue not covered in either of the current projects. Mango industry organisation offers considerable benefits that can help the industry improve adoption, market access, and advocacy. In addition, it provides the various grower sectors that it represents with a more equitable voice. Australia has considerable experience in this regard. The review endorses the proposal.

In addition, ACIAR has sought AusAID approval for a series of increases to the current budget for ongoing projects.

1. Additional Security for Program Staff: Requested $180,000: The costs of security compliance are significant and the additional areas outlined above seem logical. AusAID should consider if it is appropriate that ACIAR bear a small proportion of these costs as part of its overall program in Pakistan.
2. ASLP Mid-Term Review: Requested $48,166.68. The Mid-term review was always planned, even though its scope may have needed greater definition. AusAID and ACIAR should review the overall costs and determine an appropriate split between base costs that should be met through the projects and additional and unforeseen expenses.
3. ASLP Annual Program Meetings in Pakistan: Requested $105,000: Both the proposition for additional Provincial Consultations and Team Leaders meetings are warranted. ACIAR needs additional funds for both. AusAID should favourably consider the request if budget is available.
4. Dairy Sub-component: Requested $300,000: Based on the findings during the MTR and discussions with the Team Leader these costs seem legitimate. The team is doing a very solid job and AusAID should favourably consider the request if budget is available.
5. Social Sciences Sub-component.
    a. Rural Youth Survey: Request for $80,000: There is no doubt that Youth are an important element of rural development growth in Pakistan. The concern however with the Social project is that it is currently dissipated and uncoordinated. The review does not support adding yet another survey. If progress in addressing the issues raised in the MTR is solid then AusAID may consider broadening the scope of the Social Research in a future phase of ASLP.
    b. Communications Strategy: Request for $60,000: The whole of Component 2 is about 'enhancing collaboration across project teams' and includes activities such as:
        i. Background research on nature of interactions within and between 4 Teams
        ii. Plan and conduct Collaborative Planning Workshop (each year)
        iii. Follow up research on enhancing collaboration within and across teams
        iv. Assist CBPs in implementing action plan re collaboration

    It is thus unclear why this is substantially different from the 'communication strategy' proposed – for example the justification refers to 'facilitating and encouraging social change within the project

teams'. AusAID should not consider funding this activity without a much clearer description of what is proposed and what the tangible outcomes will be.

c. Additional Workshop Expenses: Request $40,000: These workshops are a core part of Objective 2 of the project. They need to occur and it is unfortunate that UC has been unable to contain costs. AusAID will need to support this further. However the additional costs need more justification. There may also be benefit in holding the next workshop in Pakistan to coordinate with the Team Leaders meeting already discussed under Item 3 above.

6. Citrus Sub-component: Request for $150,000: The aims of the project are quite aspirational especially given the limited budget. However, it is agreed that this is a key issue that needs further study. It is suggested that this work be deferred for consideration as part of a possible third phase of ASLP. However in preparation for this, the preliminary study: *Document the Pakistan supply chain, identify deficiencies and provide suitable remedies* should be given consideration. Depending on available budget, AusAID may wish to ask ACIAR to cost this activity separately. Its outcomes could then be used for Phase 3 planning.
7. ACIAR Management Fees: Request for $96,317: The need for increased costs of management for ASLP II was given specific consideration at the time of design and additional overhead costs were incorporated. The implications of the newly agreed standard 10% 'management fee' between AusAID and ACIAR should thus take into account any costs already embedded within existing agreements – particularly when overheads have been separately costed and current management costs of ASLP II are already in the order of 11%. As such, the retrospective application of the newly agreed management fee needs further discussion.

Future work beyond ASLP II

The review appreciates that planning for a future phase of ASLP must commence soon if continuity is to be maintained and agreements put in place. The review considers that the ASLP model has proven both viable and valuable. It is a relatively small investment that delivers significant profile. While expectations on the program are large, and even unrealistic at times, the outcomes of ASLP have clear merit. ASLP has built linkages, expanded local research capacity, and tested innovative and relevant technologies and approaches, many of which have been widely adopted by direct beneficiaries and other interested parties. While ASLP admittedly has not capitalised on, and communicated its success as well as it should, the demand from relevant agencies and programs supporting scaling up clearly shows that the outcomes achieved thus far are widely perceived as beneficial. Needs and challenges still remain, of course, but the review considers that AusAID and ACIAR should give positive consideration to continuing their partnership in Pakistan through ASLP.

The scope of any new phase of ASLP requires careful assessment. Already the teams have been proposing new or expanded areas of research, many of which have significant worth (see Table 4). Some details of the expansion proposals from the teams are outlined within each of the specific project review sections. In addition, the Reference Committee has encouraged further consideration of engagement, particularly with the livestock sector.

Table 4: Proposed areas of research for a future phase of ASLP

Sector	Preliminary proposed issues
Mango Production	1. Continue the extension and uptake of Phase 1 and 2 technologies to more of the industry 2. Ongoing research into aspects of orchard management: • Irrigation; • refining nutrition requirements

	• management of Pakistan varieties grown on some of the polyembryonic rootstocks • selecting native "desi" varieties with disease tolerance (MSDS and malformation) and abiotic tolerance (salinity)
Mango Value Chain	1. Whole farm disease management for Sindhri and Chaunsa export by sea; 2. Help to reliably meet importing countries' dis-infestation protocols; 3. Ongoing all-round improvements in high value export markets (China and Europe, including Eastern Europe); 4. Domestic market development; 5. Value added products; 6. Value chain outcomes such as: traceability, food safety, assured quality and equitable sharing of value; 7. Codes of Practice; 8. Best practice VCs for small to medium growers; 9. Capacity building.
Citrus	1. Postharvest Value Chain for Citrus: a. production of fruit with less blemish; b. quality payment incentives; c. improved post-harvest handling practices; d. transparent export marketing programs.
Dairy	1. Embedding the dairy approach within target institutions. 2. On farm strategies designed to yield much higher quantities of high quality forage per unit volume of irrigation water.

However, the evolutionary growth of ASLP as evidenced in these proposals, should not be the only basis for moving forward. ASLP is a partnership between AusAID and ACIAR, and thus must integrate the aspirations of both agencies. While this has been a source of tension, it has also contributed to ASLP's success. The partnership is epitomised by some of ASLP's embedded principles including:

1. Research is focused on key factors that limit productivity within pro-poor value chains;
2. Research is focused on those 'linkages' where Australia has comparative advantage, and where Australian industry-based teams are already established;
3. Research targets those who can innovatively partner in technology development;
4. A multi-disciplinary, integrated team approach to research overcomes cross institutional barriers;
5. Capacity and skills are embedded with key delivery partners to facilitate the scaling up of relevant outcomes; and
6. Adoption constraints are clearly understood, so that ASLP outcomes are as appropriate and as applicable as possible.

Inevitably, these principles need to be clarified, agreed and used in a way that can structure a vibrant future for ASLP. Design mechanisms need to be established by the partnership - ACIAR, AusAID and Pakistan – in order to scope options, review priorities, test them against ASLP principles, ensure focus and avoid dissipation. A final need is to consider the integration of ASLP activities with those of the newly inaugurated Market Development Facility.

Recommendation 14. The review recommends that AusAID and ACIAR commence the design of a new phase of ASLP. This should be based on evolution of current engagements, plus an assessment of all the proposed initiatives against the core principles of ASLP.

Section 2: Reviews of the separate ASLP Activities

1.0 Social Program

Partners: University of Canberra (Project Leader)

National: Social Science Division NARC

Punjab: *Faculty of Agricultural Economics, University of Agriculture Faisalabad*

Collaborating Institutions/Private Sector: Sindh Agriculture University, Tandojam

Highlights

Project Aim: To enhance the inclusion of and benefit flows of development programs to poor and marginalized groups by working with the four commodity-based projects of the Pakistan Agriculture Sector Linkages Program (Phase 2).

Outputs to date are highlighted below, for the main objectives.

Objective1. To engage the poor and marginalized groups that can potentially benefit from participating in the selected value chains of ASLP II.

- Report finalised on background research with marginalised groups in citrus, mango and dairy areas.
- Baseline survey undertaken and report on baseline survey compiled. Workshops and discussions with Pakistani colleagues.
- The baseline survey was followed up with case studies, focus groups and interviews in conjunction with PC partners.
- Findings were reported to other ASLP teams during the Collaborative Planning Workshop (CPW) (see below). The presentations outlined baseline survey findings for marginalised groups.
- The CPW was the vehicle for the Social Research Team to initiate plans in collaboration with the four commodity teams for working with marginalized groups.

Objective 2: To enhance collaboration across project teams.

- Preliminary visits were made by Australian members of the Social Research Team to Australian members of the four commodity projects in Dareton, Wagga, Gatton and Mareeba. In Pakistan visits were made to Pakistan sites and a Social Project Planning Meeting was conducted at University of Agriculture Faisalabad (UAF). Reports were prepared.
- The facilitated a CPW (see above) in Canberra on 26 and 27 April 2012. The workshop was entitled *Linkages for Livelihoods (L4L)* and included representatives of commodity and policy teams from Pakistan and Australia. Teams discussed specific ways in which collaboration could be enhanced across and between all ASLP II project teams. The participants developed a series of strategic directions for ASLP II focusing on opportunities for collaboration. These directions were turned into specific action plans by the SRP team in collaboration with the 4 Commodity Based Projects (CBP) teams.

Objective 3: To assess and enhance information and communication modalities and technologies for collaboration and value-chain enhancement.

- An ICT component was developed for the baseline survey.
- A brief report (Connect Pakistan) published on CO-LAB website presents some of background research.
- A basic needs analysis for the proposed SRP (Social Research Project) website was completed for the Australian-based members of the CBP teams during field visits to Dareton, Wagga, and Gatton.
- ICT training workshop for ASLP II teams held in Canberra, in association with ASLP II Program workshop.
- A range of ICT for communication and collaboration techniques were identified at a Collaborative Planning Workshop that will be further discussed with CBP teams.
- A summary of the results of baseline survey re ICT in Pakistan were presented at the CPW and the upgraded SRP interactive website (entitled CO-LAB) launched at the CPW
- Strategic directions for future work re ICT were discussed at the CPW.
- These strategic directions proposed by workshop participants were turned into collaborative action plans with implementation late in 2012.
- A well-tested collaborative knowledge management system is contained in the CO-LAB website that was launched at the CPW in April 2012. This involves selection of a Google Apps domain (ASLP II.org) providing email and identity system and a Wordpress content management system as the knowledge management system.
- A presentation on ICT to enhance value chains was given at the ASLP II workshop in Canberra.
- Follow-up work involved a field trip to Pakistan to gain an understanding of the needs and capacities for target beneficiary groups re ICT.
- A presentation at the CPW in Canberra on ICT to enhance value chains was given, based, in part, on the information gathered in the baseline survey.
- The April CPW in Canberra developed strategic ideas for improved use of ICT to enhance the value chains being researched in ASLP II. These strategic ideas will be turned into an action plan over the next few months (in collaboration with the four CBP teams). Following this, later in 2012, implementation of training workshops will developed.

Objective 4: To foster effective collaborative development in rural Pakistan

This objective deals with the question of how to improve the productivity and efficiency of the selected value chains while ensuring an equitable and particularly pro-poor flow of benefits.

- An initial field trip to Pakistan was made to gain an understanding of the nature of the RD&E activities thus far of the four CBPs. These findings formed the basis for a number of questions in the ensuing baseline survey.
- Discussion with Australian members of the 4 CBP's helped provide an improved understanding of the nature of the RD&E activities.
- Follow- up trip to Pakistan firmed up the details for the baseline survey.
- The baseline survey contained a number of questions concerning the ways in which smallholder farmers in the ASLP II districts link to the markets. These are presented in various reports and were discussed at CPW Canberra.
- A third visit to Pakistan was made to discuss results of baseline survey and prepare for April workshop in Canberra.
- A presentation was made at the CPW, Canberra on findings in baseline survey re improving livelihoods (income generation). These findings are also summarized in reports on the baseline survey uploaded to the CO-LAB website.

- The results on linking farmers to markets are summarized in the various written reports on the Baseline Survey that have been uploaded to the CO-LAB website.
- Other work undertaken includes:
    - A presentation on the ORCD (Organic Research and Collaborative Development) methodology at the Inception Workshop in Brisbane.
    - Further training workshops were conducted as part of the process of developing the SRP action plan which will take place in collaboration with the 4 CBP teams.

Impacts

Scientific Impacts

To date one Scientific paper and a series of trip, workshops and meetings reports.

However, the Baseline Survey and its numerous aspects when published should have an important contribution to make to the understanding of poor and marginalised groups in Pakistan. In particular these will focus on improving incomes and livelihoods though better links to food value chains and new opportunities.

Capacity Impacts

The Pakistan members of the Social Research Team have acknowledged that through the conduct of the baseline personal interview survey they have learned much about how to conduct such a complex survey, including design of the survey instrument, pilot testing, enumerator training, determining the sample, carrying out the interviews, coding the data and analysing the results. In addition, they were provided with training in the conduct of focus groups and key informant interviews.

The members of the CBPs received training in use of the Co-LAB interactive website, aimed at improving capacity to use the website. General comment from both the teams is that the CO_LAB website is not used very much at all. The Social Research team acknowledges that the usefulness and utility of the website has been well below expectations.

Further training occurred through the Participatory Action Research (PAR) workshop provided for Pakistan agricultural students in the dairy sector. The students used their learning to facilitate their own workshop.

Completed JAFs 2010-13: 1.

Pending JAFs: 1

Two people from Social project received APAS (AusAID short course awards) - course on Pro-poor market development delivered for AusAID by Mango value chain team in Nov-Dec 2012.

As noted in highlights above there have been a number of workshops, but no numbers were available to us on trainees.

Community Impacts

It is too early to consider community impacts. However, preliminary work involving the baseline survey, follow up focus groups and the Collaborative Planning Workshop has laid the foundation for community impacts in the future.

Economic Impacts

Whilst conducting the various data collection methodologies the social team identified ways in which women and youth could be involved in generating additional household income but to date there has been no economic impact from the social team's involvement in the project.

Social Impacts

No assessment thus far.

Environmental Impacts

None so far.

Project Execution:

The Social Research team has possibly the most difficult challenge of all teams. All stakeholders (including the team themselves) have varying and divergent expectations of what the team will do, where it should work, and the outcomes expected. Balancing the team's own research objectives with these disparate expectations adds a further layer of difficulty. The Social Research team is clearly still finding its feet.

General Comments:

In this regard it is useful for the Review to endorse the challenges as well as some of the constraints confronting this new area of social research.

1. Adoption constraints and pro-poor engagement is a huge area of research – clearly the scope is bigger than the whole of ASLP combined. The Social Research team must help ASLP partners appreciate the immensity of the task and avoid taking on too much.
2. Village level adoption constraints: the decision to choose cluster villages is supported. Clustering research activities within villages ensures that outcomes, lessons and experiences are shared – hopefully leading to more relevant and integrated outcomes. Nevertheless, expectations for action amongst the communities and the teams are growing. However, the processes by which integrated outcomes will be defined and interventions decided are not yet clear, and thus need clarification. There seems to be some expectation that the Social research team will itself deliver interventions to the community themselves? Whereas a primary intent must also surely be that the commodity teams would themselves adapt their engagement more appropriately.
3. Value chain adoption constraints: Many other opportunities are also available to address pro-poor adoption constraints throughout the value chain[20]. The Social Research team needs to also consider constraints higher in the value chains. For example, the 'contractual' relationships associated with milk marketing, as well as the forward selling of orchard produce, are clear disadvantages for poor farmers, and would benefit from social research in order to develop effective ways for moving forward. The social research team needs to define how they will select particular issues for attention. The logic that will be used to choose final interventions is currently not entirely clear.
4. A collaborative approach is essential – the identification and resolution of adoption constraints cannot just sit with the Social Research team. There will need to be good integration with the current teams and a respectful appreciation of the mutual skills and knowledge already attained. While this seems to be occurring with mango and citrus, some tension exists between the Dairy and Social teams. Rather than being resolved this has instead resulted in a certain degree of parallel implementation. This is clearly not helpful.

[20] For example: The 'contractual' relationships associated with milk marketing, as well as the forward selling of orchard produce, are clear disadvantages for poor farmers, and need social research in order to develop effective ways for moving forward.

Other general observations include:

- The Annual Report by the Team is convoluted and clear concise highlights are not documented against the Objectives and Activities in an easily read summary format. Instead they have to be dug out of the Activities/Outputs/Milestones tables.
- There is a clear need to improve communication with communities so they are clear when and what to expect as a result of surveys undertaken.
  There is a perception that the social teams are not as on-the-ground as other commodity teams. Given the nature of their engagement there would be an expectation that more contact time was needed to build understanding and help define integrated outputs relevant to farmers and poor families.
- At this point the Social research team needs to define and prioritise researchable areas based on what can be achieved in the remaining time for the project.

Objective 3 of the Social research project needs to consider ways in which it can better integrate with the other components of ASLP. Currently it is seen as an 'outlier' activity. That said, the Freedom phone initiative is working and proving popular. The concerning issue is where and how to sustain the ICT support after the projects end.

Recommendations:

1. Clarify the processes by which integrated outcomes will be defined and interventions decided.
2. Not only consider constraints at village level but also those higher in the value chains.
3. Define how they will focus their efforts. The logic that will be used to choose final interventions is currently not entirely clear.
4. Working relationships between the Dairy and Social teams need to be improved.
5. Consider the on-the-ground presence required and mechanisms to improve communication with communities so they are clear when and what to expect as a result of surveys undertaken.
6. Define and prioritise researchable areas based on what can be achieved in the remaining time for the project.
7. Annual reporting must be clear concise, and linked to activities/outcomes for each objective. Reports should clearly list numbers of persons trained and publications for the year.
8. It is recommended that the project work with ACIAR and AusAID to identify 3 Impact /potential impact indicators for meeting the Australian CAPF requirements. (as per the new reporting template proposed for ACIAR in Annex 3).

2.0 Mango Productivity Project Hort/2010/006 AUD 1.302m

Partners: Queensland DAFF (Project Leader)

National: NARC

Punjab: NARC and Fatima Jinnah Women University Rawalpindi, Mango Research Station Shujabad, Bahauddin Zakariya University Multan, In Service Agricultural Training Institute Rahim Yar khan

Sindh: Sindh Agriculture University Tandojam, Agriculture Research Institute Tandojam, Sindh Horticulture Research Institute Mirpurkhas, Agriculture Training Institute Sakrand

Collaborating Institutions/Private Sector: UNIDO, United Stated of America Aid (USAID), MAK Nursery, Nestle, Hexon Company

Highlights

The highlights of the project to date are given below.

Objective 1: Facilitate the spread of clean nurseries and good tree husbandry

- Improve Standardization and evaluation of potting mix completed
- Improve nursery infrastructure completed.
- Training in Australia -8 mango and citrus nurserymen trained
- Small nursery growers identified & trained- 5 local nursery seminars 350 Nurserymen, growers and students attended-31 nurseries in Punjab-25 nurseries in Sindh

Future Activities

- Further improvements to research nurseries
- Demonstration nurseries
- Private nursery / public research MOU
- Nursery coordinator
- Economic analysis of nursery technologies
- Nursery management manual
- Extension material
- Training

Objective 2: Improved Orchard Management Practices

Orchard management protocol includes:

- Phenological approach to orchard management in Sindh and Punjab established
- Overcoming issues relating to pruning, modifying irrigation via use of furrows instead of flooding to address Mango Sudden Death -Completed
- Addressing intercropping problems and preventing cultivation under tree canopies to reduce root damage and Mango Sudden Death – Completed.

Integrated Research Sites Established

- Established 21 farms in 4 clusters in Punjab & 12 farms in 3 clusters in Sindh for research and demonstrations.

Orchard Research Activities -Research undertaken at sites includes:

- Paclobutrazol and nitrogen rates for crop control –Refinements taking place
- Assessing Irrigation requirements for mango-ongoing
- Establishment of Polyembryonic rootstocks for mango-ongoing
- Evaluating salinity tolerance of rootstocks and varieties-ongoing
- Monitoring orchard nutrition for optimal fertilizer application and minimizing leachates that contribute to salinity –ongoing

Future Activities:

Integrated research to include

- Monitoring orchard nutrition
- Evaluating postharvest fruit quality from traditional and new management
- Assessing technology adoption rates outside clusters
- Economic analysis of orchard management practices
- Develop mango curriculum for FFS in the demo cluster areas
- Develop a training course and extension materials for farmers on sampling leaf and soil for nutrition analysis
- Encourage the scientific publication of research work
- Develop research proposals targeted at federal R&D grants

Objective 3: Integrated management of field pests and diseases

Designed to address mango sudden death, mango malformation and Gall midge.

Mango Sudden Death (MSD)

- Management through new chemical control measures-done
- Macro infusion injection of chemicals to help moderately infected trees to recover
- Management protocol developed, relating to flooding, protecting the butt of trees from water pooling, butt painting with Bordeaux mixture, flood irrigation, clean protected house nurseries not under the trees, use of clean planting materials, stopping cultivation under the canopies of trees.
- Application in Integrated Research Sites done
- Characterization of Ceratocystis spp the causal organism of MDS -ongoing

Mango Malformation (MMD) Disease Management

- Up to 50% of mangos trees have MMD symptoms in Sindh.
- MMD is high in trees from nursery raised under the canopy of large mango trees.
- Ongoing study of cultural and chemical (NNA) management of MMD.
- Moving nurseries from under trees to proper nursery shade houses and propagation with clean planting materials will greatly reduce the problems

Mango gall midge

- 4 species, 2 Identified, 2 unknown and parasitoid species identified
- 90% farmers were unaware of problem
- Only 11% farmers spray for control of mango midges.

- Resistance/tolerance of mango against leaf gall midges is observed and being investigated

Future Activities:

- Study on varietal tolerance to *Ceratocystis* sp the causal agent of MSD
- Study on the spore dispersal of MMD causing fungi.
- Assessment of gall midge yield losses and management to continue.
- Develop nursery hygiene protocols for mango malformation
- Assist Research officers to develop grant proposals to source research funds from federal system

Objective 4: Postharvest Disease Studies and Management

Market and Farm Surveys

- 100 % incidence of anthracnose and stem end rot in Punjab markets
- Postharvest pathogen survey of traditional and demonstration plots
- Draft protocol developed for collecting and transporting fruit samples to lab for postharvest studies

Pathogenicity of Postharvest Pathogens

- An M.Phill student has completed pathological and molecular characterization of postharvest fungal pathogens of mango
- Fungal isolates from Punjab showed more aggressive behaviour than the isolates from Sindh
- Sindhri variety was more resistant to disease than the White Chounsa

Objective 5: Extension and Capacity Building

Students

- 6 PhD students
- 12 M.Sc Students
- 9 M.Phill Students
- 10 B.Sc(Hons) Students

Seminars and Workshops

Trainings/ Seminars	**No.**	**No. of Beneficiaries in MANGO**						**Total**
		2011		2012		2013		
		Punjab	Sindh	Punjab	Sindh	Punjab	Sindh	
Management Nursery	3					220	150	370
Good Orchard Management	4	250	200	314	220	74	60	1118
Plant canopy/ Pruning / sanitation	2	48	25	71	137	27	24	332
Bordeaux Paste Preparation	5	25	56	40	47	56	48	272
Injection method for MSDS	7	25	40	15	32	21	13	146

Disease and Pest Identification	4	135	150	55	105	25	250	720
Basic plant pathology Techniques	4	29	14	17	15	37	26	138
Total	**29**	**512**	**485**	**512**	**556**	**460**	**571**	**3096**

- Training activities have been undertaken in Punjab by the In Service Agriculture Training Institute (IATI), Rahim Yar Khan, the Agriculture Research Institute, Tandojam and Agriculture Training Institute (ATI), Sakrand.
- In 2011-2012, more than 200 growers, 50 field assistants and 150 agriculture extension officers benefitted from the training activities that have focused mainly on canopy management, budding and grafting and identification of field diseases of mango.

Extension Materials

- Orchard Management protocol, English version distributed to 200 growers
  Urdu version distributed to over 500 growers
- Joint mango and citrus nursery manual -Draft completed currently being edited
- 6 Research papers
- 2 Brochures
- 2 Pamphlets
- 2 fact sheets for small farmers of each technology in draft form

Future Extension Materials

- New fact sheets aimed at small farmers in local languages and tick and cross photo style to provide technical information to extension activities initiated and coordinated by the social component of ASLP.
- Investigate use of Web to deliver training and extension information

Australian Activities

Postharvest

- International Workshop on Diagnosis & Control of Mango Postharvest Diseases – May 2-4, 2011, Berrimah Research Station, Darwin, Australia
- Support of JAF PhD candidate Arslan Qureshi.
- Evaluate postharvest disease control products (Natural Green® and EcoCarb)

Nutrition and physiology

- Nitrogen application and timing to improve postharvest flushing in mango
- Fulvic acid and nutrition efficiency in mango
- Support of JAF PhD candidate Habat Ullah Asad in Pollination and fruit set physiology research

Entomology

- Research in to the genetic tolerance of mango varieties to mango seed weevil and scale

- Organising gall fly workshop

Disease Resistance

- Screening of mango varieties for tolerance to Anthracnose

Summary

In Summary the project is addressing the following activities and excellent progress has been made. Key points given below.

Research:

- Pruning
- Tree nutrition
- Tree water requirements
- Growth regulators
- Mango sudden death
- Mango malformation
- Mango midge
- New polyembryonic varieties
- Nursery potting media
- Nursery nutrition
- Nursery irrigation
- Postharvest market studies
- Postharvest field studies
- Pathogen molecular studies
- Salinity tolerance

Extension

Orchard management

- Tree pruning
- Tree nutrition
- Growth regulators
- Pest and disease management
- Orchard cultural practices

Nursery management

- Potting media
- Nutrition
- Irrigation
- Nursery hygiene
- Structural design

Sustainability is being built in to the project through:

- Nursery men Communities development
- Involvement of Service Providers
- Trust of buyers established

- More returns to seller
- Government policy is slowly changing
- Certification Authorities capabilities are being enhanced
- Quarantine issues have been targeted and highlighted to protect the industry and provide export markets with assurances, and
- The integrated research sites are linked with Social, supply chain and UNIDO Projects
- The integrated research sites are linked with universities for student research
- The integrated research sites are linked with Research Institutions
- The integrated research sites are linked with private companies

Impacts

The Mango productivity project has already begun to monitor adoption of practices with groups of farmers already trained. Below are examples of impact the project is having. Outcomes of the Good Agricultural Practices Adoption Survey are given as examples.

S. #	Intervention	Adoption% at <10 acres (40 orchards)	Adoption% at >10 acres (10 orchards)
1	Canopy Management	20%	50%
2	Pruning for deadwood removal	100%	100%
3	Ring formation	75%	60%
4	Cutting branches with sharp tools	95%	100%
5	Bordeaux pasting on stem	70%	70%
6	Wound treatment	65%	40%
7	Scheduled 4 sprays	70%	50%
8	Paclobutrazole application	2%	30%
9	Weed control	40%	40%
10	Soil and water analysis	20%	50%
11	Leaf analysis	0%	0.5%
12	Floor Management	1%	50%

S. #	Experience	Growers (%)<10 acres (40 orchards)	Adoption Interest (Low/Med/High)
1	<5 years	24%	Medium
2	5-10 years	14%	High
3	11-15 Years	19%	High
4	16-20 Years	19%	Medium
5	>20 years	24%	Medium

S. #	Experience	Growers (%) >10 acres (10 orchards)	Adoption Interest (Low/Med/High)
1	<5 years	10%	Medium
2	5-10 years	20%	Medium
3	11-15 Years	20%	High
4	16-20 Years	40%	High
5	>20 years	10%	High

S. #	Qualification	Growers (%)<10acres (40 orchards)	Adoption Interest (Low/Med/High)

S. #	Qualification	Growers (%)<10acres (40 orchards)	Adoption Interest (Low/Med/High)
1	Primary	8%	Medium
2	Middle	20%	Medium
3	Secondary School	40%	Medium
4	Higher Secondary School	0%	High
5	Graduation	2%	High
6	Post Graduation	5%	High
7	Illiterate	25%	Medium
S. #	Qualification	Growers (%)<10acres (40 orchards)	Adoption Interest (Low/Med/High)
1	Primary	8%	Medium
2	Middle	20%	High
3	Secondary School	40%	High
4	Higher Secondary School	0%	High
5	Graduation	2%	High
6	Post Graduation	5%	High
7	Illiterate	25%	Medium

S. #	Information Source/ Practices Knowledge	ASLP	Extension	Other Projects	Other growers
1	Canopy Management	70%	5%	20%	5%
2	Pruning for deadwood removal	50%	10%	5%	35%
3	Ring formation	80%	2%	10%	8%
4	Cutting branches with sharp tools	95%	0%	3%	2%
5	Bordeaux pasting on stem	50%	20%	10%	20%
6	Wound treatment	75%	5%	5%	15%
7	Scheduled 4 sprays	60%	20%	10%	10%
8	Paclobutrazole application	80%	0%	0%	20%
9	Weed control	40%	10%	10%	40%
10	Soil and water analysis	40%	20%	20%	20%
11	Leaf analysis	100%	0%	0%	0%
12	Floor Management	100%	0%	0%	0%

S. #	Intervention	Av. Per Acre Cost<10 acres (US$)	Av. Per Acre Cost>10 acres (US$)
1	Canopy Management	6	9
2	Pruning for deadwood removal	6	6
3	Ring formation	3	3
4	Cutting branches with sharp tools	3	6
5	Bordeaux pasting on stem	6	6
6	Wound treatment	4	9
7	Scheduled sprays	80	160
8	Paclobutrazole application	20	20
9	Weed control	2	4
10	Soil and water analysis	2	4
11	Leaf analysis	0	0
12	Floor Management	0	0
	TOTAL	132	227

Scientific Impacts

The project has already produced 6 research papers and has engaged 6 PhD students, 12 M.Sc Students, 9 M.Phill Students and 10 B.Sc(Hons) Students in the research and extension components of the Mango project.

6 National workshop and conference papers produced to date. For phases 1 and 2 Scientific papers number 12 to date.

The project has made clear breakthroughs both in Phase 1 and Phase 2 in resolving the causes of Mango Sudden Death and confirming the causes of Mango Malformation and developing integrated management measures for the control of both, as well as identification and integrated control of post-harvest diseases and pests. Refinement of this work continues and the results of work to date and scientific impacts are outstanding and address key issues impacting mango productivity and quality in Pakistan and Australia with lots more to come. MSD and MMF are major bio-security threats for the Australian Mango industry and their management is important for both Pakistan and Australia.

Capacity Impacts

Capacity of researchers and extension personnel has been built via formal training of 6 PhD students, 12 M.Sc Students, 9 M.Phill Students and 10 B.Sc. (Hons) Students, as well as training and seminars that have reached nearly 3,100 participants to date. Good use is also being made of the Agriculture Capability component to assist key training initiatives like nursery management and JAF students. Capacity impacts to date are impressive and on-going particularly at farmer level via the Farmer Field School approach. The model of training of extension officers and their use in training of farmers via FFS is well established.

Community Impacts

Economic Impacts

Economic analysis of nursery technologies and economic analysis or orchard management practices are still to be done along with the economic impact of pre and post-harvest disease control as developed by the project. The potential impacts of control of MSD and MMF and Gall midge are large along with the benefits of pruning in reducing biennial bearing and allowing better disease and pest control. Irrigation and nutrition controls along with better crop control, from Paclobutrazol and management according to the trees phonological cycle of development will lead to very significant gains in both productivity and fruit quality. Potential impacts are very high. Adoption rates and extent of adoption will be key to capturing these benefits, especially for medium to small farmers. Here the Social Research project should exert leverage by working closely with the project to improve adoption and capture the very significant potential impacts. Some estimates of impacts in economic terms are clearly given in the Project Document and 30% yield increases and reduction of post-harvest losses of 20-40% or more are very significant potential impacts. Introduction of further technologies at this level will have an enhanced impact as adoption rates and extent continue to grow.

The project is in Australia's potential economic interest with respect to Mango Sudden Death and Mango Malformation, which are serious bio-security threats should they reach Australia. Both if established in Australia would have very serious economic consequences for the mango industry.

Social Impacts

For immediate participants in the Pakistan component of the project, the project strengthens farmer/contractor/researcher partnerships in disease/pest and orchard management and occupational risks associated with pesticide applications.

The project clearly fosters the improvement of communication and trust amongst all stakeholders, leading to greater responsiveness by stakeholders in maintaining quality, delivering on time, and adequately sharing resulting profits.

Increase in mango production, productivity and improved quality, will lead to improved opportunities and livelihoods of smallholders and other marginalised sectors of the industry, particularly women, derived from increased revenue flow and value-adding, For increased productivity in larger, corporate orchards increased employment opportunities for landless rural labourers and women will occur.

These benefits will accrue slowly as adoption of best management practices continues.

Environmental Impacts

Environmental benefits through significantly reduced usage of broad spectrum and toxic pesticides that are currently being used in an unregulated manner to combat the diseases will be a major impact.

Strategic chemical use developed by the project to reduce the development and spread of the MSDS and other diseases and pests common in orchard will reduce pesticide use and positively impact on the environment and the communities.

Reductions in the pre-harvest use of fungicides by adopting an integrated systems approach to MSDS and postharvest disease management will reduce the risk of pollution of soil, water and aerial environments.

Further, more the more precise use fertilisers and of water by mango trees and methods of furrow irrigation developed by the project, will reduce water wastage and nutrient leaching and the help prevent elevation of already salinised water tables in some locations.

Project Execution

The project activities accomplished to date are outstanding and reflect very good project management both within Pakistan and Australia and the teams along with the Program and project coordinators and focal persons are to be congratulated on their diligence and work outputs and accomplishments to date. Loss of some DAFF staff has been a significant constraint for the project.

The project has been very effective already, implemented efficiently, and the monitoring and evaluation undertaken professionally and in line with agreed guidelines. Sustainability is in the process of being built in to the project using the pilot research, information development, training and extension processes undertaken with key Pakistan institutions and private sector and utilising donor collaboration to foster adoption of technologies by farmers, nurserymen, educators and exporters alike. The project outputs have been in line with defined objectives and activities and in some cases have taken on-board new initiatives as and where appropriate to, bolster outcomes.

This project like others have benefited by the coordination and implementation support provided by ACIAR in Australia and in Islamabad. See Diagram in Annex 2. The nature of this support is vital in the day to day implementation and in particular the ACIAR Islamabad Coordinator and assistant. This investment by ACIAR is an essential ingredient of ASLP II's success and comes at a cost to ACIAR.

Integration of Research sites with Social research, supply chain and UNIDO Projects, universities for student research, Research Institutions and with private companies and extension, information and training is an excellent initiative that has laid the basis for the achievements realised.

Changes in research staff and the government agencies involved in the project and in AusAID have been disruptive along with the security constraints, but in spite of these problems very good progress has been made.

AusAID's change of focus from Economic development to pro-poor has compromised research and extension activities and alienated somewhat larger farmer co-operators.

Time demands placed on researchers is greater with changes in emphasis and administration. Not enough time to link Dairy and mango as the team would like. Tree crop management changes are not only slow to adopt but slow to show full impacts as opposed to post harvest research or dairy extension.

Unfortunately the floods have disrupted Sindh activities in particular and CAPF requirements were seen as an add on impost after signing off on a different strategy at the outset. Both issues are addressed elsewhere in the project and should be less of a constraint in future. There is no need to do research only on small farms. This is not the intent of a pro-poor focus. The challenge is to develop and test a research, information, extension, adoption model that can be shown to work and sustain with future Pakistan support.

The project team was full of praise for ACIAR's management and support coordinators both in Australia and Pakistan.

Social program feedback to other projects has been very limited although linkages have been established with plans for closer collaboration. Assumptions about ICT process and location were seen as add-on. Where does ICT find a home that sustains after project completion?

Budgets and flow of funds along with increased costs for transportation in armoured vehicles and inflationary effects on salaries paid to local staff have be major constraints across this and other projects. Flow of funds via ICARDA were discussed with ICARDA. Main issue is ICARDA requires formal reconciliation of funds with original receipts produced before a new advance is made.

It was felt that getting together of project teams should occur more than once per year in Australia but also once per year in Pakistan to assist integration and linkages and to help communications and develop partnerships.

Access to armoured vehicles has provided problems to this and other projects.

Follow-up Activities

Follow-up activities have been flagged under the individual Objectives in the project.

No additional funding has been sought at this time to continue defined project activities.

Phase 3 Proposal

A phase 3 project extension has not been outlined in detail but would involve two separate initiatives. One would to continue the extension and uptake of Phase 1 and 2 technologies to more of the industry. The second initiative would be to continue local research into aspects of orchard management such as irrigation refining nutrition requirements, management of Pakistan varieties grown on some of the polyembryonic rootstocks already introduced. A more comprehensive effort on selecting native "Desi" varieties with disease (MSDS and malformation) tolerance and abiotic tolerance (salinity) would be an essential component with implications way beyond the Pakistan mango industry.

General Comments:

1. The research, information, training and extension linkages with institutions and private sector as well as other donors and the Social research project is a model most likely to ensure sustainability into the future.
2. Good Adoption of technologies introduced as noted above auger well for very significant impact in the future. Some benefits with tree crops may take some years to gain full effect, e.g., new rootstocks.
3. Initial focus has been largely on the international market and working with the Mango Value Chain project and larger producers to develop the production and quality protocols needed to reach distant markets. This association with larger enterprises has clear advantages in opening up major opportunities in the export market and generation of increased foreign exchange. However, there is a huge domestic market that will benefit from better quality fruits and handling procedures to reduce the likely 40% post harvest losses at this time.
4. Poor have never been engaged previously and when the direction shifted to pro-poor interpretation of working with the poor has alienated larger growers and somewhat compromised sustainability. At this time key adoption constraints still need to be addressed especially for small farmers who are not direct marketing, but selling the crop on the tree at early fruit set. There is a major role for the Social Research team collaborating with the mango team in this area. Key adoption constraints are:
    a. Input costs versus benefits derived and the distribution of benefits along the value-chain.
    b. Examination of the integration of mango with other cropping systems and livelihood practices is essential to understand to benefits that can accrue to small holders. Time management of farm labour is very important and often returns to labour are more important than returns to capital for integrated farming of smallholders. .
    c. There is a clear need to deal with quality incentives for smallholders to define benefits to be balanced against costs of producing high quality fruit.
5. Loss of the close collaboration of the Fruit and Vegetable Project on running of FFS's has been a significant loss to be made up using alternative initiatives within the Punjab the In Service Agriculture Training Institute (IATI), Rahim Yar Khan, and the Agriculture Research Institute, Tandojam and Agriculture Training Institute (ATI), Sakrand in Sindh. Strengthening these links will be essential to ensuring sustainability support for adoption and securing optimal impacts.
6. Integration with other donor programs for mango exports, such as UNIDO and USAID/FIRMS to a less extent is occurring with larger producers and exporters and fostered by PHDEC support. The challenge is to extend this collaboration for domestic marketing, especially for smallholder farmers. Perhaps the up-coming Market Development Facility of AusAID may well find a role in this area.
7. Adoption of pruning, irrigation and disease control practices for MSD, and post-harvest diseases were observed in the field in one small farm cluster visited near Multan. Unfortunately, time precluded visits to larger farms and nurseries adopting project practices, and to the Mango Research Institute and training/extension organisations in Punjab and the Horticulture Research Institute and the training/extension institutes in Sindh province. Thus our views have to be guided by the discussions, reports and presentations given.

Recommendations:

1. The Project Extension activities proposed are aimed at further adoption as well as new initiatives that will be of lasting benefit to the mango industry worldwide and the extension is recommended.
2. It is recommended that the Social research team in collaboration with the mango team assess adoption of new technologies and define interventions to enhance adoption and capture the impacts. The ADOPT software of ACIAR./CSIRO developed for smallholders will be an important tool to assist this process.
3. It is recommended that the mango team clearly assessing economic impacts of technology introductions to quantify the interventions and flag potential economic benefits.

4. It is further recommended that the mango team undertake simple Benefit/Cost assessments on smallholder technology interventions and to clearly identify where they occur and the extent of benefits along the value-chain from farm to consumer.
5. It is recommended that the project work with ACIAR and AusAID to identify 3 Impact /potential impact indicators for meeting the Australian CAPF requirements. (as per the new reporting template proposed for ACIAR in Annex 3).
6. It is further recommended that Policy Gaps for horticulture in Pakistan be more clearly defined with the mango team working closely with the Policy team to support defined initiatives and strategies.
7. It is recommended that the project continue to support the development of SPS and Food Safety protocols and facilities including biological security as well as residue issues for mango and mango products.
8. It is recommended that testing and establishing the Information/Training/FFS Extension model in Provincial institutes and at farm level continue to help embed the pilot processes in the National and Provincial institutes and universities.
9. It is recommended that the project team along with the Social research team work on improving the Domestic Marketing smallholder value chain of mango in collaboration with the Mango Value Chain team. Larger farm linkages already demonstrated for engaging the Domestic market.

3.0 Mango Value Chain Project Hort/2010/001 AUD 1.953m

Partners and Collaborators

Australia: University of Queensland (Lead Agency), Queensland Department of Agriculture Fisheries and Forestry and the West Australian Department of Agriculture and Food

Pakistan: University of Agriculture Faisalabad, Sindh Agricultural University and the Pakistan Horticulture Development and Export Company.

Collaborators: Universities, Government agencies, institutions and commercial stakeholders at provincial level involved in both the direct activities of export and market development, information development training and extension of project findings. Along the way UNIDO and FIRMS and Bayer Crop Science have been co-operators used to advantage especially in exports.

Note: Many of these activities are an extension of Phase 1 activities. In some cases further time is required to achieve the desired results, such as in Objective 3 where demonstration chain building has not yet reached the point where open collaboration and transfer of information up and down the chain has become the norm. In other cases the implementation methodology is well understood, but it needs to be applied to a new area such as in Objective 1 postharvest disease management, or Objective 2 domestic market development. There are other cases where new methodologies have to be developed and applied because this aspect of the work was not undertaken in Phase 1, for example in developing the methodology for engagement with smallholders and women, or in establishing food safety parameters, systems and certification for mangos.

Highlights

The Mango Value Chain project is proceeding well and making important inroads into the use of value chain systems at both pre and postharvest levels to effectively, efficiently and profitably market high quality mango into both domestic and export markets that can be sustained.

Objective 1: In collaboration with the pre-harvest component research team, to improve and maintain the quality and safety of Pakistan mangos at all stages from harvest to the consumer in both domestic and export markets

Focus has been on activities to improve sea freight performance; reduce fruit quality and food safety hazards, especially those associated with fruit ripening, and improve market access; reduce the impacts of postharvest disease; improve performance and use of postharvest infrastructure; reduce losses in markets; support training and certification activities associated with fruit quality and safety.

Postharvest fruit quality: Orchard rating experiments

- Evaluated impact of cultural practices on fruit quality in selected smallholder orchards, with special emphasis on postharvest disease development-Based on linkages with pre-harvest project -.Orchards differed very significantly on disease incidence.
- In 2013 trials will source fruit from low disease clusters.

Postharvest fruit quality: Disease isolation/identification

- Extensive research at UAF to isolate and identify pathogens associated with postharvest diseases of mango fruit from different orchards
- In-vitro studies on fungicide efficiency against these pathogens have been undertaken

Postharvest fruit quality: Disease management

- Disease management studies: Application of new fungicides (Nativo, Cabriotop and Scholar) to control the postharvest diseases identified.
- Nativo® successfully registered March 2013 – world first as a mango postharvest fungicide. Significantly reduces exporting risks, especially by sea freight.
- Need to pursue Prochloraz registration
- 2013 trials to EU will use Nativo® as it has MRLs in EU already.

Postharvest fruit quality: Ripening

- Ripening studies: Established the effects of gaseous ethylene and ripening conditions on fruit quality and skin colour development of Sindhri (now well understood) and Chaunsa (work remaining to be done – in conjunction with a 2013 trial of Chaunsa sea freight to a UAE market)

Postharvest fruit quality: Sea freight

- Sindh Mango group: Initial packhouse set-up, training and containerisation of one sea freight shipment to the Netherlands produce mango fruit at outturn that was close to 100% perfect (discussed later).
- Further training of SMG staff and assessment of sea freight protocols for accessing European markets in 2013. Includes Australia-based pack-house training

Summary: Postharvest: Main outputs, outcomes and scaling up opportunities

Activity	Outputs	Outcomes	Impacts	Scaling up	Comments
Postharvest research and training	Reports Fact sheets Guidelines Manuals Training Conferences Journal articles Consultancy	Demonstrated skills and knowledge by farmers, exporters, trainers & researchers. Uptake by industry Improved market response Nativo registration	Less waste Increased prices Increased sales volume (all of these at demo scale)	Use of disease rated farms SMG demo Nativo uptake Expand markets Research capacity Trained trainers	Good links with other agencies e.g. UNIDO, Bayer Crop Science, Punjab F&V project. Industry demand for more Chaunsa work (sea freight)

2013: finish orchard disease ratings; Chaunsa ripening and sea freight protocols; slow release ethylene trials; document through-chain losses; contribute to SMG activity; postharvest training

Objective 2: To continue the development of existing domestic markets and selected export markets, using the results to inform quality improvement, value chain development and capacity building activities

Focus of activities: Increase access to improved quality mangos by consumers in domestic and export markets; identify opportunities for value added products in domestic markets; improve the performance of existing, and establish new, value chains; identify collaborative marketing opportunities and communicate them to stakeholders.

Market development: domestic market

Working with Leghari Farm, best practice mango was sent to Karachi to test and evaluate the market using two different direct sales strategies

1. Selling through their own fruit stall, three days a week: Friday, Saturday, and Sunday. Sales reached 600-800kg/day
2. Direct supply of mangos to consumers at home. Sales of 2,000kg per week

- ***Direct Sales*** Cost of pre and post-harvest Rs11-12/kg, Cost of direct supply Rs20/kg, Retail price Rs100/kg, ***Profit Rs69/kg***
- ***Farm gate prices*** Cost of pre and post-harvest Rs11-12/kg, Farm gate price Rs41-42/kg, ***Profit Rs30/kg***
- Unable to maintain continuous supply for retail outlet; demand exceeded supply for direct delivery. ***Reassess in 2013.***
- Detailed domestic market research in Islamabad and Lahore-Aim to evaluate retailer and consumer response to ASLP quality mangos-Involved new team from UAF (1 staff + 2 Masters students)
- Results incomplete: inexperience of researcher and no local support, but evidence of high value market in Lahore. Redesigned on bigger scale for 2013 (growers > Sabri > Metro)

Market development in a potential new market: Malaysia

- 2010 trial shipment to KL involved market research with KL importer, retailers and consumers
- 2011 financial analysis of adopting ASLP best practice; consumer surveys and possible mango by-product markets were examined; compared ASLP best practice with non-ASLP, focusing on cost of waste. Little difference except for longer shelf life of ASLP mangos
- ***Concluded that existing high value market at about 500 tonnes would not accommodate significant increases from Pakistan. No further research needed***

Market development in China

- Market research pre-2011 confirms China market potential
- Trial shipments to China in 2011 & 2012
- Two trials in 2012
- First 2012 consignment: undersized fruit; wrong marketing message "disease free" (project had no control over this)

Issues

- Only large growers can commit to the risk involved: no smallholder opportunity yet
- Lack of control over Karachi hot water treatment facility is a major constraint. Punjab needs such facilities to overcome this constraint
- 24 hour road trip from Punjab to HWT Karachi is a problem and causes fruit damage
- The Chinese importer is very committed to working with us and we will continue to pursue development of this market in 2013
- The project has been working with Pakistan farmers, government agencies and a Chinese importer to obtain Chinese certification of small scale HWT facilities in three pack-houses in Punjab. This would allow on-farm disinfestation and direct export from Punjab to China. All documents and a video clip prepared as requested by DPP and China. Submitted early 2012, but nothing happened. Now again being followed up by DPP, Pak Embassy, importer - 2013??

Market development: EU sea shipment by Sindh Mango Group

- Sindh Mango Group: first independently formed grower group in Pakistan (8 med-large growers)

- Following an invitation and a commitment by project team to support them
- Intensive training (Peter and Rowley Holmes) led to successful sea shipment in 2012 to Netherlands (using extra funding)
- A Pakistani first: mangos had never achieved almost perfect out-turn by sea freight to Europe
- Retail sales were very strong; repeat orders for more in 2013
- SMG confident and enthusiastic, but aware that the whole system must work 100% to get a 100% out turn
- Project has been invited to provide support again in 2013 – funds from ASF to finance Peter Johnson and Rowley Holmes
- Aim to provide best practice demonstration for the industry

Summary of Market Development

Activity	Outputs	Outcomes	Impacts	Scaling up	Comments
Market development	Reports Guidelines Manuals Training Conferences Journal articles	Increased ability to meet markets e.g. SMG High value segments understood Increased knowledge Japanese consumers No further Malaysia research	Improved net returns Increased sales volume Non-traditional markets developed New market growth	Domestic opps for smallholders and women SMG demo for sea freight Chaunsa sea freight opps Research capacity	Success in getting DPP and Chinese quarantine authorities working together on HWT approvals Difficult to get middlemen to try anything new

2013: SMG consignment to Europe; Chaunsa to UAE by sea; air freight to China; domestic marketing with Metro; processed product markets Sindh will be repeated.

Objective 3: To work with a range of selected value chain participants, including smallholders, to create demonstration examples of the benefits of collaborative value chain management approaches

Focus of activities: Continue to involve stakeholders from all parts of the value chain and identify options for enhancing engagement and pro-poor benefits; apply results from fruit quality improvement and market development activities using a value chain management framework; provide training and monitoring for all value chain building activities.

Value chain development: domestic chains

- Domestic value chains research question: "What is the value in ASLP best practices?"
- Leghari Farm direct sales chain and Punjab research in Lahore markets demonstrated potential for value chains focused on high quality (ASLP) fruit in 2012.
- 2013: commercial scale research with (Lutfabad Farm + small growers + Sabri agents + Metro stores) 4000 cartons best practice (UAF)
- Trial marketing with fruit from low disease orchards of smallholder cluster (UAF)
- Establish women's chain(s) for value added products from Sindh (SAU)

Value chain development: export chains

- 2011 and 2012 chains (Punjab growers + Durrani Associates + Midtrans China) established problems to be solved; confirmed China market potential
- 2012 chain (SMG + Maersk + Exotic Fruits Netherlands) proved near perfect sea freight of Sindhri is possible; returns were strong; repeat orders for 2013
- 2013: Punjab growers with HWT (JDW, Khakwani, Tariq + Midtrans China) further research China market issues and opportunities (PHDEC, UAF)
- -SMG shipment to Europe (Australian team, PHDEC, UAF, SAU)
- -Chaunsa sea freight trial to UAE (Punjab growers + exporter + UAE importer)

Summary Value Chain Development:

Activity	Outputs	Outcomes	Impacts	Scaling up	Comments
Value chain development	Contribute to: Reports Guidelines Manuals Training In-market exposure	Increased ability to work together in chains eg. SMG Consumer value identified as a focus for chain building Value of ASLP best practice	Markets pulling chain perform., (China, EU) provide motivation	Domestic operations for smallholders and women SMG demo for sea freight Future demands from super stores	Export chains hampered by quality issues (China) and lack of control over HWT Chaunsa sea freight to UAE could be a game changer

2013: SMG consignment to Europe; Chaunsa to UAE by sea; air freight to China; domestic chain with Metro; processed product chains from Sindh

> Objective 4: To work with universities, government agencies, institutions and commercial stakeholders to 1) improve the knowledge, resources and skills required to understand the value chain management approach to development, and 2) implement improved value chain management practices

Focus of activities: Ensure exemplars and demonstration activities are successful from a capacity building perspective; improve the skills, knowledge and practices of smallholder participants and actively foster opportunities for the poor and marginalised; increase the involvement of women in the mango industry; engage in co-planning and implementation of joint activities involving universities, agencies and commercial participants.

Capacity building: Post-season and pre-season workshops with core participants

- 251 men and 13 women attended the workshops

Research capacity building: Market & postharvest research training at UAF & SAU by Dr Sun & Dr Hoffman; postharvest lab at UAF

- 81 men and 20 women attended.

Capacity building: Sea shipment and postharvest training

430 men and 29 women were trained

Capacity building: Packhouse training

- 60 men and 11 women were trained

Capacity Training by Role October 2012:

Farmers	Private	Trainers	Agency	Student	Total
252	115	93	28	116	604

As at March 2013: Men 822, Women 73, Total 895.

For 2013: Strong focus on smallholder training (clusters; links with large growers, social science team and APAS projects) and women (processing and marketing value added products; link to social science project)

Special initiative 2013-15: By-product development for women in Sindh (Dolat Leghari, Hot Leghari, other villages) conducted by Sindh Agricultural University:

- Mango pickles from Shikapur are famous in Pakistan. In 2013 the valuchain team will conduct research to understand why, what we can learn from them, what are the entrepreneurship opportunities
- Dried green mango slices have potential as a new product for small households and women, based on otherwise waste fruit (concept from the Philippines). Preliminary product trials completed at SAU in 2012 – positive results
- Women's training in mango processing has often been done before – what have been its successes and why/why not? What can we learn so we don't repeat the same mistakes?
- SAU can produce processed mango products but have never tried to market it. Trial marketing will take place in Hyderabad and Karachi in 2013 to establish consumer response, product value and scope of opportunities for women.

N.B. This area of endeavour is flagged in the recommendations below for future development.

Key links with other agencies and programs

- UNIDO Trade Related Technical Assistance Program II: Development of 5-10 dual-badged Fact Sheets on best postharvest practices and their relevance to marketing - access to UNIDO smallholder clusters for domestic marketing initiatives, and large growers for export trials
- FIRMS: although a difficult relationship, FIRMS have disseminated ASLP materials and provided the infrastructure necessary for export pack-house operations, e.g. SMG, Punjab small scale HWT plants.
- Punjab Supply Chain Project: wants to work with ASLP but we are waiting to see if a mango smallholder cluster emerges
- AusAID APAS: 4 week training course in Australia included project officer, and resulted in at least 4 mango related projects (and a dairy project) which the team works with
- University of Queensland – Agribusiness student groups have conducted three market research assignments

Some important points learnt from Phase 2 Mango Value Chain work so far:

Successes	Need to Improve/Achieve

Fruit quality R&D Orchard rating studies Disease studies Sea shipment to EU	Fruit quality R&D Orchard selection for export HWT accreditation Postharvest disease management Chaunsa sea freight Value added products (women)
Market R&D China market Malaysia market	Market R&D Domestic research fresh & processed Europe market research UAE sea shipment results
Value Chain building Sindh Mango Group	Value Chain building Choice of exporter Choice of growers and households
Capacity building Engagement with SAU SMG training Market research training UQ students - KL outturns	Capacity building Engagement with smallholders & women

Impacts:

Scientific Impacts:

This project's approach could be regarded as 'cutting edge' in the field of value chain management because of its developing country setting, human systems orientation, integration with production and postharvest research, participatory approach and strong capacity building emphasis. The approach highlights the constraints and opportunities across the continuum from farmer to consumer and uses research to address these constraints and opportunities to make the value-chain for mango work and deliver a high quality product to consumers and economic rewards to the value-chain partners. It is the outputs of this research that give the scientific impacts, highlighted by the commercial successes documented above. These are documented in the many leaflet guidelines, manuals, protocols, and training notes and the following numbers of publications produced by the Mango Value Chain Team Viz. Conference and Workshop Papers and Presentations: International- 5, National-7; Scientific Publications from ASLP1 and 2 (2011-2012) - 4 ; Theses- 14, Theses in Progress- 1.

Benefits to Australia may well flow from mango irradiation studies, better post-harvest disease control, by-product development.

Capacity Impacts:

The project has set out to work with government agencies, institutions and commercial stake holders with a view to ensuring materials and publications and demonstration activities are successful from a capacity building perspective. Improving the skills, knowledge and practices of smallholder participants and assisting with opportunities for the poor and marginalised have begun and there has been a gradual increase in the involvement of women in the mango industry. Finally, engagement in co-planning and implementation of joint activities involving universities, agencies and commercial participants has been initiated and the Social research team has been engaged along with the mango productivity team which has worked closely with the value-chain team since the outset.

Capacity training by role in practical postharvest, sea shipment and pack-house operations for 822 men and 73 women has been in addition to the scientific training of 14 researchers who have completed their theses and one now undertaking a thesis with UAF.

Capacity building has been successful as demonstrated by outcomes and impacts produced to date and is on-going in the remainder of the project as some scaling up continues particularly with women, smallholders, domestic marketing and processing work.

The project is clearly meeting its defined agenda and expanding upon it in some cases with additional training and capturing Australian hands on export and pack-house experience,.

Community Impacts

Economic Impacts

Some farms involved in export have already demonstrated an average 30% increase in export quality fruit and average 20% increase in prices, which were directly attributable to improvements they made as a result of being involved in HORT/2005/157. These are very considerable economic impacts. Widening this export market alone to potentially big markets such as China and fine tuning protocols and using sea freight, as already demonstrated for Netherlands distant markets will have potentially very large economic impacts as volumes expand further.

As noted in the Project Design, if HORT/2010/001 were to impact 10% of the Pakistan mango industry by reducing postharvest losses by 10% while increasing domestic returns by 5%, export returns by 10%, and export volumes by 10%, it would generate an annual net improvement valued at around AUD2.5m, representing an annual value:cost ratio of 4.5:1 without accounting for any benefits beyond the four year life of the project.

Indications from the Export and Domestic market work to date indicate very positive economic benefits.

More recent results have already shown returns for higher quality mangos on export markets to be far in excess of the industry average of around USD0.32 per kilogram. In Singapore, for example, retail prices for air-flown Pakistan mangos average around USD2.00 per kilogram and USD1.00 in China. These are 3-6 fold increments in price for high quality mangos. Similarly direct sales in the domestic market in Karachi can boost returns from Rs 32/kg to Rs 100 /Kg or USD 1.00/kg.

The challenge is to accelerate the rate of adoption and the time to impact to nearer to 5 years than 10 years across a major part of the industry. This area is where the synergy from the Social research project should come on board to drive adoption and accelerate impact and the extent of impact.

Both technical and economic benefits for Australia will be spin offs for the Australian industry along with the market development knowledge particular for China and Europe.

Social Impacts

Engagement with smallholders and women as demonstrated to date in the project is the basis for social impacts at smallholder level. It is early days to assess the impact on such things as improved returns, enhanced employment opportunities and opportunities to develop new enterprises at this smallholder level.

At the larger farm level, exporter levels and that of the Sindh Mango Group of medium sized farmers impact will accrue much faster provided successes are captured in the export market. For small holders adoption will likely be slower and it is harder to capture benefits from new technologies when the crop is sold at fruit set and not at harvest. This smallholder area and engagement of more women should be a target for the Social research time to foster adoption and create more smallholder impact.

Enhanced capacity in universities as a result of this project flows through to teaching and research programs, will impact positively on the social impacts as wider knowledge flows to the community at large.

For Australia, new technologies and market studies will impact positively on the mango industry as a whole with respect to communities.

Environmental Impacts

- Producing safer food via correct use of chemicals and traceability mechanisms and enhanced SPS standards will positively impact on streams and aquifers and waste disposal sites. Such safe food approaches to mango will also open up more discerning markets such as the EU countries.
- Changes in the handling of mango from wood to plastic returnable crates will reduce timber use and positively impact on forests.
- Reduction from postharvest waste will not only save money and enhance profits but also reduce waste disposal into the city consuming environment.
- At farm level, disposal of waste mangos resulting from rots and poor handling will be reduced.
- Strategic scheduled application of water and nutrients as well as pesticides to attain clean fruit at harvest and at the same time reduce overuse of water nutrients and pesticides with consequential benefits to environment.

Project Execution:

The project has been very capably and professionally implemented. The project has been very effective and has been implemented efficiently, and the monitoring and evaluation undertaken professionally and in line with agreed guidelines. Sustainability is in the process of being built in to the project using the pilot research, information development, training and extension processes undertaken with key Pakistan institutions, universities, and private sector and utilising donor collaboration to foster adoption of technologies by farmers, educators and exporters and value chain participants alike. The project outputs have been in line with defined objectives and activities and in some cases have taken onboard new initiatives as and where needed.

Problems of implementation were similar to those expressed by the Mango Integrated Management project. Again the ACIAR staff and coordinators in Australia and in Pakistan were complimented for their valued support and management.

Clearly the project like others have benefited by the coordination and implementation support as provided by ACIAR in Australia and in Islamabad. *See Diagram in Appendix??*

Social research linkages have been found wanting at his stage and should be improved to assist the Value Chain project with adoption uptake of new technologies and generating enhanced impact. However, linkages have been established with the mango integrated crop management project and the citrus project.

As with all the projects funds flow has been constrained at times, and inflation is a problem along with the major increase in travel costs resulting from the use of armoured vehicles and increased security.

Follow-up

Follow-up areas are clearly indicated under the Objectives above in the Highlights section.

No additional funding has been sought at this time to continue defined project at this time.

Phase 3 Proposal

A Phase 3 project extension has been flagged and would involve keeping the same conceptual model that has provided the project's guiding framework for phases 1 and 2, i.e., the integration of product improvement, market development, value chain building and capacity building.

- Product improvement: 1) Whole farm disease management for Sindhri and Chaunsa export by sea needs more work. 2) Reliably meeting importing countries' dis-infestation protocols at farm/region level is a long way off.
- Market development: 1) Real potential gains for the industry lie in improving all-round performance in high value export markets (there's a long way to go, despite the rhetoric). Targets should be China and Europe, including Eastern Europe. 2) Domestic market development is still needed because local consumers want to pay more for better quality. 3) Value added products offer untapped potential.
- Value chain building: 1) Need to create demonstrations of how *systems* work that provide through-chain outcomes like traceability, food safety, assured quality and equitable sharing of value. This applies to both export and domestic markets. 2) Need to develop Codes of Practice that apply to value chains as systems. 3) Need to engage small to medium growers in creating best practice examples of VCs delivering benefits to all.
- Capacity building: 1) Target small to medium growers but don't neglect large export-ready growers. 2) Focus on how to effectively engage women in the industry – we really haven't understood this well. 3) Train trainers from government departments and agencies. 4) Build research and development capacity in Sindh (through probably Sindh Agricultural University 5) Consider different make-up of project research team.
- Engagement with other projects and initiatives: Continue to build networks with projects such as Punjab Supply Chain Project, UNIDO initiatives and other externally funded projects so that 1) funds can be better leveraged 2) additional skills can be accessed and 3) broader challenges such as infrastructure provision and policy development might be addressed.

General Comments:

1. The project has made excellent progress and the potential impacts of work done to date and immediate work planned for the rest of this phase will have very significant and long term lasting impacts on the domestic and export markets well into the foreseeable future.

2. Other general Comments to be made coincide loosely with Recommendations of the team and are mostly captured in the Recommendations as given below.

Recommendations:

1. It is recommended that the Phase 3 proposed extension as outlined is approved for formulation.
2. In the time remaining in the project it is recommended that emphasis should move more to the Domestic market for mango since some 90% of mango is consumed in the country. Market identification, development of models at the medium and smallholder levels to supply this market more profitably need to be pursued. Expansion of the Sindh Mango Grower group to capture more of the domestic market might be a good starting point. Improving the marketing process and credit advances to get more direct gains by selling fruit by weight and quality at harvest time than for than farmers of selling off the crop at fruit set. Testing of mechanisms of marketing of fruit from smallholders into the domestic market needs to be explored. The Swiss Tutti Fruity Swat project is a good example of what may be tried with smallholder producers. If success can be achieved with perishable peaches then why not with more robust mangos with better post-harvest life and handling characteristics.

3. In line with the above it is further recommended that adoption constraints and a pro-poor focus needs an analysis of economic benefit capture of the individual players in the operating value chains to identify their shares in the mango chain of small farmers. Then examine potential options that might readily improve the share of smallholders to induce farm gate sales of mango so full technology interventions such as improved irrigation, pruning, fertiliser application and strategic sprays of pesticides can be fully captured
4. It is recommended that the opportunities for developing mango Value Added Products be further explored and expanded from the small interventions in UAF and SAU. Products such as green mango, mango chutneys and pickles, mango puree and juice, canned mango, frozen mango, mango leather, crystallised mango products etc., for the domestic market, may help pull out surplus lower quality mango from the peak market to sustain fresh mango prices and offer on-farm smallholder farm product processing for some products as is done in Philippines. This work would be led by the mango value chain team in collaboration with the Mango productivity team and Social research group working with small holders clusters wherever possible, and linking with larger processers or farmer association processors or groups.
5. It is recommended that the Value chain team continue to link with other donors such as FIRMS and UNIDO to explore more opportunities for both the export and domestic markets through closer integration and collaboration.
6. It is recommended that the project team explore ways to utilise the AusAID Market Development facility support in further domestic and export market development and capture.
7. It is recommended that the Mango Value chain project, continue to assist with the development of SPS protocols for mango, including Hot Water Treatment for mango for export to China, fungicide and pesticide registrations and biological food safety issues for both the home and export markets.
8. It is recommended that the project work with ACIAR and AusAID to identify 3 Impact /potential impact indicators for meeting the Australian CAPF requirements. (as per the new reporting template proposed for ACIAR in Annex 3).
9. It is recommended that simple adoption studies be initiated to assess adoption and potential impacts.
10. It is further recommended that Policy Gaps for horticulture in Pakistan be more clearly defined by working closely with the Policy Team to support defined initiatives and strategies.

4.0 Citrus Project Hort/2010/002 AUD 1.288m

Highlights

Partners and Collaborators

Australia: Industry and Investment NSW (Lead Agency), West Australian Department of Agriculture

Pakistan: National Agriculture Research Council, Islamabad, University of Agriculture, Faisalabad (Punjab province), Citrus Research Institute (CRI), Sargodha (Punjab province), Agricultural Research Institute (ARI), TARNAB Peshawar (KP province), Fruit and Vegetable Development Project (Extension)

Collaborators: UNIDO on Crop management, Furrow irrigation and Reworking and commercial nurserymen as well as Federal Seed Certification and Registration Department, Islamabad, Four Brothers irrigation system provider, Lahore, Roshan enterprises, fruit packing shed, Sargodha, Jaffar Brothers irrigation system provider, Lahore, Fatima Jinnah Woman University, Rawalpindi, Commercial nurseries in Mildura and Melbourne, University of Maejo, Chiang Mai, Thailand, South West University, Chongqing, PR China

The project is proceeding well and it is clearly benefiting from the links to the Punjab Fruit and Vegetable Project, which previously leveraged the Farmer Field School work with mango clusters so effectively to foster adoption of technologies and deliver positive impacts for the citrus industry. Main highlights of the project are given below.

Pakistan Research Component

Objective 1: To improve nursery production practices and introduce germplasm to extend the marketing season

New Citrus Varieties to Extend the Production Season:

- 12 new varieties & 7 rootstocks established
- 7 key private nurseries provided new variety budwood (May 2013)
- More budwood for commercial nurserymen Aug 2013

Nursery Management with Focus on:

Insect proof screen houses and Nursery training: growing healthier trees:

- Screen houses completed at ARI, Peshawar NARC, Islamabad and CRI, Sargodha

Outcomes are:

- Propagation from mother trees in clean disease and pest free environment
- Industry nursery is now based on clean budwood and healthier trees for farmers

Nursery training:

Activities

- Project officers in Australia - Aug 2012
- CRI – potting media, budding, media properties - Feb 2013
- ARI – potting media training - Mar 2013

- 50 nurserymen ,trained Feb 2012 and 45 trained in Feb 2013

Outcomes

- Improved potting media composition and properties : healthier trees
- Enhanced propagation techniques : faster tree growth

Citrus & mango nursery training in Australia:

- 4 citrus nurserymen / 3 mango nurserymen
- Introductory workshop at NSW DPI EMAI
- Practical work experience in Australia
- -Victorian citrus farms – Sunraysia Vic
- -Birdwood nursery – Nambour Qld
- Debrief seminar in Sydney
- Nurserymen introduced changes to improve efficiency
    - potting media and containers / propagation techniques
- Capacity building in Pakistan
    - Grower & student workshops > 25 trained
    - Mango nursery day
    - Citrus nursery workshop - 45 trained
    - Combined nursery workshop – Pakistan 2013
    - Nursery technical manual & pamphlets in English and Urdu
- Assess practice change in citrus & mango nurseries

Commercial outcomes

- Sultan Nursery Farms established a Screen house nursery
- Jhang Bhatar – screenhouse built with ASF (Agribusiness Support Fund from USAID and other applying for 50% support

Objective 2. To demonstrate 'Best Practice' orchard management focussing on crop management and irrigation management

Crop Management Emphasis on:

- Crop load regulation
- Reworking
- Pruning
- Nutrition management
- Irrigation management
- High Density Orchards
- Crop Phenology

Crop Load Regulation to reduce biennial bearing problem of Kinnow mandarin using fruit thinning and crop load estimation:

- Thinning Trials successfully completed and 50 extension officers and 500 farmers trained
- Crop estimate training – CRI & ARI Dec 2012, 97 trained

Re-working: Problem: long time to change & assess new varieties

Solution is to Grafting new variety on a mature tree and it is Quick to grow new tree for variety assessment and higher fruit production

- Practical re-working workshop for growers -85 trained at Training workshops at ARI – April 2012, UAF – May 2012 and CRI – April 2012

Tree Pruning to overcome tree crowding and fruit damage, overcome loss of bearing sites and to regulate crop load and overcome biennial bearing and improve fruit quality

- Grower pruning demonstration sites established and 2 workshops conducted for 70 farmer in 2013. Results demonstrated.

Nutrition Management via Soil solution work & nutrition training to Improve efficiency of fertiliser use and application (reduce costs and produce healthier trees) and Improved soil salinity management (productivity), by reducing leaching of excess nutrients.

- Soil solution and full workshop on 8 May 2012 at CRI for research staff and 30 extension officers
- Soil solution workshop at ARI on 29 June 2012 25 growers trained

Irrigation Management: Aim inefficient use of water reduce water usage, Reduce root disease (from water logging), improve production (healthier trees) using furrow irrigation and perhaps pressurised (sprinkler and drip irrigation) in the longer term.

- Furrow irrigation has been shown at CRI Sargodha to increase yields and gross returns per acre by around 20 % compared with flood irrigation, while using less water than flood irrigation.
- On-farm furrow irrigation at Sargodha has been established and farmer training begun. Adoption has taken place already on some farms.
- Trials at CRI and ARI showed the following results:

Treatment	Yield (kg)/tree
Flood	98
Furrow	121
Sprinkler	111
Drip	171

High Density Orchards will give early and higher yields, when incorporated with furrow and pressurised irrigation systems.

- In KP province farmers have converted from low (288 trees/ha) to high density (555 trees/ha) as well as in Punjab using furrow irrigation. Pressurised irrigation now being tried in 2013.
- High density orchards have the capacity to yield anything up to 2-3 fold current yields per ha with good management and disease free trees.

Crop Phenology Problem is that lack of crop phenology knowledge (or the developmental stages of the tree in relation to its environment) and its important application to management, are unknown in Pakistan.

- Phenology calendars have been developed for Pakistan and growers trained in phenology and posters distributed
- Already >15% of growers trained have started to change management practices in their orchard to match the Phenological calendars distributed

The potential impact of this change will be greatly improved productivity, improved fruit quality and tree health and reduction in waste of water, pesticides and nutrients, especially when phonological management is combined with high density orchards.

Australian Research Component

The Australian Research Component covers:

- Water use efficiency
- Flowering initiation
- Evaluation of new rootstocks

Water Use Efficiency:

- A Kinnow water use efficiency trial at Dareton established in comparison with Daisy another heat tolerant Earlier maturing variety has been established at Dareton in NSW using sap flow meter technologies. The trial will provided guidelines for refining irrigation management in Pakistan.

Flowering Initiation:

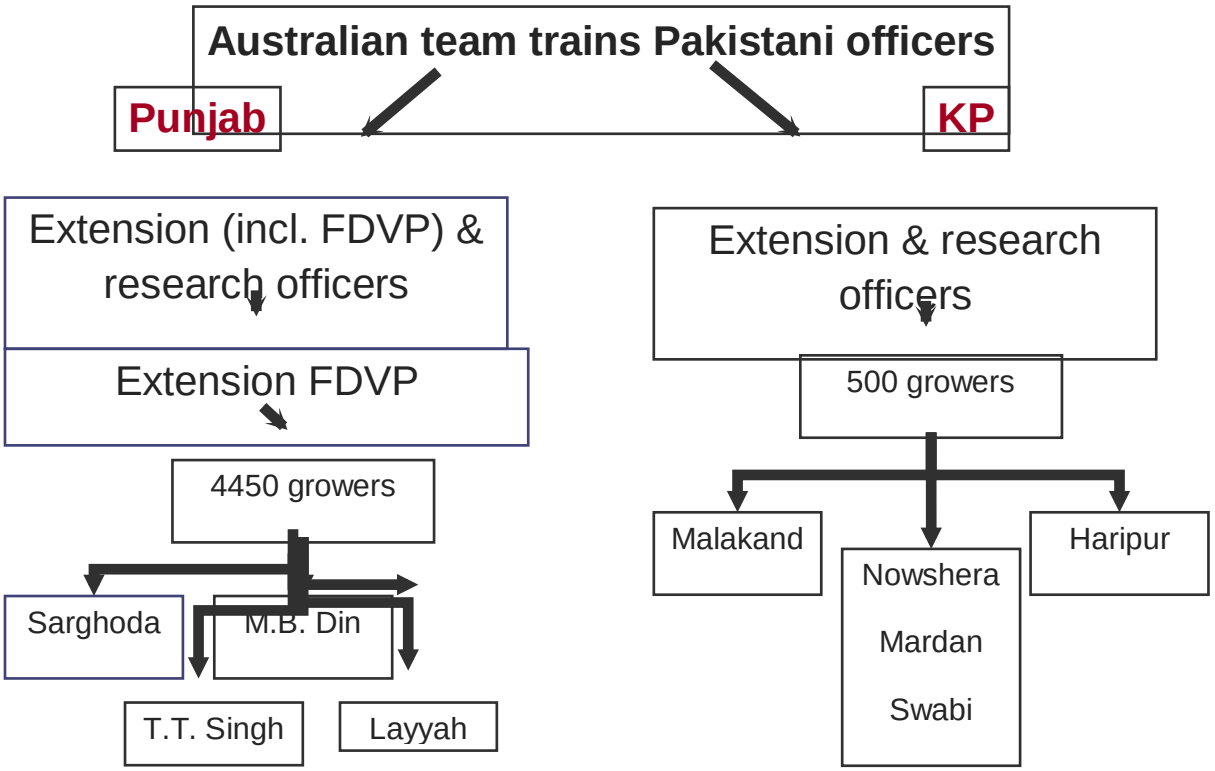
- Citrus flowering is being examined using Scanning electron Microscopy to identify the bud initiation developmental stages for using fruit thinning chemicals to reduce biennial bearing. Ralex R is being used in this trial work with oranges at present.

Evaluation of New Citrus Rootstocks in Western Australia

- A range of citrus rootstocks have been sent to WA for setting up a Demonstration trial of salt tolerance rootstocks. The rootstocks include: ACIAR Chinese Rootstocks (4): NSW DPI Breeding Program (5): Californian Citrus Breeding Program (5)and Standard rootstocks to compare salinity tolerance.

Objective 3. To enhance research, extension and production capacity of Pakistan citrus institutions and industry

Extension strategy ASLP II Citrus



- Training of FVDP extension staff completed
  - 4 in Pakistan & 1 in Australia
- Capacity building through Farmer Field Schools (FFS)
  - 4 sites, 177 schools/year, 4450 growers planned
- Farmer Field Days technology transfer:
  - 4 field days: 900 growers
- Mega field day (May 2012): 600 growers
- UAF field day : 50 growers
- Demonstration cluster sites established
  - 4 X Best management practices (BMP)
  - 4 X High density plantation with high efficiency irrigation system.
  - 4 X Canopy management of citrus orchard.
  - Citrus grower's conference, 9-10 May 2012 -200 participants Day 1, 160 Day 2-Another planned for 2014
- Distribution of technical material
  - 12 citrus training manuals
  - 300 leaflets on BMP
  - SMS best practice citrus production messages- 42 messages : 1150 growers/per message
- Posters, video and newsletters produced and distribute on Best management Practices
- Fortnightly E-newsletter -43 E-newsletters sent to 399 growers
- Monthly advice through FVDP website www.fvdp.gop.pk-also regularly updated on Facebook & Twitter

- Radio Sursebz Pakistan (Live)-9 broadcasts
- Voice of America-1
    - 29 Mr 12 (Sabawon)-1
    - Australian ABC Radio -2
    - TV Programs (27) covering:
    - Crop management, Reworking, Fertigation, High density orchards, Fruit thinning, Green Farms

Project Summary:

- 7 new varieties to extend & expand marketing period
- Clean & healthy planting material, Training and screenhouse establishment in private sector.
- Practice change to improve production efficiency
    - On farm adoption: pruning, thinning, nutrition , irrigation, phenology and high density planting
- Capacity building : growers & extension
    - Primary beneficiaries: > 7000 (Punjab & KP)
    - Secondary beneficiaries: > 21,000
- Quality marketing introduced

Impacts:

Scientific Impacts:

The provision of scientific training and provision of equipment through the ASLP project to enhance the capacity of Pakistan scientists to conduct the research trials with better precision, speed and accuracy is probably the major scientific impact to date. At this time no scientific papers, but 2 international conference papers have been produced but with 6 students are enrolled in Masters degrees, 7 students having Completed Masters degrees and 1 student has been awarded JAF for a PhD at Curtin University WA, Australia the scientific impacts of these students is yet to come.

Major focus has been on effective simple adaptive research on such things as irrigation, fruit thinning, pruning, phenology, varieties, potting mixes, high density planting etc., and getting the technologies demonstrated and adopted. Any and all of these technologies come with very significant impacts, if adoption is significant, but their contribution to extending scientific knowledge is small. However, with this type of tree crop research it takes time to properly test varieties and rootstocks, salinity tolerance and disease tolerance and so on unlike post-harvest trials that take just days to complete.

Clearly, from the work planned there will be significant scientific impacts further on in the project and beyond.

Capacity Impacts:

Capacity building has been the outstanding feature of this project to date. The training and potential impacts generated by the project is very large given the short time the work has been going. Early uptakes of >15% of trained growers in a short time adopting changes in practices, such as irrigation methods, phenology etc., which can lead to yield increments of 16-20% or more almost immediately.

The real impact of the Citrus project to date has been the training and extension of simple technologies to a large number of researchers, extension people and farmers, through direct training, FFS and multimedia and supported very ably by a raft of quality extension materials and messages. Now that the project has been linked with the Punjab Fruit and Vegetable project for FFS interventions and the Social research project the adoption should

increase and impact begin to accrue more quickly. The capacity of Pakistani research staff has been enhanced in the areas of varietal evaluation, and trial design and data analysis.

The project has 6 students enrolled in Masters degrees, 7 students have Completed Masters degrees and 1 has student has been awarded JAF for a PhD at Curtin University WA, Australia.

Pakistani extension staff has received training within a pro-poor value chain framework that will increase their capacity in the areas of citrus varieties, citrus crop management and new extension methodologies and in increasing benefits to the poor and marginalised.

Adopting all of the Best Management Practices, including high density plantings could easily see productivity jumps by multiples of probably 3-5 fold, based on existing yields and experience elsewhere.

In terms of publications produced they are as follows:

- Number of Fact sheets: 4
- Number of technical Manuals: 5
- Calendars: 3 Videos: 4 (Budding and grafting; Citrus fertigation; high density orchards; Citrus re working)
- Scientific papers: 2 (12th international citrus congress, Valencia, Spain, Nov 2012); Australian society of horticultural conference Lorne, Australia, Dec 2011)
- Newspaper articles: 3
- Newsletters: 43

Community Impacts:

Economic Impacts

The introduction and commercial production of new citrus varieties will not significantly impact the Pakistan industry until 10 years or more after the end of the project.

Implementation of 'Best Practice' production systems (and enhanced industry capability), however will have significant impact within 5-8 years of the end of the project.

As noted above in Capacity impacts simple interventions of Best Practices can easily approach 16% increases in productivity and high uptakes of 15% in a short time of 6 months or so by trained farmers Benefits will come from yield increases and reduced post-harvest losses especially for exports. The challenge will be how to get such gains from smallholders and medium sized farmers who have major marketing constraints into both domestic and export markets. With all Best practices applied and with high density plantings, individual farmers could increase yields per hectare by 2-3 fold based on experience elsewhere in the world.

Australia will benefit from the research particularly on water use and refined nutrition approaches as well as improved fruit thinning, all of which could readily increase net returns by 10% or more.

Social Impact

The social impacts of the project for poor and marginalised farmers and women are minimal since capture of key benefits involves a move from selling the crop at fruit set to selling the crop profitably at harvest. This whole area of marketing is a key one for focus of the Social research group in the future. In the interim nursery training for women, especially for budding and grafting will bring some benefits and as exports increase as driven by UNIDO

and FIRMS and PHDEC, more jobs may emerge for women. To date the number of women trained are, 53 Primary beneficiaries plus 353 secondary beneficiaries.

The project design did not predict major social impacts and these will mainly accrue via improved productivity along with more job creation.

Environmental Impacts

This project is expected to have positive impact on the environment through the introduction of irrigation systems and efficient use of nutrition under pressurised irrigation systems. Water use will be reduced by as much as 40-60 % or more and combined with intelligent use of pesticides, impact positively on the environment.

Reduced cultivation from less use of tractors to cultivate inter-rows saves on tractor fuel.

Introduction of modified irrigation techniques will also have positive effects on soil structure and reduced salinity and also reduced overall water use. Leaching of nutrients into aquifers and waterways will be less with more precise fertiliser and irrigation practices.

2025 there will be serious shortages of water. The adoption of this technology will have positive effects on the environment.

Project Execution:

The project activities accomplished to date are many and in line with defined objectives and activities. This outcome reflects very good project management both within Pakistan and Australia and the teams along with the Program and project coordinators and focal persons. The project is already proving to be very effective in its impacts related to new technologies tested and now piloted for wider adoption. Sustainability is in the process of being built into the project using the pilot research, information development/multimedia, training and extension FFS processes undertaken with key Pakistan institutions and private sector growers and nurserymen. Collaborator linkages have also been important in assisting with introduction of technologies and adoption.

The project has been implemented efficiently, and the monitoring and evaluation undertaken professionally and in line with agreed guidelines and has established linkages with both mango projects and the social research project, to further extend project benefits. The teams and partners along with coordinators and collaborators are to be congratulated o their efforts to date.

Problems of implementation were similar to those expressed by the Mango Integrated Management project. Again the ACIAR staff and coordinators in Australia and in Pakistan were complimented for their valued support and management.

Requests for additional funding during ALP2 are well justified and addressed under recommendations.

Follow-up/Future Work:

- Up-scaling various components by Pakistan and project using the model developed
- Mega nursery training Sep/Oct 2013
- Distribution of budwood to nurserymen Sep 2013, getting commercial take-up of improved screen house nurseries and technologies
- Development of nursery fact sheets/manuals and videos
- Development of crop management & irrigation management training package
- Developing nursery training packages for future training

Key Issues still to be addressed:

- Quality payment system and marketing assistance to smallholders.
- Working on the whole pre and postharvest value chain to reducing blemish and enhance quality of fruits with improved profit sharing particularly to smallholders, especially for the domestic as well as export markets.
- Greening Disease, impact, resistance, and Psyllid vector bio-control to stop spread, clearly need strong focus from ACIAR since this damaging disease is very widespread and impacting heavily on citrus productivity and tree death right across Asia. This may be the focus of a new project in ACIAR and not necessarily under the ASLP framework. In addition, the disease and its vector pose serious bio-security threats for the Australian citrus industry, should it reach Australia.
- Value-adding via juice products, purees etc.

Phase 3 Proposal

A Phase 3 proposed outline has already been prepared to cover the Post Harvest Value Chain. The outline is given below:

Postharvest Value Chain for Citrus

Pakistan has a reputation of delivering citrus fruit of unreliable quality and shelf life. There is significant potential to improve the value chain and lift grower returns. Targeted improvements in the value chain include: (1) production of fruit with less blemish and growers paid more for producing quality fruit (quality payment program); (2) improved post-harvest handling practices (packing and freight) to reduce fruit breakdown at market (market confidence) and (3) more accessible and transparent export marketing program where growers are informed and collaborate in export programs (motivation to improve).

1) Fruit currently suffers very high rates of blemish from a combination of pest and wind blemish. Only 10% of fruit can be international grade 1 quality. Modern growing practices aim for at least 50%. The main problem is that growers are not paid on quality and thus little incentive is given to grow quality fruit. The project proposes to initiate a number of demonstration farms throughout each district that will implement best practices and sell the fruit based on quality.
2) Improved export packing and freight practices will reduce the incidence of fruit breakdown in the market place. Some on-farm practices can also affect out-turns (GA, fungicide sprays). Buyers will be more confident in buying Pakistan fruit thereby increasing demand and price. Improvements will be made post-harvest sorting and fungicide treatments, storage temperatures, fruit handling and freight practices.
3) Growers are totally disconnected from the market and do not receive market indicators to drive change and improvement. The value chain will be integrated by actively involving the growers in part (A) of the project to send fruit to packers that participate in part (B) of the projects and then all participants will participate in a market review exercise where they will visit the main profitable and potential export markets to obtain an understanding and feedback of market requirements. These growers and packers/exporters will hold information sessions (field days and seminar) with other district growers (facilitated by project officers) to update project progress. An objective of the project is to change the paradigm of growers from price takers to price managers and to establish a long term market information system (i.e. web, newsletter) for growers.
4) Separately, Greening Disease, impact, resistance, and Psyllid vector bio-control to stop spread, clearly need strong focus from ACIAR since this damaging disease is very widespread and impacting heavily on citrus productivity and tree death right across Asia. This may be the focus of a new project in ACIAR and not necessarily under the ASLP framework. In addition, the disease and its vector pose serious bio-security threats for the Australian citrus industry, should it reach Australia.

General Comments:

- The project is deriving clear benefit from its link with the Fruit and Vegetable project to develop extension material and train extension offices and transfer new technologies via the Farmer Field School approach. This approach is clearly working as farmers in the FFS groups and nearby neighbours begin adopting new project technologies.

Recommendations:

1. It is recommended, as with all new technologies introduced, to help foster adoption and improve impact, that simple comparative with and without Gross Margins Costs and Returns based on the trials and demonstrations data need to be assembled for using in the leveraging the extension and FFS approach.
2. It is recommended that a study/survey be initiated to show the economic benefits of establishing disease free producing citrus orchards and the likely extension of good production years.
3. It is recommended that other mandarin varieties such as Emperor, be considered for introduction to fill the gap between Daisy and Kinnow to maintain the supply of mandarins in the market and not just relying on oranges, often less preferred to fill the gap.
4. It is recommended that a re-think of the irrigation systems employed be undertaken to take into account current farm systems of either, vegetables, row crop summer maize or sweet sorghum fodder or winter Berseem or vegetables using cheap options of furrow systems or furrow systems combined with flood bays for Berseem as discussed in the field.
5. It is recommended that the project begin to focus on a quality payment system and marketing assistance to smallholders. Working on the whole pre and postharvest value chain to reduce fruit blemish and enhance quality of fruits with improved profit sharing particularly to smallholders, especially for the domestic as well as export markets. Such work will need to be combined with a profitable system of smallholders selling fruit at harvest rather than from contracts written at fruit set to sell the crop.
6. It is recommended that the project examine how smallholder farmers may become more engaged in the value-added market for existing and potentially new citrus products.
7. It is recommended that ACIAR re-engage with Citrus Greening disease research on impact assessment, resistance, and Psyllid vector bio-control to stop its spread. This should be a high priority for ACIAR since this damaging disease is very widespread and impacting heavily on citrus productivity and tree death right across Asia. Such a project would not be part of the ASLP framework but a separate ACIAR initiative, with perhaps links to ASLP. Greening disease and its Psyllid vector pose a serious bio-security threat for the Australian citrus industry, should it reach Australia.
8. It is further recommended that Policy Gaps for horticulture in Pakistan be more clearly defined by working closely with the Policy Team to support defined initiatives and strategies.
9. It is recommended that the project work with ACIAR and AusAID to identify 3 Impact /potential impact indicators for meeting the Australian CAPF requirements. (as per the new reporting template proposed for ACIAR in Annex 3).

   It is recommended that the request for additional funding to address initially the post-harvest losses and fruit quality issues covering clearly defined actions in the citrus value chain of AUD 150,000 be approved. A lot of his work would be a scoping for a larger Project perhaps Phase 3 commitment after ASLP II ends, but to take up some issues in the remaining time the project runs.

5.0 Dairy

Highlights

Partners: Charles Sturt University, Australia (Lead Partner), with University of Sydney, The University of Animal and Veterinary Sciences Lahore, Punjab Livestock and Dairy Development Department Lahore, Sindh, Livestock and Dairy Development Department Karachi.

Collaborators: Nestle company, Pioneer Seed Company, Jullander Private Limited

Highlights of the progress are presented below.

Objective 1. To determine the most effective manner in which the extension approach from LPS/2005/132 can be scaled-out with a lower level of direct supervision to different areas of Pakistan.

Aim is to determine the most effective extension approach in different areas of Pakistan.

- To reach more communities/villages
- Encourage capacity building at the institutions level
- Provide a model for Livestock Departments to follow in the future
- Link poor communities to information & market options

Highlights to date are:

- Key teams established for Pakistan, comprising Project Manager, Supporting Staff, Field Manager and Training Manager with 3 Field Teams each with 7-11 Extension staff covering 14 villages with 248 farmers in Thatta and Badin, 24 villages with 632 farmers in Jhelum and Bhakkar and 15 villages with 411 farmers in Kasur, Okara and Pakpattan. All smallholders.
- Extension methods developed include an Extension Approach involving development of mass media extension materials, innovative ways of approaches and training, whole family approach including women activities, then mass awareness and scaling out. A wide range of extension materials have been developed around, feeding, health, calf rearing, fodder production, milk value adding etc. Significant engagement of women has been across the board from cleaning sheds, fodder cutting, feeding and watering, calf care, milking, milk sale and milk value addition.
- Women extension issues involving low literacy, lack of female extension officers, cultural barriers and economic status are issues being addressed.
- Mass awareness and scaling out has been approached via Facebook, with videos, TV shows and FM radio for the future. Close links with the Social research group are sought for future in leveraging adoption and impacts. To date the links with the Social research group have been somewhat dysfunctional at field extension levels.
- Freedom Phone – cheap, easy way to communicate with many people/farmers. Farmers simply ring up to access the info Rob Fitzgerald of the Social research team-currently assessing costs etc. Technology is available we can simply 'fill it' with dairy info; e.g. For local disease outbreak information, for farmer success stories, for information relating to calf rearing for local milk and fodder market prices.
- The community farm established at Kasur on the edge of the UVAS training campus is a further initiative. It has involved the development of an animal holding area complete with feeding and watering facilities while the farmers are building shade structures. The idea is to remove the animals from the home environment to improve home hygiene. Then collect milk of high quality to maximize returns to the

farmer. This is another example of the innovations pursued by the Dairy project. The farm environment also encourages a farmer's forum to look at cooperative approaches to procuring fodder and inputs at lower prices and getting better prices from direct sales to major collectors of chilled milk.

- Assessing impacts have been approached by Herd Book recording, Adoption Charts, research on impacts with and without project technologies, and documenting success stories and 6 monthly surveys.

Field staff have observed management and productivity improvements on approximately 40% of the farms in the better serviced Okara region (72 out of 180 farms) and around 15% in the desert region of Bhakkar (18 out of 120 farms). Generally these have involved adoption of the un-tethering of animals and the provision of free access to water and feed.

In the second phase the extension team has been utilising a broader approach by extending information not only to the males of the household, but also to the women and children and their school teachers. Preliminary results utilising these methods have yielded very positive outcomes with adoption rates as high as 90% of the 760 farms that are collaborating with certain specific messages on vaccination and drenching.

Keys to success have been the dedicated project and extension teams driving the process.

Objective 2: To develop and promote strategies for optimizing feed resources for small-holder dairy farmers.

Aim is to develop and promote strategies for optimizing feed resources for small-holder dairy farmers through University/Institute Research, On-farm Research and Promote entrepreneurship.

Nutrition is still the fundamental constraint to dairy production in Pakistan and research encourages capacity building at institutions produces outputs to feed into extension system and will result in more efficient utilisation of feed resources in poor communities.

Highlights of the Nutrition work to date include:

- The Nutrition Focus Group, has produced a much needed Fodder and Feed Calendar for Pakistan. The calendar is developed in a format readily usable by farmers for adoption on farm and academics for teaching purposes. The calendar has been made available to the 400 collaborating farmers as hard copy. The development of the calendar provided academics with the experience of developing this resource and this was a very valuable training exercise. The feed calendar will lead to achieving a more flexible and cost-effective "feed year" for the various regions in which we are working. It includes a major component on forage conservation to ensure the supply of cost-effective feed resources year-round.
- Concentrate sources and feeding along with use of mineral blocks either bought or manufacture on farm have been successful introductions.
- Establishment of forage demonstration plots in partnership with Pioneer seeds has been a success. Impacts have already been documented by farmers growing sweet sorghum for feed and seed sale, with best yields ever and bonus sale of seed.
- Before 2015 the aim is to: Development/dissemination of ration formulation booklet, conduct ration formulation workshops and conduct research specific for in Sindhi environment.

Recommendations for further Nutrition research/funding:

- Take farmers to the next stage of feeding technology
- Weigh animals (scales and/or girth tapes)
- Relate growth rates to productivity/age and live weight

- The basics of balancing of rations

Objective 3: To identify and promote profitable new strategies for calf rearing.

Aims are to Determine constraints; Define cost-effective rearing strategies; Promote as a profitable business to overcome very high mortality rate of calves in Pakistan (>50%) since Calves are the future of the industry, Build the capacity of the institution for herd management and provide business options for farmers.

Highlights of calf raring thus far:

- Funded and conducted 3 calf rearing projects to refine feed strategies to weaning
- Conducted calf growth competition for school children using new extension messages

Prior to 2015:

- Translate calf growth strategies to on-farm trials across our districts, encourage male calf rearing to encourage entrepreneurial activity particularly among women

Future possibility:

- Introduce management strategies to take calves from birth to puberty as fast as possible, to produce a calf per year with a consequent boost to reproduction rates as well as milk production.

Outputs and impacts to date include 2 calf rearing research papers on Saiwal calf rearing, successful case studies with farmers getting buffalo and Saiwal calves to puberty in 12 months and 14 months respectively, instead of much longer periods when calf rearing project technologies were not used. The added bonus is that calf mortality rates have dropped dramatically using the calf raring interventions.

- Finally it was shown that children could adopt our calf rearing strategies, to reduce mortality and achieve very good average live weight gains of 430g/day.

Objective 4: To identify and promote strategies for improving smallholder profitability through marketing opportunities of a higher quality product.

Aim is to identify and promote strategies for improving smallholder profitability through marketing opportunities of a higher quality product. The outcomes of which will:

- Give small farmers more options for selling product
- Benefit the pro-poor by linking communities to markets/methods to adapt
- Provide institutions with options for interventions
- Provide a model for Livestock Departments to follow in the future

Highlights to date:

Milk value chains have been analysed to show economically and policy constraints and to show that among the masses of detail assembled that:

- 90% of the farm households have less than 10 animals
- 78% of the farms are below 7.5 acres / 3 hectares (average farm size 6.4 acre/2.6hectare)
- Livestock contributes 12% to GDP
- Milk is most important component as it market value exceeds that of all major cash crops

- Pakistan produces 46 billion litres of milk of which 62% is buffalo & 32% is cow milk
- Milk produced in a mixed crop-livestock farming system
- Significant losses from livestock enterprises as a whole
- Small farmers are being risk averse at the cost of inefficient and uneconomical livestock and milk production.
- The dynamics of whole farm economics may lead to specialized crop, fodder, meat or milk producers having a comparative advantage in production and thus increasing industry's overall efficiency
- From actual production of 5,025 litres by farmers, with dilutions by small collectors, collection points, large collectors and retailers the volume changes to 7445 litres, with fat standardization icing and selling in 0.9litre retail. Studies showed that consumers have their doubts about quality & quantity, but still preferred fresh unpackaged milk and that middle men and retailers in the value chains were aware that consumers value high fat content milk

An evaluation of 3 Milk Value chains was done to examine how a value chain approach, addresses issues of milk production profitability for farmers and affordability for consumers.

Findings were:

- Poor chain farmers may depend on employment, loans and cash advances to produce a low price higher fat milk
- No technology used and low margins accrue to(producer & small collector)
- Low quality milk for consumer
- Milk quality, units and prices not linked.

The next steps are defining and implementing interventions that add value to, or improve efficiency of the milk value chain.

Objective 5: To build the capacity of future and current extension and industry personnel driving the production and marketing of milk from the farm to the consumer.

Aim is to build the capacity of future and current extension and industry personnel driving the production and marketing of milk from the farm to the consumer through:

- Building the capacity of individuals and institutions to sustain project activities and outcomes for the future
- Improving the effectiveness of the educational processes
- Investing in the future of dairy leaders/scientists
- Improving communication both up and down the chain

Progress:

- The Dairy project has already produced 6 conference and workshop publications, 4 scientific papers, 6 completed theses and has 5 theses in progress.
- Capacity has been built with a considerable number of student visits and firmly established academic linkages and academic visits.
- Capacity building with coordinators and project managers, 19 internship and 7 jobs, along with Project Manager, Supporting Staff, Field Manager and Training Manager with 3 Field Teams comprising 35 Provincial Livestock Departments extension staff all across 7 districts with a total number of 53 villages and 1091 farmers and whole family beneficiaries including women and children.

Impacts

Assessing impacts have been approached by Herd Book recording, Adoption Charts, research on impacts with and without project technologies, and documenting success stories and 6 monthly surveys.

Scientific Impacts:

The scientific impacts of the project have been impressive and include:

- The project has successfully completed a survey after one year in order to evaluate adoption rates from all the farmers working in our project.
- Currently, the project is running a calf research trial on "Effect of weaning period and milk feeding regimes on post weaning growth performance of Sahiwal calves" in collaboration with Dr Shaukat Bhatti from UAF at the Livestock Production Research Institute Bahadurnager, Okara.
- Two papers from calf trials carried out in Phase I of the ASLP have been published in impact factor Journals.
    - S.A. Bhatti, A. Ali, H. Nawaz, D.M. McGill, M. Sarwar, M. Afzal, M.S. Khan, Ehsanullah, M.A. Amer, R. Bush, P.C. Wynn and H.M. Warriach. (2012) Effect of pre-weaning feeding regimens on post-weaning growth performance of Sahiwal calves. Animal 6(8):1231-1236
    - S.A. Bhatti et al (2012) Effect of diet on pre-weaning performance of Sahiwal calves. Trop. Anim. Health Prod. 44:819-826
- A recent publication based upon data collected during Phase I of the project.
    - H. M. Warriach, D. McGill, R. D. Bush and P. C. Wynn (2012). Production and reproduction performance of Nili-Ravi buffaloes under field conditions of Pakistan. J. Anim. Plant Sci. 1018-7081
- Extension material produced by the project has been widely acknowledged by the government agencies, universities, private sector and other stakeholders
- The project has successfully launched its own website (www.aslpdairy.pk) and Facebook page. This website has been designed in both English and Urdu. All the project activities are updated on a regular basis.
- The project had run a research trial on buffalo synchronization by a Pakistani student carrying out his Masters at Charles Sturt University, Australia. This trial was conducted at BRI, LPRI, private breeders and farmers working with project. His research is being presented at the AAAP conference in Thailand in November 2012. The work has important potential impact on the reproductive efficiencies of buffalo and herd building.
- Extension impacts are being assessed by Herd Book recording, Adoption Charts, research on impacts with and without project technologies, and documenting success stories and 6 monthly surveys.

Capacity Impacts:

- During the first half of 2012, four extension worker training workshops have been conducted to give practical hands on training to the extension workers. There is the group of 35 extension workers working with the project who were all involved in each training workshop. One program was organized at Nestle Sarzabs dairy farm near Okara in order to provide them practical on-farm training.
- Two Veterinary graduates from UVAS have successfully completed their internship with project this year. Up till now 17 students have been completed their internship with our project and some have gone onto become successful in obtaining a position within the project.

- The project has established fodder demonstration plots in the districts of Okara and Kasur in collaboration with the Pioneer seed company. This is providing both farmers extension workers with on-farm practical training where they are seeing the positive benefits of the fodder.
- The Nutrition Focus Group has worked together to develop the feed calendar. This has been a practical hands-on exercise for them to develop their skills in communicating complex issues such as fodder choice, preparation, harvest and feeding within the one document.
- The project has organized a fourth "Student Forum" this year and students from all the 11 veterinary faculties of Pakistan participated. This forum was led by four Australian students from CSU and also involved the team from the ASLP Social Sciences project, University of Canberra. Professor Barbara Chambers and Dr Sandra Heaney-Mustafa conducted a one day training workshop with all the participating students. They covered different social issues such as ways in which we can promote and support professional women working in the rural areas of Pakistan.
- Muhammad Ishaq field manager attended SAADC 2011 conference held in Thailand to present his paper on "Effect of body condition score on milk production and reproductive disorders in buffaloes"

In summary, Capacity building has occurred with coordinators and project managers, 19 internship and 7 jobs, along with Project Manager, Supporting Staff, Field Manager and Training Manager with 3 Field Teams comprising 35 Provincial Livestock Departments extension staff all across 7 districts with a total number of 53 villages and 1091 farmers and whole family beneficiaries including women and children.

Community Impacts:

The community farm at Kasur on the edge of the UVAS training campus has involved the development of an animal holding area complete with feeding and watering facilities while the farmers are building shade structures. The idea is to remove the animals from the home environment to improve home hygiene. Then collect milk of high quality to maximize returns to the farmer. This is another example of the innovations pursued by the Dairy project.

Economic Impacts:

- An agreement was obtained with Nestle to install a milk chiller at the community farm to assist with the sustainability of the model village. This has helped to sell milk as a group direct to the milk collectors and hence obtain a greater price per litre.
- Farmers start to think co-operatively to obtain the best price for animal feed, fodder seed, fertilizer and pesticides.
- Develop a communal vegetable garden near community farm in order to obtain fresh vegetables at lowest price and to maximise the utility of limited water supplies for the village. This idea has been extended to individual farms as well.
- Maintaining a genetically superior community bull which will minimize the breeding cost and provide good quality progeny.
- As noted in Objective 4 a great deal of economic data on the milk value chains have been collected as a prerequisite to fine tuning interventions in the value chain from farm to consumer to bring about improved prices and milk quality at the farm gate and deliver more economically high quality milk to consumers that prefer to consume fresh milk. Impacts of this work are yet to come.
- Impacts of improved calf rearing and better nutrition for calves and producing animals have been clearly demonstrated and extended by an innovative effective, efficient extension system. Economic impacts remain to be assessed in some cases.

Social Impacts:

- The project has been working on extension methods involving the whole family including the primary farmer (generally the father) as well as the women and children in the household. This has led to a much higher extension message adoption rate and encouraging stories like young children insisting that their mothers feed their calves more milk to help them grow.
- The community farm is also providing farmers with a forum for discussing and resolving their socio-economic issues. It also provides them with the opportunity for sharing their various experiences to improve their livelihood.
- Interaction to date with the Social research group has been minimal on leveraging social impact and adoption. In some cases the Social research group has been seen by villagers as having nothing to offer them and just ask questions.

Environments Impacts

- Although there is little evidence of a direct impact at this time, advice on improving the environment for the animals is paying dividends. A cleaner area for feeding and milking leads to a lower incidence of mastitis and infections of the reproductive tract. Inevitably the enhancement of the productivity of cows will decrease the size of the national herd and therefore allow Pakistan to meet its greenhouse gas output reduction obligations.
- Other areas where the project may be having an environmental impact include; developing biogas units, the community vegetable garden and the promotion of cooperative management to minimise things such as feed and water wastage. This will also improve negotiations for prices for commodities bought by farmers in bulk and then in commanding the best price for their saleable milk.
- Better waste disposal and cleaner villages have indirect environmental benefits to family and children's health.

Project Execution

The Dairy project is somewhat different to the other more research based projects of ASLP II in that the emphasis is on improving dairy value chains by extension with support of targeted research in key areas. The design has brought up new challenges in how to run and manage such a project. The results to date from both Phase 1 and Phase 2 have been outstanding, and reflect the excellent collaborative management of the Australian and Pakistan teams. The teams have developed with University research partners and extension staff of Provincial Livestock Departments an effective, efficient and sustainable pilot extension model that clearly works and delivers desired impacts right at the pro-poor levels of smallholders. The project has clearly met obligation of reporting and M&E and established linkages with the other ASLP II projects and a wide range of institutional partners and collaborators across the government and private sectors.

Implementation and execution issues and constraints are in many ways similar to the Mango Integrated management project with respect to finances, vehicles, operation and reporting issues etc. However, there is one major difference is that he project has been embedded with poor and marginal farmers and groups since its inception.

Sustainability beyond ASLP II for Dairy Extension:

To effect sustainability maintain the pilot model developed with the UNVAS Lahore and UAF as research and outreach agents supported by a major focus though them and key private sector agencies on the veterinary officers of the provincial livestock departments. Over time they will continue to understand how whole farm systems work to alleviate poverty and build communities. Hopefully with good policy in place other donors will further leverage

this developmental pilot. UNVAS Lahore along with UAF and linkages back to PARC and provincial governments an provide the leadership and vision needed to drive the pilot model.

It is the projects goal for provincial departments to incorporate project generated development strategies into their normal staff recruitment training. This action then lets the provincial departments identify the factors that lift primary adopters of the projects extension messages in farming communities to the next level of entrepreneurship.

An exit strategy has been proposed for the 43 Livestock Departments of Sindh and Punjab to be re-absorbed back into their departments to boost their extension with project learned skills and knowledge. This point has been pursued with upper and middle management continually since project commencement.

Requests for additional funding are well justified and addressed under recommendations below.

Follow-up

Follow-up during the project will focus on finalising, research, surveys, analyses and focusing more on adoption and impacts. In particular focus will be on:

- Continuing Nutrition/Calf Research/Outcomes
- More illustrative material to overcome the problem of illiteracy
- Pioneer – Demonstrations and training in forage production
- Nestle – dissemination of fodder calendar
- Regular contact with provincial Livestock Departments and Universities through our NFG
- NFG needs to be sustained as a national advisory body.
- Helping Universities to continue to run calf rearing trials independently of ASLP
- Helping farmers see hat develop calf rearing can be a profitable exercise to continue with themselves.

Phase 3 Proposal

A Phase 3 is envisaged and it is proposed that the work would comprise the following:

Issue: There is a need to develop an approach to ensure that the impetus for ASLP dairy will be sustained beyond ASLP 3

The approach: There is little doubt that the key organisation to sustain the program is the Punjab Livestock ministry and its veterinary service. However we also realise that the extension model that we have developed is not adoptable by the Department without some assistance.

We therefore propose that UVAS absorb the current ASLP dairy extension team. Under their guidance the extension activities will be developed using the resources made available from the Punjab department. There will be a need for a motivated visionary leader to ensure that this project proceeds as planned. We should never lose sight of the need to further improve the model: details for this are provided below.

The leadership will also need to build the network by engaging with other organisations with either similar or complementary interests.

Issue: The financial incentives for the farmer are often insufficient to expand production and the quality of product.

The approach: Further analysis of the key components of traditional and contemporary market chains need to be conducted. These apply equally to the sale and distribution of milk, forage seed and forage (either fresh or as silage

or hay). With respect to milk we need to analyse the role of the dhodi carefully and develop strategies to enrich their role so that they contribute more effectively to the village community.

The role that improvements in the quality of the milk leaving the farm and reaching the consumer may have on price paid to the farmer needs to be analysed. The same principles will pertain to forage seed and forage.

Issue: Insufficient high quality forage is available to feed dairy animals to production potential. Research is conducted within the Agriculture Ministry and yet the need is for feeding livestock under the Livestock Ministry.

The approach: Develop on farm strategies designed to yield much higher quantities of high quality forage per unit volume of irrigation water. In conducting this research we plan to link key scientists from the agriculture and Livestock ministries to develop a close working relationship between the two research arms. Part of this approach will be to further develop entrepreneurial activities for forage seed, fresh forage and conserved product in the form of silage and hay. We plant to ensure that forage production becomes an important contributor to sustainable mixed farming systems.

Issue: Our extension approach is not being adopted quickly enough through the Punjab and Sindh livestock ministry veterinary service. There is still a significant number of farmers who listen but do not adopt no matter what the vision is.

General Comments

1. NARC/PARC linkages have been lacking since inception and in the future these linkages need to be built to help leverage of expansion of the pilot program with both national and international donor support linked national priorities.

Recommendations

1. It is recommended that the project work with ACIAR and AusAID to identify 3 Impact /potential impact indicators for meeting the Australian CAPF requirements. (as per the new reporting template proposed for ACIAR in Annex 3).
2. It is further recommended that Policy Gaps for Livestock in Pakistan be more clearly defined to support defined initiatives and strategies.
3. A funding request to cover additional salaries and wages of Pakistan and Australian Staff as well as staff travel and allowances and additional field operational costs, meetings, trial costs and fuel costs totalling AUD 140,000/year for the remaining years is well justified by inflationary costs and loss of support in some areas. It is recommended that this request be approved.

6.0 Additional projects

A number of smaller additional projects have been approved and funded by ASLP II. These include the Vegetables, Forage Seed and Mango Industry Associations initiatives. Outlines of these project are given below along with comments.

The Heat Tolerance Vegetable Project HORT/2012/002 AUD 549,724

ACIAR is in the process of commissioning additional project (vegetables) under ASLP Phase 2 entitled:

HORT/2012/002 Heat stress alleviation in summer vegetables Characterisation and utilization of heat tolerant germplasm in central Punjab, Pakistan

Partners and Collaborators

Australia: University of Sydney, NSW, and NuFlora, a private-public sector partnership in horticulture, NSW, Australia – NuFlora has strong linkages with vegetable growers in NSW along with public sector alliance with The University of Sydney in the area of vegetable breeding and seed production.

NSW Farmers Association.

Pakistan: Institute of Horticultural Sciences, University of Agriculture Faisalabad, Department of Crop Physiology University of Agriculture, Faisalabad and Mehr Muhammad Din & Sons, a privately owned vegetables seed entrepreneur from Gujranwala, Punjab, Pakistan and

The Issue

Pakistan experiences four distinct seasons. The central Punjab, the target area of this proposal, has a semi-arid climate with hot summer having average temperatures above 40 deg C and maximum temperature peaks above 45deg C (May-July).(*FAO Report, 1998; HKO Report, 2012). Punjab and Sindh province experience the hottest summer in Pakistan and similar weather extremes are also frequent in the crop production areas of Australia (BOM Report, 2012, cited in ProDoc).

Water, fertilizer, and crop protection requirements of vegetables are generally higher than other broad acre crops. Disease and insect pressure, under low management regimes, affect vegetable production considerably but in summer months but the damage due to heat greatly exceeds damage due to other factors. Although challenging, the farmers can manage a sufficient degree of control over other biotic factors but to control heat stress, due to their limited capacity to exercise cultural control, genetic intervention looks to be the only viable option under Pakistani conditions. High temperature events in Australia are less common compared to Pakistan, however increased weather extremes are likely due to climate change (CSIRO Report, 2006). There is a need to introduce better adapted germplasm to high temperature conditions in Pakistan and Australia.

With increase in population the farm size has reduced and more than 90% of farmers cultivate less than five hectares of land in Punjab. The staple food crops are usually inadequate and there is an increasing trend to adopt high value crops like vegetables to meet daily family needs (AVRDC, 2006). The health benefits of vegetables as part of the daily diet also demand a bigger supply in markets.

Effects of high temperature on vegetables have been extensively investigated and reported in literature (Abdul-Baki, 1991; Lobell and Asner, 2003; Gruda, 2005; Hazra et al. 2007; Abdelmageed and Gruda, 2009). According to a recent study, under heat stress, each degree Celsius increase in average growing season temperature can reduce crop yield up to 17% (Hayat et al. 2009). A report on rice showed a decline of 10% grain yield for each 1°C increase in growing-season minimum temperature in the dry season (Peng et al. 2004). High temperature, even for

short durations, inhibits photosynthesis, respiration rate, and interrupts plant water status due to high rate of leaf transpiration. It may cause abortion of buds, flowers and young fruits. Successful pollination, fruit quality, and seed viability are affected by excessive temperature (Abdul-Baki, 1991; Abdelmageed and Gruda, 2009).

N.B. All references above are from the ProDoc.

The heat stress, both in terms of intensity and duration, is much greater in Pakistan compared to many other countries where modern varieties of vegetables are bred. Surprisingly no research work has been conducted on screening, evaluation and mitigation of heat stress effects on vegetable crops in Pakistan. This proposal is the first comprehensive effort to initiate work in this regard.

Research Questions

- Is the genetic diversity in okra, cucumber, and tomato sufficient to improve heat tolerance of Pakistani and Australian materials?
- Is phenotypic variability, in genetically diverse local germplasm, sufficient to improve heat stress tolerance in Pakistan and Australia?
- Can the physiological basis of improved heat stress tolerance be determined and eventually used as selection criteria to improve the efficiency of plant breeding for heat tolerance?
- Is the heat tolerance observed in Pakistan transferrable to the Australian production environment and vice versa?
- Are local skills in plant breeding, and agronomy sufficient to establish a viable local vegetable stress breeding base in Pakistan? Workshops will be held to evaluate and up-grade local skills in these key areas.

Aim and Objectives

The overall aim of this project is to offer new genetic options by introducing better adapted germplasm, and to expand the knowledge base of heat stress tolerance in summer vegetables. The aim of this work will be accomplished by achieving the following objectives:

1. To screen and evaluate the adaptation of locally available indigenous and exotic germplasm of tomato and okra to heat stress under controlled and field settings.
2. To characterise the selected germplasm and to evaluate it for its profitable use in commercial farming.
3. To improve seed production and distribution of thermo tolerant germplasm to stake holders both in Pakistan and Australia.

Current Status

The project has been approved and is just beginning at this time.

The Approach/Work Plan is to:

- Collect germplasm from Pakistan, Australia and AVRDC.
- Examine diversity using molecular marker systems
- Screen heat stress response in controlled and field conditions
- Validate existing molecular markers in project germplasm
- Determine the physiological basis of the trait
- Assess agronomic acceptability of the germplasm
- Publish results in popular and scientific articles

- Deliver germplasm to the stakeholders

Comments

While vegetables and fruits value chains are recognised as high priority areas for work by PARC in submissions to Ministry of Planning, the current project just approved doesn't really fit that category.

Recommendations

Village Based Seed Enterprise for Sustainable Forage Seed Production AUD 300,000

ACIAR has recently commissioned an additional project (Forage Seed Production) under ASLP Phase 2 entitled: *Establishing Village-based Seed Enterprise (VBSE) for Sustainable Forage Seed Production to improve availability of fodder for better livestock Production*.

Partners and Collaborators:

Australia: Charles Sturt University

Pakistan: ICARDA and the ALP2 Dairy Project Farmer Groups, Fodder Research Institutes and seed companies including FRI, Sargodha and Pioneer.

The Issue:

The availability of forage crops with high forage productivity and quality and a steady supply of quality forage seed at affordable prices are crucial for developing an economically viable and sustainable feed production for the small-holder dairy sector. The limitation of forage/fodder supply relates to the use of low yielding indigenous varieties, the lack of quality seed and the failure to adopt improved technologies for seed production at the village level. The involvement of the farming community in commercial seed production is important for selecting appropriate varieties for a specific environment and for having seed supplies that are marketable directly into local farming communities.

Research Questions and Methods

1. What are the key determinants of forage seed demand and low seed yield in a small-scale farming system? A detailed survey will be conducted to collect the primary information about forage seed system. A questionnaire will be designed and pre-tested before the actual survey will be conducted.
2. Do different varieties and management practices like cutting regimes affect the seed production at the farm level? A field experiment will be conducted to evaluate different varieties in relation to the cutting regimes for economical seed production. This trial will be conducted at the entrepreneur farmers' field.
3. What is the role of honey bees in berseem pollination and its effects on seed yield? An experiment will be conducted to determine the impact of honey bees on pollination which is very crucial for berseem seed production. Each seed entrepreneur will be used as a replication.
4. What are the physical (weeds, etc.) and physiological (germination, etc.) seed quality factors in fodder seed production? A simple experiment will be conducted to test the purity and germination of the seed.
5. Is VBSE economically viable seed enterprise for the profitability and sustainability of seed entrepreneurs? A group of farmers (3-5 farmers) will be selected and mobilized in the target areas and empowered through training for the establishment of VBSE. Training will be provided on seed production and marketing of fodder crops.
6. What are the innovative promotion and marketing options to ensure seed sales and maximize profitability? The seed entrepreneurs will demonstrate the seed production fields to the local farmers and will ensure provision of quality seed at affordable prices. This can be achieved by linking the seed

entrepreneurs to locally available credit facilities for production and marketing. Also linking the seed entrepreneurs with federal seed certification department to ensure seed quality for marketing. This will enhance the credibility of the seed enterprises.

Aim and Objectives:

The main objective of this project is to improve forage seed production and marketing to increase fodder production and thereby boosting livestock production and productivity. This will be achieved through the development, evaluation and promotion of seed production and marketing schemes designed to make commercial forage seed production a commercially viable operation. The key outcomes will be:

- Ensure a steady flow of high quality seed of adapted forage varieties at affordable prices from the formal sector (public/private) or alternative sources for further multiplication and marketing by seed entrepreneurs to smallholder rural farmers and/or farmer co-operatives.
- Identify, mobilize and empower key farmers as seed entrepreneurs to establish village-based seed enterprise (VBSE) within project target areas and to become local seed producers and suppliers to forage crop producers.
- Enhance feed production and supply for the ever growing small-holder dairy industry of Pakistan.

Partnerships:

Partnerships public and private sector linking with farmers and researchers as noted above between will attract interest and be key to success of the innovation. Farmer groups and clusters established by the ASLP II Dairy project in Punjab will be the target groups for the project. ICARDA, ASLP II and Institute researchers in collaboration with private and public sector seed companies will work closely with selected farmers to form Village Based Seed Enterprises for producing and marketing selected fodder seeds mostly of Berseem and Maize.

Outputs:

1. Demonstration of new forage varieties and associated production technologies to smallholder livestock producers
2. Production and marketing of good quality forage seed by VBSE's with minimum cost.
3. Increase fodder production and thereby enhance livestock production and productivity.
4. Dissemination of seed production technology and capacity building of the local seed entrepreneurs to increase fodder seed production for their productivity and sustainability under local conditions of Pakistan.
5. Creation of international public goods (Scientific publications) regarding the production of fodder seed in project targeted villages as well as the effectiveness of VBSE in the Pakistani agricultural environment.

Outcome:

Once a commercially viable system developed, the idea and activity of VBSE will be promoted to ensure that any such enterprises are sustainable in the long term. The model will then be adapted to suit specific environments across Pakistan.

Major Impacts/benefits:

1. The current forage seed system will be reviewed and an alternative village-based forage seed production and marketing scheme will be proposed. This will provide an opportunity to select improved and recently released forage varieties and provision of source seed from research institutes for further seed multiplication and marketing. This will develop a linkage between farmers and research institutes which

will enhance future interactions. It also plays an important role in policy making for the smallholder farmers of Pakistan.

2. Pilot sustainable local forage seed production and marketing enterprises will be established and refined in the project areas. This will lead to an increased supply of quality forage seed for small-holder dairy farmers. We expect this to be reflected in increased milk production which will depend on the adoption of new forage varieties and access to locally produced seed through VBSE to maximise nutrient flow to the animals.
3. The seed producers will benefit from VBSE approach to increase their incomes and others farmers also benefit by accessing quality seed at affordable prices and increase their fodder and livestock production. The farmers will diversify their income generation through livestock as well as forage crops. This will enhance the profitability and sustainability of smallholder farming families. The diversification of on farm income for participants in VBSE will improve their livelihood as well as those who are recipients of the high quality forage seed emanating from the project.
4. Strengthening capacity of technical staff and seed entrepreneur farmers for seed production and marketing will be implemented.
5. The information generated from this project will help to identify the weaknesses in the current forage seed system, and also provide aid in developing a national level project to extend further multi-dimensional research and development activities.

Justification:

Detailed justification is provided by the ProDoc. Very high and increasing demand for fodder, low fodder yields, expense of importing fodder seed, poor quality local fodder varieties are clear justification for the project.

Current Status

The project has been approved and is just beginning in a small way at this time. The main project begins in July 2013.The project complements the ASLP II Dairy project and will be implemented alongside the dairy project activities as witnessed in the Field Visit in Punjab.

Comments

1. In areas where water is scarce and where soil and water salinity are encountered Sweet Sorghum and various forage sorghums may be a better choice than maize for summer cropping, because of their drought and salinity tolerance. FAO experience in China with Sweet sorghum for Food, Feed, Fibre and Fuel, proved very valuable in these marginal situations. (FAO Sweet Sorghum Manual link: http://ecoport.org/ep?SearchType=earticleView&earticleId=172&page=2268) The whole of the commercial dairy industry in peripheral Beijing is based around sweet sorghum for forage and for silage feeding in winter.

Mango Industry Organisation in Pakistan AUD 150,000

ACIAR in May 2012 commissioned a study to be done by two consultants to identify possible roles for a an industry organisation within the context of the social and economic environment of the mango industry in Pakistan, and the contribution that an industry organisation could make to more effective programs and policy in development of the mango industry in Pakistan.

The Study was planned to:

- Report on current plans/projects for mango industry development, current models for industry input and discuss possible roles for greater industry input where appropriate.

- Outline a possible process to develop an industry strategic plan for the Pakistan mango industry, if appropriate, including input from all sectors in industry (growers. exporters, processors, wholesalers, retailers), Government (national and regional), and donor agencies.
- Report on appropriate roles for Pakistan mango industry associations in assisting development of the Pakistan mango industry and report to ASLP on possible mechanisms for greater industry Input into project design and implementation.
- Report on roles, representation and resourcing the Australian Mango Industry
- Association.
- Participate in an ASLP-National Mango Conference organised by the mango production, value chain and social projects, reporting on expanding industry relationships.
- Report to ASLP projects the ALSP policy group and Government of Pakistan on how they might improve industry liaison into design and implementation and discuss possible mechanisms for greater input into industry development policy, project design and implementation.
- Scope and report a possible representative structure(s) in conjunction with current industry organisations, through industry workshops
- Scope and report possible resourcing to meet identified roles in conjunction with current industry organisations, through industry workshops (with Objective 4).
- Progress and final reports are due by1 January 2013 and 29 September 2013, respectively.

Current Status:

Two field visits have been made to Pakistan by the consultants July 2012 and November 2012and 2 interim trip reports produced. A final trip will be made in 2013 where full recommendations are expected by 29 September 2013.

Interim findings produced a great deal of background materials on the mango industry which suggest the need and willingness of the mango growers, private sector industry and GOP to set up a Mango Industry Association long somewhat similar lines to Australia.

There are significant benefits in developing a Pakistan Mango Industry Assoc. to sustain the research and government momentum established by ASLP. It will also deal with major issues of poor communication between farmers and marketers (export and domestic). Lack of communication in the supply chain constrains market changes. Consultants see the role of a developing Pakistan Mango Industry Assoc. in driving initiatives established by ASLP after project funding is finished. It is clear from industry workshop that everyone wants a single voice for industry, even apparently disparate groups, e.g. in Multan. It is also clear that the current model of industry input is confused, because the industry does not operate as a single voice but many disparate voices.

The experience of establishing the Australian Mango Industry Assoc. is very applicable to Pakistan. Issues of divergent views, perceived and real regional differences, and relations with national and provincial governments, funding and driving research, development and extension are all similar issues. The key issue is to get industry participants to see the issues they face are common. The differences are small, between regions, between large and small growers, between industry and government, between supply chain participants. The critical issue on developing a common understanding is ownership.

A process to develop a National Mango Industry Strategic Plan has been devised. Possible issues to include in the plan have been explored in detail. These include social, export and domestic markets, production and marketing systems among many. More stakeholders have yet to meet with the team and this will happen later in 2013, when

the inputs will be finalized including a draft National Mango Industry Strategic Plan and hopefully the formation of a National Mango Industry Association.

Comments

The standard of the consultant's reports in terms of layout and addressing the key points of the study with individual conclusions and recommendations must improve for the final reporting process. The 2 Interim reports were very unprofessionally written.

7.0 Agriculture Capability Strategic Priority Component

The Reference Committee Meeting Proceedings for 2013 gave very detailed information on the Agricultural Capability Component in addition main highlights are given below.

Highlights

Activities and Initiatives:

Eleven major Activities and Initiatives were supported across all projects in the 2011-2012 period.

Scholarships:

John Allwright Fellowships:

- Current JAFs - Three
- Completed JAFs 2010-13 -Three
- Pending JAFs- Two
- Current and incoming JAF awardees will complete their training by 2016.
- It is recommended that three or four additional JAFS be awarded to ASLP associated applicants by 2015.

Enhanced management and Planning Skills Training (John Dillon Fellowships): has been publicised in Pakistan and promoted by Project Leaders.

The Agricultural Capability component supported seven initiatives in 2011-2012 and several activities are planned for 2012-2013. Key outcomes have been:

- Enhance capacity of technical interventions to improve productivity and benefit flows in the mango, citrus and dairy sectors
- Enhanced capacity for social and participatory planning and research
- Strengthened capabilities for communication and use of ICT
- Broader awareness of ASLP achievements and opportunities.

Some example activities include:

- Nursery training for citrus and mangos
- Plant pathology capacity building
- Attendance at conferences
- A young graduate trainee (Ayesha)
- TA for mango export development

Agricultural Capabilities Activities support:

- Ongoing consultation on priority topics
- Advice to Firms, FAO and UNIDO in relation to their programs
- Proformas and reporting
- Linked support Pro-Poor Market Development under APAS in 2012

Key progress:

- Social project workshop in 2012 (Canberra)
- Mango postharvest disease diagnosis and management (Darwin 2011 and Islamabad 2012)
- Support for mango export activities in the Sindh 2012 & 2013
- Citrus and Mango Nursery personnel training (Australia 2012)

Future:

- Meat science in Australia (5 personnel)
- Dairy extension for Baluchistan and KP (20 personnel over 3 years)
- Irrigation management in Pakistan (20 personnel x 3 locations)
- Fodder and fodder seed production in Pakistan
- Support to Huanglongbing (HLB)-Citrus Greening Disease 2011 (Indonesia) and 2013 (Pakistan)
- Communications/Extension training 21011 (Thailand) 2013 (Pakistan)
- Conference/Congress attendance 2012, 2013, 2014
- Industry meetings and Poverty focused meeting to report outcomes in Pakistan 2014, 2015

Summary of numbers of farmers, private sector stakeholders and trainers the mango, dairy and citrus sectors as well as NGO and agency personnel in Pakistan, directly participating in ASLP supported activities in 2011-2012

Project	Sector	Tech-nologies	PAR	Impact assessment
Farmers	Citrus Dairy Mango Multi-sector	500+ 500+ 175 +252 50+	755 households in baseline survey (head of household and spouse)	
Private Sector	Citrus Dairy Mango Multi-sector	5 20 50+115 5	Focus groups in citrus, mango and dairy in 8 villages 2 orchard contractors in citrus and mango 10 labourer households in focus groups	
Trainers	Citrus Dairy Mango Other /Multi-sector	20 100 130+93 10	5	15
NGO personnel	Citrus Dairy Mango Other or Multi-sector			
Agency personnel	Citrus Dairy Mango Multi-sector	20 50 20+28 20	Training of ten Pakistan research partners and students in survey interviews and focus group techniques	
Students	Citrus Dairy Mango Multi-sector	10 100 150+116 20	Workshop on Participatory Methods for Dairy Team in Pakistan with 30 Pakistan and 4 Australian Vet. Students/Extension officers	
All personnel	Mango Value Chain	567 male and 37 female		

Comments

1. The Agricultural Capability Component has been a very good initiative of ASLP II. It has largely supported additional capacity building to assist in important areas not covered by other components. It has been well utilised by the project, with activities planned out over the 4 years, even though the funding is minimal at AUD1.4m.
2. Funding is a constraint and should be increased.

Recommendations

1. It is recommended that funding for the Agriculture Capability Component be increased to support the remaining years of the project. A proposal from ACIAR should be prepared for AusAID. An increase of funding to at least AUD 2m, would be perhaps appropriate.

8.0 Enabling Policy Strategic Priority Component

Key indicators have been i) planning and scoping of the Enabling Policy Component, (ii) planning and outcomes of Enabling Policy scoping study (iii) Planning, design and outcome and capacity building arising from the Enabling Policy project and (iv) impact and implications of Enabling Policy planning, activities and outcomes.

1. Planning and scoping of the Enabling Policy Component:

The Enabling Policy Component of ASLP was outlined as Annex 5 of the ASLP Phase 2 design document. The scope and planning for the component were discussed at the ASLP Phase start-up and First Reference Committee Meeting and during liaison visits in Pakistan by the ASLP Co-ordinator, Impact Evaluation Program Manager and the ASLP Implementation Manager.

2. Planning and outcomes of Enabling Policy scoping study

In October 2011, the Centre for Strategic Economic Studies at Victoria University Melbourne was commissioned by the ACIAR to conduct a scoping study of Pakistan's diary, mango and citrus subsectors to assist in the development the Enabling Policy component of ASLP Phase 2. The purpose of the Enabling Policy Scoping Study was (a) to provide an overview of the key policy gaps and issues for Pakistan's federal and provincial governments in relation to dairy, mangos and citrus sub sectors of agriculture and produce marketing for development and poverty reduction, and (b) to suggest what further collaborative activities ACIAR could consider to optimally address these policy gaps or opportunities in Pakistan.

The key output of the study was a report suitable for use in the development of an ACIAR project proposal. The key steps in the analysis were:

- Review existing ASLP I and ASLP II documentation.
- Participation in the 2011 ASLP Program Meeting.
- A literature search of key documents addressing Pakistan agricultural policy.
- Collection and analysis of secondary trade data - mangos, citrus and dairy.
- A field trip to Pakistan in January 2012 to meet key informants in policy and agricultural institutes, and dairy farmers, mango and citrus growers and agricultural traders.

Significantly, the independent scoping study affirmed the priority of focussing Australian agricultural development interventions on issues that are key elements of the ASLP I and/or ASLP II design and delivery. These include:

- the attention of ASLP to dairy and horticulture (mango and citrus) rather than field crops and to building links between research and extension;
- the strengthening of focus on the poverty and smallholder dimensions of the sectors;
- the need to enhance marketability and export growth ;
- the rising significance of China as an export destination and the considerable opportunity for market development with other countries in the region ;
- the importance of support for improving agricultural capability;
- the importance of giving attention to enabling policy in ASLP II.

The scoping study also highlighted some policy issues that are beyond the scope of the current projects where additional attention is critical for Pakistan's development but noted that one project would not be able to address all of them. These included:

- smallholder viability and profitability,

- devolution and co-ordination (also capacity building in the public services),
- rationalisation of the price support policies for agricultural inputs and outputs,
- agricultural R&D and farmer education,
- export/domestic market access and infrastructure,
- water allocation and pricing,
- the importance of taking a proactive approach in relation to assessing the potential impacts and undertaking R & D on climate change and agriculture.

Subsequently in February, 2013, Dr Aamir Irshad, the Chief of the Pakistan Planning Commission affirmed the priority of key areas raised in the ASLP Enabling policy scoping study.

3. Planning, design and outcome of Enabling Policy project

ACIAR has given preliminary approval for a project with a strong capacity building component for the provincial government partners. IAP/2010/091 Enabling Policy – Improving Agricultural Policy Environment for Benefiting Smallholders in Dairy, Citrus and Mango Industries of Pakistan that will address some of the issues raised in partnership with the Pakistan National Planning Commission and provincial agencies, and the project proposal is now being finalised.

In December 2012, Dr Debbie Templeton, ACIAR Impact Evaluation Program Manager ran a workshop[1] Concepts and Tools for Agricultural Research Evaluation and Impact Assessment which provided a good foundation for planning the enabling policy project, strengthened impact assessment capacity for Federal and Provincial agencies and reinforced the concept of 'imbuing an impact culture in R&D organizations'.

4. Impact and implications of Enabling Policy planning, activities and outcomes.

The enabling policy project will be undertaken in two stages, both of which will involve partnership with policy making agencies, because the failure of many previous policy initiatives proposed by consultants can be attributed to lack of ownership of policies by policy makers. The first stage will consist of documentation of the condition of the smallholders, current policies relevant to the key constraints facing the smallholders, and the formation and testing of hypotheses in the light of five detailed field studies and consultations with relevant experts. The second stage will involve detailed analysis of a small number of implementable policy options and examination of pathways for implementation for each subsector/region. During the course of both stages, several capacity building and training courses and workshops will be held in Pakistan and Australia, including workshops on decentralised sectoral governance, input pricing, extension services and market connectivity.

- Substantial capacity building impacts are expected within five years of the commencement of the Enabling Policy project. In particular, there will be significant capacity building impacts at provincial government levels for policy development, co-ordination, monitoring and evaluation. The capacity building impacts will start occurring while the project is under way and will result from the proposed capacity building workshops and seminars to be held in 2013 and 2014.
- Community-level impacts (economic, social and/or environmental) will take longer to be realised, and will depend on political environment. However, given the devolution of agricultural planning and development to the provincial governments in 2011, and the increased concern with food security and poverty, the political environment may be ready for change.
- The approach taken in the project of building capacity amongst policy makers may enhance the likelihood of 'owner driven' policy that has more chance of adoption and successful implementation.

- For example, Punjab's Livestock and Dairy Development Department (L&DDD) has set the target of 10% increase in smallholder household income during five years, but has identified the need for capacity building in policy formulation and co-ordination as a crucial requirement for achieving this target.
- There is also growing industry and political interest in understanding, and meeting, domestic and international trade protocols to increase marketing opportunities for horticultural produce, and/or provide a ready supply of quality agricultural inputs. The development and implementation of sound policies for market development will favourably impact on farm input prices, availability and quality, as well as on the overall level of marketable surplus sold in domestic and export markets. All-in-all, policies that stimulate the development of more equitable and efficient markets and enable smallholders to engage in these markets will increase smallholders' incomes and standards of living.
- The enabling policy project will also contribute indirectly to better outcomes resulting from several other ASLP II components, as a result of the improved policy environment in which their outputs are adopted and utilised.
- By facilitating the achievement of ASLP's objective of poverty reduction through development, this project will also help to raise the profile and visibility of ASLP in the international donor community.

From the Project document the enabling Policy Component is designed to:

- Overcome Policy barriers to global harmonisation and best practice for pro-poor value chain. The work planned is to:
    - Enhance capabilities and policy underpinnings for improved productivity, marketing and pro-poor outcomes
    - Promote Spill-over to Social Protection Assistance or Border Livelihoods Components of APARDS
- Australian partners are: Centre for Strategic Economic Studies, Victoria University, Melbourne and Trade Data International Pty Ltd and the p
- Pakistan Partners include Central and Provincial agencies including the Planning Commission, PARC, Pakistan, Department of Agriculture, Punjab; Department of Agriculture, Sindh; Department of Livestock, Punjab; Department of Livestock, Sindh and Department of Management Sciences, COMSATS IIT.

Project Aim:

- The aim is to develop, evaluate and define implementation paths for enabling policies to improve on a sustainable basis the livelihoods of the smallholders.

Project Objectives:

1. To document key policy-related constraints to, and opportunities for, increasing the earned income of poor smallholders.
2. To develop enabling policy options for addressing these constraints and opportunities, and to assess which options can be effectively implemented to benefit citrus, mango and dairy smallholders, both women and men.
3. To understand the policy making process in these areas in Pakistan, to pinpoint departmental responsibilities for specific policies and to ascertain the capacity gaps and potential coordination failures, and to suggest how these gaps should be filled.
4. To develop implementation pathways for the selected policy options and for making enabling policies more sustainable over time.
5. To contribute to improving the capacity of the relevant agencies in Pakistan to analyse, develop and effectively implement agricultural policies for benefitting the smallholders.

Methodologies include:

- The Institutional Analysis and Development (IAD) framework
- The Sustainable Livelihoods Approach (SLA)
- Field studies to collect information about smallholders' resources and assets, livelihood strategies, risks and vulnerabilities, role of governance structures and processes, and livelihood outcomes
- Multi-period benefit-cost analysis will be used for analysing policy options.
- Impact pathways will be developed to track the likely impacts of the new policy options.
- Capacity building workshops will be conducted for government officials involved in implementing and monitoring these policies.

Capacity Building:

- Provincial government departments are lacking in policy related capacity.
- Capacity building workshops will be conducted to address deficiencies in policy analysis, formulation, implementation, and intergovernmental policy co-ordination in decentralised sectoral governance.
- In these workshops, the methodology of Organisational Learning and Change will be used for enabling the provincial governments to address the broader challenge of improving multidimensional livelihoods, instead of the narrower focus on income poverty.

Economic Impacts derived from the ASLP II Project data to date:

- It is estimated that for small dairy farmers, away from the main cities, the price received for milk can be increased by 30% if they have access to cooling tanks,
- Improved access to markets for fruit growers, as a result of changed government regulations, can increase fruit selling income by 50%.
- As a minimum an increase of 5% in output levels and in prices received, and a 5% reduction in input prices, should be achievable.
- These three gains would increase income from the specific activity by 15-25%.

Capacity Building impacts:

- Substantial capacity building impacts are expected at provincial government levels for policy development, co-ordination, monitoring and evaluation within five years of the commencement of the project. The capacity building impacts will start occurring while the project is under way and will result from the proposed consultation workshops and capacity building workshops.

Policy Environment Impacts:

- Enhancement of policy development capacity of provincial and local government departments,
- Significant improvement in Pakistan's agricultural policy environment.
- Increase the likelihood of greater uptake of the new technologies and farm practices recommended by the other ACIAR projects or ASLP II components.

Current Status:

- Following a Scoping Study, the Preliminary Proposal has been through the IHR
- Full Proposal has been developed in the light of IHR comments and has been submitted to the Pakistani Partners for their inputs

- The Planning Commission of Pakistan has strongly supported the Full Proposal. Comments from other partners are awaited.
- It is a two year project, expected to commence mid-2013.

Comments

The Policy Project is expected to work closely with the ASLP II projects, partners and collaborators as it refines methodologies to capture and document project impacts, along with its many other activities.

Section 3: Annexes

Annex 1. Terms of Reference

The Terms of Reference for the mid-term review draws from the ASLP Evaluation Questions as specified in the ASLP Design and the ASLP M&E plan (Table 1). In addition the opportunity is being taken to use the review to provide data that can inform future investment planning.

The mid-term review will focus on four evaluation criteria: effectiveness, efficiency, monitoring and evaluation and sustainability. The primary questions that the evaluation team shall focus on under each criterion are below:

Effectiveness:

1) *Assessment of ASLP contributions to overarching Australia Pakistan Agriculture and Rural Development Strategy (APARDS)*
   a) Has ASLP effectively collaborated with GoP agencies, other donors, the private sector and NGOs to develop broad-based partnerships within its key value chains?
   b) Has ASLP implementation established sufficient mechanisms for management and fiscal flexibility to respond to emergent opportunities as they arise?
   c) Is there any evidence of systematic change in the ASLP value chains from the perspective of improved productivity, profitability or equity?
   d) Has ASLP been credible, relevant and appreciated by partners and targeted beneficiaries?
   e) Has ASLP contributed to enhancing selected markets that benefit the rural poor, through improved productivity, efficiency and employment opportunity? If so, in what way has their poverty been alleviated?
      i) What is the profile of the beneficiary households and communities (number, location, household demographics (including gender, age and disability profiles)?
   f) Has ASLP built the capacity of government, private and civil society to service the needs of stakeholders? If so, what agencies/enterprises and CSOs have been assisted, how has their service provision/behaviour changed (including in the case of government policy development and the implementation of relevant pro-poor reforms)?
   g) Has ASLP applied research and the approaches developed and implemented during implementation influenced the way in which other agencies work in relevant areas of rural development?
2) *Monitoring impacts of ASLP to other APARDS Intervention areas*
   a) Has ASLP provided advice based on its applied research/implementation experience, and has AusAID facilitated any knowledge transfer that could contribute to the Border Livelihoods Component outcomes? If so, has this knowledge been utilised by those implementing that component?[21]
3) *Assessment of ASLP management to the satisfaction of all parties*
   a) Has ASLP led to the improved performance of key rural value chains?
   b) Have any improvements in the performance of targeted value chains resulted in the improvement of the livelihoods of the rural poor (especially women)?
      i) Have the rural poor been properly targeted?
      ii) Have women's livelihoods directly benefited as a consequence of ASLP activity?

[21] Projects comprising the Border Livelihood component: **Sarhad Rural Support Program (SRSP)** Livelihood Strengthening Program in the Border Districts of Nowshera, Peshawar and Charsadda, Khyber Pakhtunkhwa; **Food and Agriculture Organization (FAO)** Australian Assistance to Agriculture Development in the Balochistan Border Areas program.

c) Are stakeholders more capable of undertaking their roles and has this been demonstrated in their activities?
d) Has improved capability led to better rural extension services?
e) Has ASLP's engagement in policy analysis and policy dialogue with national stakeholders led to improved policy formulation and implementation resulting in pro-poor reforms in the agriculture sector?

Efficiency

1) Has the implementation of ASLP activities made effective use of time and resources to achieve the outcomes? If not, what more can be done to ensure greater effectiveness of time and resources?
2) How has ASLP managed the security challenges faced by the program and have these been effective?
3) To what extent has ASLP demonstrated that it is delivering Value for Money and leveraging the comparative advantages of ACIAR and partners in the delivery?
4) How well has ASLP worked with other development partners to reduce transaction costs?

Monitoring and Evaluation

1) Is the M&E system collecting the right information to allow judgment to be made about meeting objectives, including maximising the level of sustainability at the next evaluation point?
   a) Is the M&E sufficient to ensure compliance with the requirements of CAPF/Effective Aid? If not, what necessary adjustments could the program make to respond to these new results policies/mechanisms?
2) Is ASLP's M&E framework appropriate for both reporting and ongoing management of the initiative? If not, how can the M&E framework be improved?
3) Have program and project level M&E been managed and monitored to the standards/expectations of ACIAR and AusAID.

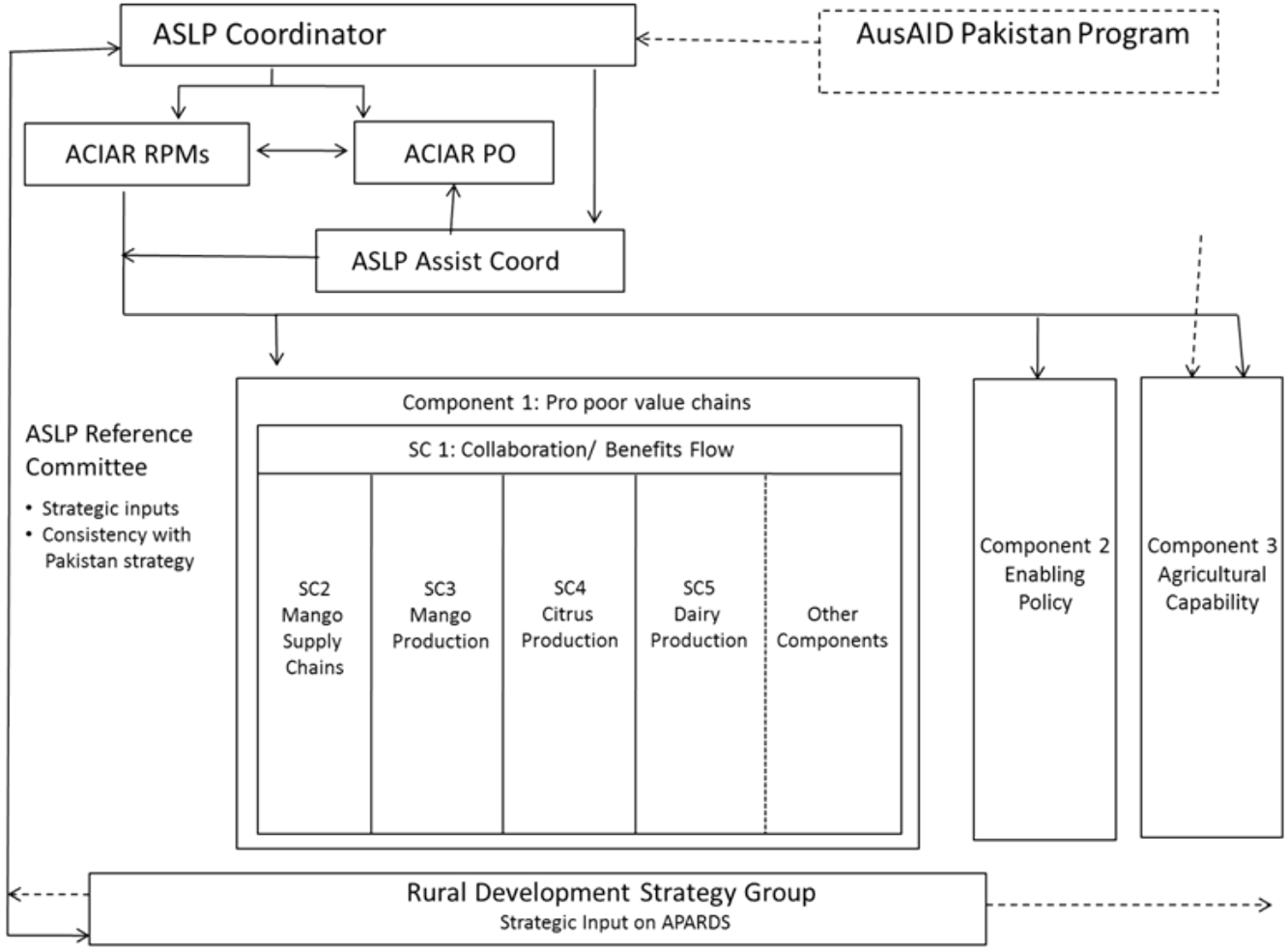
Sustainability

4) Are there any actions that can be taken now that will increase the likelihood that ASLP activities will be sustainable? Are there any areas that are clearly not sustainable? What implications might the lack of sustainability have for future program support? What actions could be taken to address this?

Table 5: The ASLP Evaluation Questions as specified in the ASLP Design and the ASLP M & E plan.

Strategic Intervention	Key evaluation questions
A Assessment of ASLP contributions to overarching APARDS	
(i) Collaborate strategically to improve livelihood systems for the rural poor in Pakistan	(a) Has ASLP facilitated broad-based engagements across the rural sector? (b) Have strategic linkages been established amongst or between these engagements? (c) Has ASLP implementation established sufficient mechanisms for management and fiscal flexibility to respond to emergent opportunities as they arise? (d) Has ASLP been credible, relevant and appreciated by partners? (e) Has ASLP contributed to poverty alleviation in rural Pakistan?
B Monitoring of spill-over impacts of ASLP to other APARDS Intervention areas	
(ii) Social Protection Assistance: Enhance government social protection programs and associated graduation opportunities.	(a) Has ASLP provided, and AusAID facilitated, any spill-over or linkages to this component?
(iii) Border Livelihoods: Improve community institutions and rural livelihoods and enhanced market functions in conflict buffer areas.	(a) Has ASLP provided, and AusAID facilitated, any spill-over to assist Border Livelihood Component outcomes?
C ACIAR managed ASLP	
(i) Pro-poor Value Chains: Enhance selected value chains that benefit the rural poor through market and employment opportunities.	(a) Has ASLP led to the improved performance of key rural value chains? (b) Has this improvement resulted in the beneficial improvement of the livelihoods of the rural poor?
(ii) Agriculture Capability Agriculture Capability: Build the capacity of Government, Private and Civil sectors to service the needs of stakeholders across the program.	(a) Are stakeholders more capable of undertaking their roles and has this been demonstrated in their activities? (b) Has improved capability led to better service delivery?
(iii) Enabling Policy: Support analysis that improves economic and natural resource management.	(a) Has engagement in policy analysis led to improved policy and associated reform?
(iv) ASLP Management and Monitoring.	(a) Have program and project level monitoring and evaluation been managed and monitored to the satisfaction of ACIAR oversight and reporting arrangements.

Annex 2. ASLP Coordination Framework



Annex 3. Activities and outputs/milestones template

Objective 1. To facilitate the establishment and spread of 'clean' mango nurseries and general good tree husbandry so that high quality planting material is widely available to the industry

For reviewers add any comments in last 3 columns in Bold Italics, after teams have added their comments in the table at each reporting time.

Key Researchers/ Institution/ Collaborators	No.	Activity	Outputs/ milestones	Due date of output/ milestone	Risks/ assumptions	Applications of outputs	What has been achieved?(as of date?) What is expected to be achieved by end of project?	What has not been achieved? (and is not expected to be completed by end of project)	Potential Adoption in 10 years (%)	Any additional comments? (e.g. additional outputs that have been achieved or will be achieved or planned outputs that now appear problematic in any way)
Key Persons: Add Institutional Abbreviation (e.g. DAFF plus MRS & ISATI Punjab etc.	1.1	Assist in extending the model commercial nurseries to other operators (PC)	Nursery manual distributed Small nursery operators trained on nursery establishment	Distribution completed by Yr1 m6 Training completed Yr1 m12	Manual translated into local languages Training of trainers activity undertaken and FFS engaged. Operators willing and able to invest in improved nurseries	Reference source for all nursery producers Small holders actively involved in clean nursery production practices	Draft of the manual is being compiled in collaboration with the Citrus project The potting mix has been standardized by the research team and is being evaluated at different geographical locations by growers and at research stations.	Add for each year	e.g. 30-50%	Y- 15 I- 25 Q- N.A.
Etc.	1.2		etc.	etc.	etc.	etc.	??	??		??

N.B. Please ensure Header is repeated on each new page. Please ensure each Output/Milestone aligns across the page with entries in the other columns. Use one row for each Activity/Sub Activity as set out above. Repeat for Objectives 2,3, 4, 5 etc. It is understood that Some Activities have no Potential Adoption or measurable Potential Impacts

Annex 4. Identifying Potential Impacts

Summary of numbers of farmers, private sector stakeholders, trainers, NGO and agency personnel, (mango, dairy and citrus and other sectors) directly participating in ASLP supported activities in 2012-2013. Revise for following years Annual Reports.

Project	Sector	Techno-logies	Participatory Action Research	Estimate of adoption of technologies in 10 years
Farmers	Citrus Dairy Mango Vegetables Policy Multi-sector			
Private Sector	Citrus Dairy Mango Vegetables Policy Multi-sector			
Trainers	Citrus Dairy Mango Vegetables Policy Other /Multi-sector			
NGO personnel	Citrus Dairy Mango Vegetables Policy Other or Multi-sector			
Agency personnel	Citrus Dairy Mango Vegetables Policy Multi-sector			
Students	Citrus Dairy Mango Vegetables Policy Multi-sector			

Annex 5. Review Itinerary

Australia (02-06 April)

Date/Day	Activity	Place/City
April 02, Tues	Reviewers arrive in Canberra	
April 3, Wed	9.00-9.15: Introduction 9.15-10.15: Overview 10.15-10.30: Morning tea 10.30-11.30: Social Sciences Component (45 minutes presentation; 15 minutes discussion) 11.30-12.30: Citrus Component 12.30-1.30: Lunch 1.30-2.30: Dairy Component 2.30-3.30: Policy and vegetable Components); Capability Building 3.30-3.45: Afternoon Tea 3.45-5.00: General Discussion	ACIAR House Conference Room, Canberra
April 4, Thurs	Travel to Brisbane Reviewer's Meeting	Brisbane
April 5, Friday	9.00-9.15: Introduction 9.15-10.15: Overview 10.15-10.30: Morning tea 10.30-11.30: Social Sciences Component (45 minutes presentation; 15 minutes discussion) 11.30-12.30: Mango Value Chain Component 12.30-1.30: Lunch 1.30-2.30: Mango Production Component 2.30-3.30: Other Components and wrap-up 3.30-3.45: Afternoon Tea 3.45-5.00: General Discussion	QDAFF, Bogo Road complex Brisbane
April 06, Saturday	Reviewers and teams return home	

PAKISTAN (17-25 April)

Date/Day	Activity	Place/City
April 17, Wed	Arrival at Islamabad via TG 0349 at 2225	Airport pick-up/Stay in Serena Islamabad
April 18, Thurs	0830-0910:Security Briefing by Colin=> Confirm 0930-1300: RC Meeting at Serena, 1300-1430: Lunch 1500-1600: Meeting with UNIDO => Confirm	Stay in Serena Islamabad Confirm
April 19, Friday	0930-1030: Meeting with HoM/DHoM at AHC=> Confirm 1030-1130: Meeting with Greg Ellis and Andrew Mackee (AusAID)-> Confirm 1145-1230: Meeting with Secretary Min Food Security & Research=> Confirm 1245-1400: Lunch & Meeting with Chairman PARC=> Confirm 1500-1600: Meeting with Dr Majeed (ICARDA)=> Confirm	Stay in Serena Islamabad Confirm

April 20, Sat	Presentations from Project Teams at NARC 9.00-9.15: Introduction 9.15-10.00: Overview 10.00-10.15: Morning tea 10.15-11.10: Social Sciences Component (40 minutes presentation; 15 minutes discussion) 11.10-12.05: Citrus Component 12.05-1.00: Mango Value Chain Component 1.00-1.45: Lunch 1.45-2.40: Mango Production Component 2.40-3.35: Dairy Component 3.35-3.45: Afternoon Tea 3.45-5.00: General Discussion 1900-Participate in AdiS at AHC	Night Stay at Serena Islamabad Confirm
April 21,Sun	0630: Departure to Sargodha/ Faisalabad 0945-1130: Visit to Citrus Demo Site, Nursery, CRI 1300- Lunch at UAF (To be decided who will host)=> Confirm 1430-1530: Meeting with VC=> Confirm Visit to Malik Lab=> Confirm Night Stay at Lahore	Chak 83 SB, Sargodha Stay at PC Lahore Confirm
April 22, Mon	07:15 Field Visit to Dairy Sites (Chak 45 GD, Lahore Multan Road, Okara) Onward movement to Multan (3-4 hours drive)	Stay at Ramada Multan Confirm
April 23, Tues	07:00-08:00 Field Visit with Mango sites 09:15 Departure back to Lahore Night stay at Lahore	Grower: Ch. Naeem Basti Hassu Near Thatta Qureshi, Main Ali Pur Road Muzaffar Garh. Stay at PC Lahore Confirm
April 24, Wed	0900-1030: Meeting with VC-UVAS=> Confirm 1045-1145: Meeting with Secretary Agriculture=> Confirm 1150-1230: Meeting with Secretary Livestock & Dairy Development=> Confirm 1300-1430: Meeting & Lunch with PHDEC=> Confirm	Stay at PC Lahore Confirm
April 25, Thurs	0900-12.00: Reviewer Meeting 12.00-1.00: Lunch 1.00-3.00: Meeting with ACIAR etc. (Review debrief) PM: Depart for Australia	

Annex 6. List of Persons Met

ASLP Mid-term Review – 03 April 2013 Canberra

Name	Institute	Roles
Les Baxter	ACIAR	ASLP Co-ordinator
Greg Johnson	Horticulture 4 Development	ASLP Implementation manager
Mathew Tasker	AusAID	
Troy Skaleskog	AusAID	
Tariq Chattha	University of Sydney	Vegetable
Graham Brown	University of Sydney	Vegetable
Peter Wynn	Charles Sturt University	Dairy
Sosheel Godfrey	Charles Sturt University	Dairy
Tahir Khurshid	NSW DPI	Citrus
Steven Falivene	NSW DPI	Citrus
Nerida Donovan	NSW DPI	Citrus
Barbara Chambers	University of Canberra	Social
John Spriggs	University of Canberra	Social

ASLP Mid-term Review – 05 April 2013 Brisbane

Name	Institute	Roles
Les Baxter	ACIAR	ASLP Co-Ordinator
Greg Johnson	Horticulture 4 Development	ASLP Implementation Manager and Mango VC
Mathew Tasker	AusAID	
Barbara Chambers	University of Canberra	Social
Ian Bally	QDAFF	Mango production
Peter Hoffman	QDAFF	Mango VC
Irene Kernot	QDAFF	Horticulture Manager
Ray Collins	University of Queensland	Mango VC
Tony Dunne	University of Queensland	Mango VC

List of MTR and Reference Committee Participants

Name	Designation
Mr.Taimur Azmat Osman	Federal Secretary, Ministry of National Food Security & Research
Mr. Abdul Basit Khan	Sr. Additional Secretary, Ministry of National Food Security & Research
Dr Iftikhar Ahmad	Chairman, Pakistan Agricultural Research Council
Mr. Ahmed Ali Zafar	Department of Agriculture, Punjab
Mr. Irfan Elahi	Secretary, Livestock & Dairy Development Department, Punjab
Mr. Noor Muhammad Balouch	Department of Agriculture, Sindh
Mr. Ahmed Said Khan	Government of KPK
Dr. Abdul Majid	Country Representative ICARDA
Dr Muhammad Azeem Khan	Director General NARC
Mr Greg Ellis	AusAID, AHC
Mr. Shoaib Tayyab	AusAID, AHC
Mr. Andrew Mackee	AusAID, AHC
Mr. Faisal Sohail Fateh	Project Coordinator (ASLP Mango)
Dr. Hussan Warriach	Project Coordinator (ASLP Dairy)
Dr. Hafeez-ur-Rehman	Project Coordinator (ASLP Citrus)
Mr. Razzaq Malkana	Project Coordinator(ASLP Mango Value chain)

Dr. Munawar R Kazmi	ASLP Operational Manager-Pak
Ayesha Arif	ASLP Program Support Officer-Pak
Dr.Iqrar Ahmed	Vice Chancellor
Dr. Talat Naseer Pasha	Vice Chancellor
Mr. Nadeem Akmal	Project Officer, Social Project
Mrs. Sajida Taj	Focal Person, Social Project
Dr. Izhar Ahmad Khan	Focal Person, Social Project
Mrs. Tehmina Mangon	Focal Person, Social Project
Mr. David McGil	Project Officer
Ms. Shumaila Arif	Training Manager
Mr. Khalid Mehmood	Focal Person Mango Project
Dr. Shafqat Saeed	Mango Project
Mr. Abdul Ghaffar	Mango Project
Mr. Yousaf Channa	Mango Project
Dr. Ghulam Nabi	Citrus Project
Mr. Muhammad Asif Khan	Citrus Project
Dr. M. J. Jaskani	Citrus Project
Mr. Altaf ur-Rehman	Citrus Project
Dr Aman Ullah Malik	National Project Coordinator, Research & Outreach
Mr Sohail Ayyaz	Project Development Officer, Mango Value Chain Project
Mr. Bruno Valanzuolo	Chief Technical Advisor, UNIDO
Mr. Aurangzaib	UNIDO
Mr. Ali Abbas Qazilbash	Program Officer, UNIDO
Mr. Asif Mehmood	Program Officer , ASLP mango Project
Mr. Tariq Malik	Plant Pathologist, Mango Research Institute Multan
Mr. Bashir Hussain	CEO, PHDEC

List of Midterm Review Participants April, 2013

Sr #	Name	Institute	Role
Pakistan Agriculture Research Council			
1	Dr. Iftikhar Ahmed	Pakistan Agricultural Research Council (PARC)	Chairman PARC
2	Dr Muhammad Shahid	PARC	Member Crop Sciences
Ministry National Food Security & Research			
3	Mr.Taimur Azmat Osman	Ministry of National Food Security & Research	Federal Secretary,
4	Mr. Abdul Basit Khan	Ministry of National Food Security & Research	Additional Secretary
ASLP Social Project			
5	Dr. M. Azeem Khan	National Agricultural Research Centre (NARC)	Coordinator Social Project
6	Mr. Nadeem Akmal	NARC	Project Officer, Social Project
7	Sajida Taj	NARC	Focal Person, Social Project
8	Dr. Izhar Ahmad Khan	University of Agriculture Faisalabad (UAF)	Associate Professor Rural Sociology-Social Project
9	Mrs Tehmina Mangon	Sindh Agriculture University (SAU)	Assistant Professor Economics-Project officer- Social Project
ASLP Dairy Project			
10	Dr. Hassan Mehmood	ASLP Dairy Project	Dairy Project Manager

Sr #	Name	Institute	Role
	Warriach		
11	Mr. David McGil	CSU	Project –Scientist
12	Ms. Shumaila Arif	ASLP Dairy Project	Training Manager
13	Mr. Irfan Elahi	Punjab GOVT	Secretary, Livestock and Dairy Development
14	Mr. Talat Naseer Pasha	UVAS	Vice Chancellor
15	Mr. Imtiyaz Ahmed Watoo	Host- Farmer	Chak 45 GD, Okara, Dairy Farm Holder
16	Mr. Malik Gohar	Farmer-beneficiary	Chak 45 GD, Okara, Dairy Farm Holder
17	Mr. Niyaz Ahmed	Farmer-beneficiary	Chak 45 GD, Okara, Dairy Farm Holder
18	Mr. Mohammad Safeer	Farmer-beneficiary	Chak 45 GD, Okara, Dairy Farm Holder
19	Mr. Mohammad Yousaf	Farmer-beneficiary	Chak 45 GD, Okara, Dairy Farm Holder
ASLP Mango Production Project			
20	Faisal Sohail Fateh	NARC	Senior Scientific Officer/ Mango Project Coordinator
21	Mr. Khalid Mehmood	Regional Agricultural & Economical Development Centre (RAEDC)	Director/ Focal Person Mango Project
22	Dr. Shafqat Saeed	Bhauddin Zakriya University (BZU)	Associate Professor/ Researcher-Mango Project
23	Mr. Abdul Ghaffar	Mango Research Station (MRS) Shujabad	Horticulturist/ Mango Project
24	Mr. Yousaf Channa	Agric. Extension Dept. Sindh	Focal Person for Sindh -Mango Project
25	Mr. Asif Mehmood	ASLP Mango Project	Program Officer, ASLP Mango Project
26	Mr. Tariq Malik	Mango Research Institute(MRI) Multan	Plant Pathologist-Mango Project
27	Ch. Naeem	Host-Farmer	Mango Grower, Basti Hassu, Muzaffar Garh
ASLP Citrus Project			
28	Dr. Hafeez-ur-Rehman	NARC	Citrus Project Coordinator
29	Dr. Ghulam Nabi	Agriculture Research Institute (ARI) Peshawar	Researcher-Citrus Project
30	Mr. Muhammad Asif Khan	Agriculture Extension- Punjab, Lahore.	Director Fruit & Vegetable Development Project- Citrus Project
31	Dr. M. J. Jaskani	(UAF)	Associate Professor Horticulture-Citrus Project
32	Mr. Altaf ur-Rehman	Citrus Research Institute (CRI)-Sargodha	Director-CRI/ Citrus Project
33	Mr Abdul Rehman	Citrus Research Institute (CRI)-Sargodha	Responsible for Screen House/ Citrus Project
34	Mr. Muhammad Ellyas	Host-Farmer	Citrus Grower, Chak 83 Sb, Sargodha
ASLP Mango Supply Chain Project			
35	Mr. Razaq Ahmed Malkana	Pakistan Horticulture Development & Export Company (PHDEC)	Value Chain Coordinator-ASLP Mango Value Chain Project
36	Dr Aman Ullah Malik	UAF	Research & Outreach Coordinator, ASLP Mango Value Chain Project
37	Mr Sohail Ayyaz	PHDEC	Project Development Officer, Mango Value Chain Project
38	Mr. Bashir Hussain	PHDEC	Chief Executive officer

Sr #	Name	Institute	Role
Meeting In UAF			
39	Dr. Iqrar Ahmed Khan	UAF	Vice Chancellor
40	Dr. Asif Ali Khan	UAF	Director ORIC
Meeting With UNIDO			
41	Mr. Bruno Valanzuolo	United Nations Industrial Development Organization (UNIDO)	Chief Technical Advisor
42	Mr. Aurangzaib	UNIDO	Sector Specialist- Horticulture
43	Mr. Ali Abbas Qazilbash	UNIDO	Program Officer
Meeting with ICARDA			
44	Dr. Abdul Majid	ICARDA	Country Representative
Meeting with Secretary Agriculture			
45	Mr. Ahmed Ali Zafar	Punjab GOVT	Additional Secretary Planning