



“Support to the Development of Agriculture Private Sector: Perennial Horticulture” (HPS) Project

DCI-ASIE/2013/335-321 (Europe Aid/133-872/L/ACT/AF)

2ND QUARTERLY PROGRESS REPORT,

01 APRIL 2014 - 30 JUNE 2014



Al Rafiq Kinnow processing factory in Sargodha, Punjab, Pakistan



**AFGHANISTAN
NATIONAL
HORTICULTURE
DEVELOPMENT
ORGANIZATION**

In consortium with



Key acronyms:

AAIDO	Afghan Almond Industry Development Organization
ANHDO	Afghan National Horticulture Development Organization
ANNGO	Afghan National Nursery Grower Organization
CU	Central Unit
CPG	Citrus Promotion Group
CTV	Citrus Tristeza Virus
DTL	Deputy Team Leader
FM	SO1 Field Manager
MAIL	Ministry of Agriculture, Irrigation and Livestock
MSN	Mother Stock Nursery
NC	National Collection
NGA	Nursery Growers Association
NNGA	Nangarhar Nursery Growers Association
NVDA	Nangarhar Valley Development Association
PBTL	Plant Bio Technology Lab
PHDP	Perennial Horticulture Development Program
PHDC	Perennial Horticulture Development Center
PM	Project Manager
RI	Relief International
SO	Specific Objective
TL	Team Leader



1. Summary of the Quarterly Activities:

SO1 team has closely coordinated with ANNGO to initiate the process for the revision of the ANNGO by law aiming to facilitate ANNGO efforts to become an inclusive organization that will permit all large and small scale nursery producers to join. A Legal Advisor Nat'l Consultant has been mobilized to provide capacity building to ANNGO BoDs on legal issues and facilitate the revision process. Currently, we have drafted the revised by law in order to be considered by the ANNGO BoDs in the coming months. Field Managers (seconded to ANNGO) support the NGAs and their umbrella organization ANNGO in implementing the certification scheme as well as provide MSNs and production nurseries with technical support and advice. ANNGO inspectors performed field visits to assess the application of the certification process. The field inspection reports were overall positive and all the assessed MSNs in the northern and eastern provinces will be certified and used by the NGAs members for certification purposes. In cooperation with ANNGO, we collected the requests and anticipated production of buds. From data analysis, we identified the actual market needs and shared the information with the SO2 team to ensure that in the future there will be a close coordination between the private sector and the national collection curators. We identified the suitable international consultant that will support and advise ANNGO regarding the ornamental sector and his mission is anticipated in Aug-14.

SO2 team activities were positively influenced by the mobilization of two PHDPPII Int'l Consultants (Greg Cullen and Monica Berti) that provided technical advice and support to the six Field Horticulturists in the PHDCs and the Pomology Laboratories' technical staff for the adaptive research programmes. We have drafted protocols and procedures for fruits harvesting time and maturity indexes, including shelf life trails, consumer preference test and Physiochemical analyses. We have initiated harvesting time, physiochemical analyses and shelf life trails on 12 varieties of Cherry and 14 accessions of Apricots. Field observations and data collections regarding the breeding programs and other breeding activities of almond and apricot is continuing regularly. We have been counting the fruit set on the almond and apricot pollinated branches. The collected seeds will be used in the next years breeding program. Work for the compilation of further volumes of the national collection publications (on apricot, plum and peach) is on-going including further data collection on accessions, and verification of previously collected data. PHDPPII organized a Horticulture Workshop in Badam Bagh (21–24JUN14). Most HPS staff actively participated in the workshop with presentations on different topics related to their field of work.

SO3 team performed field trips to assess grapes/raisin producers and farmer associations in Kabul, Parwan and Kapisa Provinces and obtain information about the quantity and quality of fresh grapes / raisin production and marketing trends. We have selected the initial 6 potential beneficiary groups (partners) including a total of 226 grapes/raisin producers in Kalakan, Qara Bagh, Dehzabz and Farza Districts in Kabul, Bagram District in Parwan and Mahmood Raqi District in Kapisa Provinces for pilot projects throughout the grape & raisin value chain. The identification and design of the key interventions is on-going as per farmer group needs. The SO3 Post-Harvest & Quality Control Int'l Consultant (May – Jun-14) visited private & public quality control institutions in order to determine their their role and needs to enable them to contribute further in promoting Afghan exports. We met with the MAIL Deputy Minister to obtain the future policy and perspective of the MAIL in regards to QC issues. The Pomology Laboratories in Kabul, Mazar-Sharif and Kunduz are now equipped with new instruments for testing fruits but also water and soil. We continued to coordinate closely with AAIDO; however, we faced difficulties in obtaining latest info regarding almond production and trade from them. It is becoming apparent that AAIDO does not possess currently the necessary capacity and/or maybe should not be considered as a reliable project partner. Potential alternative partners have been identified during our field visit to the north but we will require time to assess their actual capacities further. Anyhow, the almond production in the north part of Afghanistan was damaged severely this year due to late frost. In Apr-14, we facilitated a study tour to Italy for one Tabasom QC lab technician on advanced training in the Ochratoxin test (ELISA kit) in TECNA (specialized food safety assurance company) Triest, Italy. We facilitated the participation of the head of Ahmad Tamim Co.Ltd (Mr. Haji Bashir) in Halal Exhibition in Moscow in Jun-14. Mr. Bashir met with traders from all around the world and discussed export possibilities of Afghan products.

In the eastern Afghanistan region; SO4 team coordinated with PHDPPII, PBTL, the University of Florence and the University of Bologna to develop a new 3 year project proposal to study the effect of citrus tristeza virus (CTV) infection on the productivity of citrus in the area of Nangarhar Valley and address the choices related to the use of rootstocks for the future citrus industry of Afghanistan. The proposal is submitted to the French Development Agency (AFD). In coordination with the biotechnology lab team and in relation to the currently postponed CTV monitoring campaign; we collected samples from two orchards



in Nangarhar province. We identified the infected trees and marked them accordingly for future use as the reference trees. Traditionally, every May we receive a high number of student visitors in need of technical guidance and information for their last semester thesis. Specifically, in the eastern region, many students are assigned with thesis on citrus related topics. Most of the students referred to us and we were happy to support them in their research assignments. The SO4 PM presented the CPG in the Horticulture Workshop that was organized by PHDP. In cooperation with the PBTL, 4 participants undertook a Study Tour to Pakistan (12-18JUN14) aiming to assist the PBTL's further study of the Afghan CTV serotypes strain by investigating the research developments and the CTV serotypes present in the nearby Pakistan. Dr. Shamsur Rehman and Jamil Ahmad (PBTL Plant Virologists) participated in the tour to expand the biotechnology laboratory staff capacity.

2. Findings of Project Implementation Progress and Analysis:

After the successful recruitment of the project team and the establishment of the operational capacity during the past quarter; during the 2nd Quarter of the project we had the opportunity to start-up the implementation of most of the sub activities as per action plan. Specifically:

Staff Recruitment

By the end of the reporting period, all the required national staff indicated in the budget had been recruited. The current HPS Organization Chart is presented as **Annex-A**.

Coordination

Close coordination between ANHDO, RI and PHDP TA from the initial stages of the project, ensured a good team spirit. Decisions have been taken jointly with all relevant actors and extra care is taken to avoid surprising anyone and potentially damage the crucial level of trust and cooperation that was already starting to be established from the very beginning.

The following Coordination Committee meetings have been conducted as per requirements:

- | | | |
|---|--|---------------------------------------|
| a | 2 nd Coordination Committee meeting | Sunday, 13 th April 2014 |
| b | 3 rd Coordination Committee meeting | Saturday, 17 th May 2014 |
| c | 4 th Coordination Committee meeting | Wednesday, 25 th June 2014 |

Consultants Recruitment

During the reporting period, we announced the international consultants' vacancies in accordance to the plan we prepared in close coordination with PHDP TA in late March. It has been jointly agreed that we should avoid mobilizing international consultants during July 2014 (Ramadan Period) due to security concerns. Moreover, due to security concerns in regards to the presidential re-elections in mid June 2014 as well as other obstacles (presented below), only Dr. Federico Valori (SO3 Post-Harvest & Quality Control Int'l Consultant) arrived in Kabul on 06th May 2014 as part of his first mission. He is anticipated to remain in Kabul until the 03rd July 2014 (51 working days).

a/a	Consultant Vacancy	Remarks
1	SO1 Nursery Expert - Ornamentals	MATI Company changed Lorenzo Gambi with Dr Cosimo Frati
2	SO3 Marketing Specialist	Suitable candidates had high fee expectations (>\$800/day)
3	SO4 Citrus Value Chain Expert	Dr. Luigi Catalano is available in October not currently

Overall Progress Indicator

Based on the activities that took place during the reporting period the second (2nd) Quarterly Progress Report Matrix is presented as **Annex-B**. Moreover, **Table-A** below summarizes the main related progress information per Specific Objective:

Progress Indicators	Qtr. Progress Achieved	Overall Progress
Overall Objective: Contribute to the uplifting of horticulture (yields, quality standards, market value) and enhancement of capabilities of the private sector, through specific pilot actions in target areas.	4.7%	6.7%
Specific Objective One: The Afghan private sector nursery industry and its associated organizations and institutions meet the demand, nation-wide, of Afghan farmers for certified	4.9%	7.7%



perennial plant material for increased planting of modern orchards and vineyards.		
Specific Objective Two: Adaptive research and technical development programmes are successfully providing the technical solutions to increase orchard and vineyard productivity and value to the consumer at household, and national level	5.6%	8.3%
Specific Objective Three: Pilot demonstration of enhanced post-harvest management systems and market driven value chain development for key perennial horticulture crops within target areas and target groups	2.9%	3.1%
Specific Objective Four: A soundly based and profitable citrus industry in eastern Afghanistan is developed	5.3%	7.7%

Table-A: Overall and Quarterly Progress information per Specific Objective

Implementation of Activities

Specific Objective 1:

The Afghan private sector nursery industry and its associated organizations and institutions meet the demand, nation-wide, of Afghan farmers for certified perennial plant material for increased planting of modern orchards and vineyards.

R1. All large scale and small scale nursery producers join in building up ANNGO as an independent organization driving forward progress in the fruit tree and general nursery production

Sub activity 1.1 Organize regular board meetings and General Meetings

Regular coordination meetings were undertaken with the ANNGO technical staff to organize joint implementation activities. April-14 was a month where ANNGO was mainly preoccupied with the recruitment activity of a new General Manager. On 10MAY14, the SO1 Project Manager participated in the selection panel for the new ANNGO General Manager. The new ANNGO General Manager (Noor Zainulabudin) started on 17MAY14. We coordinated closely with PHDP TA in order to draft the new ANNGO bylaw based on the following jointly (with ANNGO) agreed procedure:

- Meeting with PHDP TA on revision of the bylaw regarding its structure;
- Revision session with the Legal Advisor (Nat'l Consultant) and translation in Dari and Pashto;
- Revision session with the ANNGO BoDs members and Legal Advisor to explain the articles and obtain their consent;
- Training session with the General Assembly and the Legal Advisor to understand the implications of each article, before the final vote.

On 10&17JUN14, we conducted 2 coordination meetings with the ANNGO TA and chairman where we had the chance to discuss the revision process of the by law. The first draft of the newly revised by law was translated during the month of June-14 and will be reviewed in coordination with the ANNGO board members after Ramadan in August-14.

Sub activity 1.2 Organize regular planning meetings of technical staff

Four coordination meetings took place with ANNGO technical staff in April-14 to address the following:

- The training arrangements for the anticipated FM capacity building.
- Interviews for the remaining three (3) FMs for Herat, Kunar and Zabul NGAs.
- Preliminary inputs regarding the ANNGO annual catalogue.
- Plan the distribution of MSNs in 2015/2016

ANNGO was reluctant to prepare new material for the anticipated capacity building training. Instead, they preferred to use the existing training material with minor changes. During the training between 03-05MAY14 with the newly recruited technical staff (Field Managers) which are seconded to ANNGO; we conducted a regular planning staff meeting and the FMs could share challenges and problem that they face in the different provinces.

Sub activity 1.3 Organize regular training of ANNGO board on legal responsibilities



The recruitment for the Legal Advisor - Nat'l Consultant was successfully completed in April-14 by finally contracting Prof. Musa Fariwar. His inputs did not start immediately since it was decided at the time to wait for the appointment of the new ANNGO GM in mid May-14.

On 17JUN14, we conducted a coordination meeting with the Legal Advisor and ANNGO TA to review the newly drafted revised by law. Moreover, during 21-23JUN14 the Legal Advisor undertook the translation in Dari and Pashtu of the newly drafted revised by law for the ANNGO BoDs members review.

Sub activity 1.6 Recruitment of additional staff

During April-14, the recruitment phase of the new staff (25 Field Managers) that will be seconded to ANNGO and located to the NGAs faced further minor delays since the NGAs didn't send on time the reference letters in support of the continuation of the staff that was seconded to them in the previous projects.; however, the contracts (and secondment agreements) were signed for the 22 preselected candidates (already recruited by the two consortia that were managing the previous projects) with 01MAY14 as the starting date. The three remaining vacancies (Herat, Zabul and Kunar NGAs) were announced on ACBAR website during April-14 with the final selection completed at the end of May-14 with the new ANNGO General Manager participating in the interviews.

During May-14, two of the newly recruited staff (seconded to Chongar NGA and Bagram NGA) resigned from their position for family and health problems respectively. In coordination with ANNGO, we undertook the necessary recruitment steps to fill the referred vacancies and identified a suitable candidate for each of the NGAs.

Sub activity 1.7 Staff training programmes

After some initial delays due to the recruitment phase, the first (1st) Quarterly Training took place during 03-05MAY14 with the newly revised training material. The training was attended only by the already identified twenty (22) Field Managers that already have been working in the previous (past) consortia projects. The following topics were covered:

- Presentation and discussion of the Evaluation Test Findings
- Duties and responsibilities of the Field Managers
- Presentation of the project (SO2) activities
- The Certification scheme and documentation



The SO1 PM provided inputs regarding the project activities, the duties and responsibilities of the newly recruited Field Managers under the current project and the evaluation test results; ANNGO presented the sections regarding the certification scheme. They were case studies to test and let the FMs practice what they have learned.

The other three FM (Herat, Zabul and Kunar) were trained in private sessions after their appointment to ensure that they could fully understand the certification scheme and all the requirements of the job.

Sub activity 1.9 NGA coordination and training

Provision of organisational support to the NGAs and technical support to Mother Stock Nurseries (MSNs) and production nurseries continued during the reporting period. After the 1st Quarter Capacity Building Training in early May-14, the Field Managers (FMs) focused on monitoring the MSNs and providing the owners with technical support and advice. The MSN owners received instructions and advice on how to improve MSNs quality and produce certified and healthy bud woods for the coming budding season.



Field Manager monitoring and tech. support to Paktya MSN



Field Manager technical support to Nangarhar certified nursery



Moreover, the FMs also conducted field visits to certified commercial nurseries in order to collect certification documents and provide them with technical support regarding the upcoming grafting season. During the reporting period, FMs collected the following certification documents and in coordination with ANNGO TA, the SO1 Nursery Expert continued to review the documents and strengthen the FMs to ensure that they understand the process and they are following the certification scheme requirements accordingly:

- Number of Requests to register a nursery as candidate for the certification scheme: 206
- Number of Requests to register different planting material for certification: 52
- Number of ANNGO inspectors' reports before issuing the certification labels: 29:

Sub activity 1.10 Marketing and promotion

We supported ANNGO technical staff to edit the new 2015 ANNGO Annual Catalogue of certified fruit trees species and varieties. Specifically we advised them to:

- Improve the quality of the photos.
- Cooperate with the SO2 staff to organize the collection of the data.
- Separate the ornamental and the forestry plant sections.

Regarding the Manual of Procedures for ANNGO regulatory system (attachment to seed & planting material regulations); we shared with ANNGO the draft document (that was developed in cooperation with PHDP TA based on the European legislation) for their comments. This document will be discussed after Ramadan in August.

R2. The technical level of the fruit tree nursery industry in Afghanistan is raised to standards appropriate to the development of a modern orchard industry

Sub activity 2.1 Review the role and sustainability of smaller nurseries and the support systems to local nursery grower associations within the overall objective of raising standards and production capabilities of the Afghan nursery industry

We established a monitoring system for the FMs to ensure that all the relevant information regarding the project activities are sufficiently recorded. This monitoring system plus the completed certification documents will ensure a comprehensive understanding of the sustainability potential of the smaller nursery growers and will support the NGAs to raise standards and be able to produce high quality saplings. Coordination with ANNGO TA is on-going and PHDP TA has prepared a baseline survey that will support further the referred review.

Sub activity 2.2 Find (approximately 60) of the best-organized and viable commercial nurseries either inside or outside ANNGO. Promote ANNGO membership for those that are not yet in the organization. Focus on these selected nurseries for introduction of improved nursery including pests & diseases monitoring, introduction of innovative propagation techniques.

Starting on 01JUN14, the newly recruited SO1 Micro Propagation Technician is working in the BBTL to produce tissue culture. This is an innovative propagation technique that the project needs to support the increase of the propagation capacity in the country. During June-14, the technician propagated a total of 355 clonal rootstock plants to increase the capacity production of MSNs.

Sub activity 2.3 Provision of at least 15 more Mother Stock Nurseries, from the National Collection of fruit varieties, after review of demand and need

We initiated joint coordination meetings including the SO2 project team and ANNGO technical staff to coordinate the next distribution phase of samplings to MSNs. According the initial ANNGO plan, they intend to distribute 5,390 saplings of Peach, Plum, Apple, Apricot, Cherry, Pear and Almond countrywide. The existing plan may be revised based on requests received by ANNGO from different NGOs (Aga Khan Foundation, Concern Worldwide and TLO) to become included in the certification scheme and receive new MSNs for the nurseries that they will establish under other development projects.

In cooperation with ANNGO TA, we collected the requests and anticipated production of buds. From the analysis of the data, we aim to identify the actual market needs and share the information with the SO2 team to ensure that in the future there will be a close coordination between the private sector and the national collection curators to meet the actual market demands.

Sub activity 2.5 Provide regular Virus indexing testing for mother stock nurseries and potential mother stock material with sample testing at Plant Biotechnology Laboratory. At least 20,000 tests by 2017.

After the deployment of the Field Managers in the field, ANNGO finally started with the virus index campaign in early May-14.



During May-14, ANNGO Inspectors performed two field visits in the eastern region to collect samples for the virus, fungi and bacteria indexing campaign in Laghman and Kunar MSNs to be analyzed by the BBTL in Kabul.

The analysis presented evidence that some of the samples were infected by bacteria, fungi and nematodes. The BBTL laboratory provided ANNGO with the evidence and informed the related NGAs regarding the necessary treatment/s.

The collection of samples for the bacteria and fungi campaign that was planned for Kandahar and Zabul Provinces during June-14 was postponed due to re-election period and the related security concerns.



BBTL staff collecting samples in Laghman MSN

Sub activity 2.6 Widen the mission of ANNGO to include ornamentals, medicinal plants and forest trees for domestic and export sales. At least 5 new agribusinesses promoted.

On 01JUN14, we participated at a coordination meeting with ANNGO TA and the director of the Horticulture Department at the MAIL. We visited the biggest ornamental nursery in Kabul (and probably in Afghanistan) where they requested more support to the sector and they would like to create a different association that will include only the ornamental nursery growers. In cooperation with ANNGO, we discouraged this initiative that will duplicate efforts and actions. There will be further coordination to ensure cooperation in the sector.

We have finally identified the suitable international consultant that will support and advise ANNGO regarding the ornamental sector. His mission is anticipated in commence in August to support ANNGO in this strategic expansion of activities.

R3. The planting material registration and certification system increases its operations to meet increased demand

Sub activity 3.3. Implement the planting materials regulations and update as necessary

During the reporting period, we reviewed the existing certification documentation and proposed a number of recommendations for improvement to ANNGO TA. We reviewed all relevant documentation in cooperation with PHDP TA and ANNGO and produced a draft document that needs to be discussed further with ANNGO before finalization. The final regulation document will be annexed in the anticipated revision of the ANNGO manual of procedures.

Sub activity 3.4. Train staff in implementation of registration and certification rules

Following the training that was conducted during early May-14, the FMs started to visit the nurseries in the provinces to collect the necessary initial documentation. Not all the documents were filled correctly so the SO1 Nursery Expert initiated an M&E programme to monitor the performance of the FMs in the field.

Specifically, during the reporting period, the SO1 Nursery Expert conducted in total seven (7) field visits to different NGAs countrywide aiming to directly support the FMs in their activities and provided them with on the job training for building up their capacities to implement registration & certification rules sufficiently.

Sub activity 3.5. Carry out field inspections. 250 per year. At least 1000 inspection by 2017, with circa 60 MSNs and 200 best nurseries regularly inspected every year.

According to the plan prepared with ANNGO, the field inspectors started field missions in late May-14 to inspect the MSNs. During May, they started visiting the MSNs present in Laghman, Kunar and Nangarhar. Field inspections continued in June to inspect MSNs in Kabul, Parwan, Balkh, Samangan, Baghlan, Badakhshan, Takhar and Takhar. The reports from their missions were overall positive and all the inspected MSNs will be certified and used among the NGAs members for certification purposes.

Sub activity 3.6. Report on inspection successes and failures and maintain records in a computerised database

During the reporting period, the inspection records continued to be done on paper and the archive is currently held with ANNGO.



Specific Objective 2:

Adaptive research and technical development programmes are successfully providing the technical solutions to increase orchard and vineyard productivity and value to the consumer at household and national level

R1. Adaptive research and technical development programmes are successfully providing the technical solutions to increase orchard and vineyard productivity and value to the consumer at household and national level

Sub activity 1.1 Annual adaptive research activities in cross pollination

Field observation of the national collections and the Demo plots continued throughout the reporting period. On April-14, we conducted cross and self-pollination trails on apricot National Collection of varieties. The trial involved cross breeding among 12 Amiri types aiming to identify a suitable pollinizer. Furthermore, we performed data entry of the field data regarding the self and cross pollination trials of apricot and almond as well as from the breeding programs. Collected pollens of flower and small shoots to store under different temperatures in coordination with the Virus Indexing Laboratory staff. We used different storing techniques to potentially permit cross breeding with late flowering varieties.

Starting in May-2014, we conducted a trial to study the gibberellin effect on flowering thinning and berry sizing of Shundukhani grapes variety in Badam Bagh aiming to study the effect of GA3 before flowering on cluster compactness and to determine the proper dose of GA3 on flower thinning and berry sizing.

Trial no. 14-04 has 8 treatments and each of the treatments have four replications. The first treatment is Control, treatments number 2, 3, 4, and 5 are for thinning out the berries. Treatment number 6, 7 and 8 are designed for berry sizing.

**Sub activity 1.2 Literature search for existing information on imported varieties**

Preparation programme on field testing new almond lines with selected partners. Organizing new system for single harvest cherries for ensuring good ripening data could be collected, with intention to use system on other stone fruits, too.

Sub activity 1.3 Collating and publishing information (National register of varieties / List of varieties eligible for certification / Characterisation results (phenotypical methods & molecular methods / Research trials results)

During the reporting period, we continued coordination with the field horticulturists in the PHDCs regarding the ongoing adaptive research activities. The progress of description and characterization of varieties was on-going. Data from the descriptor sheets were entered into a database, counted and missing data for each accession was highlighted. This will enable the Field Horticulturists to collect all those missing data which would be used in the next Registers of National Collection. A briefing was carried out regarding an update of description of varieties and missing data of all species with the PHDP II International Consultant, Miss. Monica Bertie.

During May-14, we conducted a leaf description for 18 clones of Amiri apricots which results were pending due to not having a clear difference to distinguish each accession. Furthermore we completed the leaf characterization according to UPOV description and submitted to IT and database assistant for further process and data enter to the database.

PHDP II organized a Horticulture Workshop in Improved Seed Secretariat building in Badam Bagh (21st – 24th of June). The procedure for management of the National Collections was presented as well as a clear vision for maintenance of germplasm and national collections.



Work for the compilation of further volumes of the national collection publications (apricot, plum and peach) is on-going including further data collection on accessions and verification of previously collected data.

Sub activity 1.4 Pomology Laboratory work on fruit quality, maturity index; packaging trials, etc.

We conducted introductory briefings of all SO2 on-going activities and work plans to the newly recruited SO2 laboratory staff including introductions of PHDP, ANHDO and ANNGO staff. The new staff were introduced to the laboratory and shown how to use and maintain the relevant instruments.

Installation of the Pomology Laboratory instruments and field machinery that were procured by PHDP continued during the reporting period mainly in the Pomology Laboratories located in the Kabul, Jalalabad, Mazar-i-Sharif and Herat and Kunduz PHDCs. The installation of the laboratory equipment included a brief practical training to field horticulturists and laboratory MAIL responsible staff of PHDCs on equipment use and laboratory safety rules.



We drafted protocols and procedures for fruits harvesting time and maturity indices, including shelf life trails, consumer preference test and Physiochemical analyses. Moreover, we carried out regular field visits to the Kabul PHDC farm and examined the maturity stage of fruits especially of the cherry & apricot national collection.

We conducted harvesting time, physiochemical analyses and shelf life trails on 12 different varieties of Cherry fruit and 14 accessions of Apricots in Kabul.

Harvesting time plays a very important role in marketing of fruits. If fruits are harvested at the proper time, the marketability and consumer preference for those fruits will be high. Specifically for Cherries, we were aiming to determine the appropriate harvesting time as the one having almost 50% of dark red cherries in our randomized sample that we got from different trees of one clone. We chose the dark red color as our target because this is the most preferred characteristic by consumers in Afghanistan. Grouping according to color is not sufficient for determining the maturity and harvesting time for other stone fruits like Apricots, Peaches and Plumes. Grouping is done according to four main categories: Overripe, Ripe, Nearly Ripe and Unripe fruits. We have included other characteristics like firmness, juiciness, Brix, acidity, grade and also taste of the fruit. Most Apricot fruits ripe uniformly therefore it is important to identify the proper time for harvesting related to the market distance.



Physiochemical Analyses of Cherry samples (grouped according to the color) included 24 fruits from the dark red color cherries. Some new physical measurements were also included this year. The physical characters for Cherry fruits include: Weight, Height, Diameter, Grade, Firmness, Stone weight and Stalk weight. The chemical measures include Sugar content, pH and Titratable acidity. A copy of this measurement is also given to staff who works on UPOV characterization so that they can attach as fruit characters. In Apricot fruits the group Ripe (24 fruits) was taken for physiochemical analyses. Also, some new measurements have been added to Apricot and Peach analyses. Physical characters for Apricots include: Weight, Height, Fruit Lateral width, Fruit Ventral width, Stone weight, Color and the chemical measures include Sugar content, pH and Titratable acidity.

Shelf life: Cherry fruits are non-climacteric; they do not change their quality characteristics when kept for some days or they do not produce ethylene hormone which promotes ripening even after the fruit is



harvested. The best quality cherries (dark red color) were kept in room temperature (nearly 25oC) for 7 days after which their quality was compared.

Fruit samples decreased in total weight due to water loss, fruit bruising and drying occurred. Flesh became very soft and very dry, browning of stem occurred with curling stems. Taste was sweet but fruits were crispy, fruits are not juicy, Fruit samples with splits got fungus, color was very dark.



At harvesting day



After 7 days at 25oC

Apricot fruits are climacteric; they change their quality characteristics and they continue ripening after harvesting. We decided to keep nearly ripped apricot fruits in both room temperature and fridge for 2 full days meaning that the fruit quality was checked on the fourth day. Findings were compared based on analysis on the day of harvest and also on 2 days after storage. Nearly ripe Apricots stored in a fridge have not changed their color. However, after stored in room temperature (same group) for two days they change their color and ripe considerably. The need for cold storages in districts and provinces for storing of Fruits & Vegetables is apparent.



Apricots must be harvested at a proper time with minimum acceptable maturity indices described. Also, they should be harvested nearly ripe to compensate for the transportation time and reach the final market or consumer at a good quality and ripeness state.

Sub activity 1.5 Organizing and defining laboratory work and writing down procedures and protocols

In coordination with PHDP II International Consultant (Monica Bertie) and based on the newly drafted protocols and procedures for fruits harvesting time and maturity indices, including shelf life trials, consumer preference test and Physiochemical analyses; we developed a three (3) year research plan (2014-16) to estimate day for 50% ripe harvest, analyze characteristics of ripe fruits, analyze maturation process in grapes, observe changes during shelf life at room temperature and in fridge. There will be 3 years of repetitions in 2 Pomology Laboratories resulting to 6 sets of data in total to be compared for deriving final conclusions.

Sub activity 1.6 Facilitate the recruitment of students

Interns have been mobilized to assist the Kabul, Herat, Mazar-i-Sharif, Jalalabad and Kunduz PHDCs. Full time interns were mobilized in roles like: Kabul Field Horticulturist Assistant, Kabul Biotechnology Lab Assistant, Kabul IT and Data Entry Assistant, Herat Field Horticulturist and Mazar Field Horticulturist Assistant. Moreover, a number of part time interns have been used to facilitate period field work on pollination trials and variety description activities in the PHDCs.

Sub activity 1.7 Organize study tours

We initiated the necessary preparations regarding a potential study tour plan to Italy in September-14. Prof Giordani (PHDP TA Int'l Consultant) will assist the SO2 team in the organization of the study tour as well as he is expected to be able to facilitate the tour and assist the team in Italy. The study tour aims to increase the technical capacity of national staff in the horticulture sector; namely in germplasm management, nursery production under a certification scheme, fruit production and marketing, including sensorial evaluation.

Sub activity 1.8. Collaborate with PHDP II for publication of the National Collection register

We coordinated with the MAIL Horticulture directorate and the Director of Information and Public Relation regarding Almond NC register proof reading process. In May-2014, the Register of Almond National Collection was reprinted and submitted to HE the Technical Deputy and Director for Monitoring and Evaluation, Ministry of Agriculture, Irrigation and Livestock (MAIL) for final verification. Subsequently, meetings were held with HE the Deputy Minister for final proof reading of the Almond Register. This version was approved and it was suggested that the register should be printed with error correction notes at the first or end of the register so that any anomalies can be corrected. The first color draft would be printed soon.

Data collection on the apricot national collection is ongoing aiming to achieve that the NC register would be completed in 2014. This includes a review of the data collected to date and a review of protocols for



the data collection. The completion of the work on apricots will be based on results from Badam Bagh, due to lack of crop in Mazar after a period of severe late frosts.

R2. Breeding programmes for improved apricot and almond varieties based on the best combinations of Afghan and imported germplasm have produced varieties for production testing and as a basis for further long term development

Sub activity 2.1 Planting nursery in 2014, to transplant in 2015. Maintenance of breeding lines until 2017.

During this period, we conducted regular field observations and data collections regarding the breeding program and other breeding activities of almond and apricot. We have been counting the fruit set on the almond and apricot pollinated branches. The collected seeds will be used in the next years breeding program.

Sub activity 2.2 Growing on existing almond lines from 2013/2014, and newly sown lines from nurseries as from 2015

We conducted regular field observations regarding the breeding program and the progenies. Supervised the budding process of almond new varieties gained from the new breeding lines.

We conducted four different cross and self-pollination trials on almond. The aim of conducting the trials were to collect the cross seed and using it in breeding to have some self-pollinating, high yielding, soft shell and late flowering varieties for north and north eastern regions. Regarding the Trial no. 13-01 Evaluation of first crosses of Afghan & imported germplasm as improvements on existing varieties of Afghan almond in Kabul; during September 2013 we did a T- budding on some bitter almond Rootstock from the new almond lines gained from the cross pollination trials of 2008. During the reporting period, we counted them and the number of successful buds was good. The successful and healthy saplings will be planted in the National Collections and the remaining will be provided to interested almond growers in the North and North eastern regions of Afghanistan. Regarding the Trial no. 11-01 Use of Afghan & Imported germplasm to develop improved varieties of almond; we conducted observations from the crossed seeds. The crossed seeds will be used as in the breeding program of 2015.

Sub activity 2.3 Growing on transplanted apricot lines as from 2014 and 2015

Regarding the Trial no. 10-06 Use of Afghan germplasm to develop improved varieties of apricot in Kabul; the cross pollination aim is to use the crossed seeds in the breeding program. We collected approximately 170 seeds on the crossed branches and the collected seeds will be sown in Dec 2014.

Sub activity 2.4 Recruit talented fresh graduates and provide support for research study related to the long term breeding and other research goals

During the reporting period, we successfully completed the recruitment process for the following talented fresh graduates:

- Junior Research Assistant, Shir Shah
- Pomology Laboratory Assistants (X2), Mukhtar Ahmad and Ahmad Munir
- Junior Post Harvest Technician, Mohamad Wali Adel

Specific Objective 3:

Pilot demonstration of enhanced post-harvest management systems and market driven value chain development for key perennial horticulture crops within target areas and target groups

R1. Grape & raisin value chain improved with enhanced harvest and post-harvest systems for exports and home market

Sub activity 1.1 Survey of group of traders and producers and their organizations; selection of partners for pilot project throughout the value chain

During the reporting period, we conducted a number of field visits to assess grape and raisin producers and farmer associations in Deh Sabz, Kalakan, Qarabagh, Farza and Mir Bacha Kot Districts of Kabul Province, Bagram District of Parwan Province and Mahmood Raqi District in Kapisa Province. The purpose of these visits was to get in depth information about the quantity and quality of fresh fruit and raisin production and marketing trends, and identify bottlenecks in the value chains.

Based on the farmers surveys we have identified the following challenges and potential areas of interventions as common between the grape and raisin farmers we interviewed:



Challenges faced by the Farmers:

Farmers lack basic organizational capacity to form groups / cooperatives.

Farmers lack access to credit and experience limited access to market.

Farmers lack basic agricultural inputs / means to achieve better quality product.

Farmers lack basic hygiene and good agriculture practices.

Potential areas of intervention:

We could support local farmers to organize in groups/cooperatives. After that we could provide farmer group/s with technical support on Marketing and Post-Harvest Mngt to build up their capacities and enhance product quality and market access. Moreover, we could potentially provide the farmer groups with raisin processing inputs and assist them link with traders and microfinance organizations.



Meeting farmers in Mahmood Raqi



Grape & Raisin producers, Kalakan District



Trellised Vines in Kalakan District

In order to facilitate the selection of the program target implementation areas as well as the identification of the project partners (beneficiaries) we have drafted a set of selection criteria in order to achieve a proper selection processes.

Selection Criteria:

1. Security conditions and Accessibility
2. Climate conditions
3. Existing Farmers Association or Cooperative or farmers' willingness to organize in groups.
4. Existing and sustained fruit production (data)
5. An existing relative food safety awareness
6. Potential traditional local products
7. Awareness of orchard management.

We identified the following short list of 6 groups of grape growers and raisin producers as potential beneficiaries (partners) for pilot projects throughout the grape & raisin value chain. In total 226 grapes and raisin producers are currently targeted within 6 Districts of Kabul, Parwan and Kapisa Provinces.

Groups	Province	District	Village	Intervention	Farmers
1	Kabul	Kalakan	Kalakan Central Village	Grape and Raisin	30
2		Qara Bagh	Qala-e- Godar, Bagh-e-Zaghan and Qala-e-Qazi	Grape and Raisin	36
3		Dehzabz	Pacha Sahib	Grape and Raisin	30
4		Farza	Bostan	Grape and Raisin	30
5	Parwan	Bagram	Choob Bakhsh Rubat	Grape and Raisin	60
6	Kapisa	Mahmood Raqi	Nawabad, Kora Taz, Mangal Ha and Qorotaq	Grape and Raisin	40
Total Farmer Groups:			6	Total Farmers:	226

During the following months, the referred farmer groups will be formally formed and pilot project agreements will be signed to include the responsibilities of the partners and the relevant project inputs.

Sub activity 1.2 Conduct analysis and description of the value chains identifying key interventions for improvement

The identification and design of the key interventions was on-going as per farmer group needs with the support of the Post-Harvest & Quality Control Int'l Consultant. A pilot project agreement template was developed aiming to establish a transparent and unified approach on project implementation that will allow all the partners to understand the project.



Sub activity 1.4 Quality control analysis (see result 4)

During the Post-Harvest & Quality Control Int'l Consultant mission he assessed all the major national quality control institutions and stakeholders in Afghanistan. His report will include a detailed Quality Control analysis and will be provided in July.

Sub activity 1.7 Support organizational development as feasible and necessary including possibility of brand names if feasible

During the reporting period, we coordinated with Tabasom Raising Processing Factory (Kabul Industrial Park) and Amin Haroon Raisin Factory (Mazar-e-Sharif Industrial Park) raisin processing factories and exporters as well as with raisin producers who are supplying these factories.



Raisin sorting facility, Tabasom



Processed and unprocessed raisins



Raisin storage facility, Amin Haroon Ltd.

“**Tabasom Raising Processing Factory**” was equipped with modern raisin processing machinery in 2005. The company employs 150 workers (a good proportion of them women working on shorting) including management, casual labors, marketing and technical staff. They are registered with Ministry of Commerce and AISA and they have established a laboratory for Quality Control tests. They have a process capacity of 30 MT raisins per day (7,500 MT annually) and they export 40% to EU (Germany, Holland, Denmark, France & UK) and remaining 60% to USA, Russia and Middle East countries.

Challenges faced by the Tabasom:

- Lack of Fumigation facilities in country for pest control & food processing for export goods.
- Low quality input from the raisin producers due to producers lacking basic technical capacity in raisin drying to achieve better quality raisins.
- Farmers lack basic organizational capacity to form groups / cooperatives.
- Lack of information on existing raisin producers.

Request for Support from GoA, NGO etc.:

- Provide in country fumigation facilities for raisin exporters.
- Provide farmers with capacity building to enhance producers' capacity in achieving an enhanced quality product. Facilitate in/out country study tours to familiarize producers with best practices.
- Mobilize raisin producers; promote the establishment of groups / cooperatives and facilitate building up their organizational capacity.
- Establish and maintain a collection and information mechanism to disseminate info on raisin producers.

Potential future interventions could be focused on capacity building of grape growers in grape and raisin post-harvest management and facilitation of raisin processing best practices in collaboration with Tabasom.

“**Amin Haroon Raisin Factory**” is operating during the past 30 years; processing and packaging Afghan raisins known as kishmish. The company employs 90 staff including regular and casual labourers mainly women. They are registered with Ministry of Commerce and AISA and they have a processing capacity of 15 MT raisins per day (4,000 - 4,500 MT annually). They export almost 100% of the production to Russia. The factory is equipped with relatively old raisin processing machinery requiring improvement (and investment) to meet other international markets demands and higher hygiene and sanitary standards.



Challenges faced by the Amin Haroon:

- Low quality input from the raisin producers due to producers lacking basic technical capacity in raisin drying to achieve better quality raisins.
- Farmer reluctance to adopt new drying techniques.
- Farmers lack basic organizational capacity to form groups / cooperatives.
- Lack of information on existing raisin producers and market linkages.
- Poor sanitary & hygienic conditions in factory
- Unavailability of suitable raisin packing carton in country.

Request for Support from GoA, NGO etc.:

- Provide farmers with capacity building to enhance producers' capacity in achieving an enhanced quality product.
- Provide fruit processing inputs for the growers.
- Mobilize raisin producers; promote the establishment of groups / cooperatives and facilitate building up their organizational capacity.
- Establish and maintain a collection and information mechanism to disseminate info on raisin producers.

During June-14, we visited two more (Wahdat and Amiri) raisin factories in Kabul. Both factories had old US made machineries with production capacities of 8 to 10 MT. According to the owners of the factories, they are exporting mainly to Russia, Europe, UAE, Saudi Arabia and other regional countries.

During a field trip to Mazar-i-Sharif, Balkh Province and met with Balkh women from the Agriculture Products Processing Company (APPC) in Mazar-i-Sharif city. They requested support for establishment of a processing and packaging center and finding markets for their products.

Further coordination meetings will take place with these (and additional) potential partners to assess their needs and conclude in specific interventions and final partnerships. We plan to survey more private businesses involved in this sector to explore further opportunities for identifying the final partners of choice in organizational development activities including brand name/s.

R2. Almond Industry value chain supported and enhanced

Sub activity 2.1 Support AAIDO in conducting market survey and re-survey; analysis of data, and extrapolations

On 21APR14, we met with Mr. Ahmad Javid Hamidzada (AAIDO CEO/Program Director) in Mazar-i-Sharif. He was there to support the implementation of ADF/USAID microfinance project in the north of the country. This project supports almond growers in the northern provinces by providing credit aiming to increase the production quantity and quality of almond and meet the demands of local and international markets. He said that AAIDO organized a credit/microfinance campaign in Balkh, Samangan, Kunduz and Takhar provinces to receive payments for credit that the almond growers received last year. AAIDO has functional offices in Balkh, Samangan and Kunduz provinces; they provide support to almond growers and collect data on almond production and local market trends. Currently, their main activity was the credit collection for the ADF/USAID project. Each AAIDO regional office has one staff. Additionally, AAIDO is conducting surveys to obtain information regarding the almond grower status, the number of almond orchards, type and varieties of almond trees, quality and yields, pest and diseases and marketing data. Mr. Hamidzada requested ANHDO to support them in:

- The current AAIDO project is ending soon, they are in need of support to maintain their current staff (as an organizational asset) until they find financial resources for their salary.
- Providing them with an operational budget to permit the continuation of activities and presence in the north.
- ANHDO focus on quality control issues aiming to achieve the improvement of almond product quality standards and introduce and promote further improved and certified almond varieties.

We conducted further meetings with Mr. Qasim Ali (AAIDO Samangan) and M. Hakim (AAIDO Kunduz) to assess their current capacities to perform as a reliable and sustainable long term partner.



We continued to coordinate closely with AAIDO aiming to design a joint market survey and conduct a joint analysis of the data. However, during the reporting period, AAIDO was mainly preoccupied with closing the EU funded project that was jointly implemented with Roots of Peace. We faced difficulties in obtaining latest info regarding almond production and trade from them which is leading us to the conclusion that AAIDO does not possess the necessary capacity and/or maybe cannot be considered currently as a reliable project partner.

Disaster for the Almond Production this year in the north:

It has become obvious from our field visits that the almond production in northern Afghanistan was damaged severely this year due to late frost and the production of almond has decreased considerably. During the spring season of 2014, almond trees were affected by cold weather (late frost); the project team observed that all trees had no fruits and this year's almond production will be negatively affected. Local farmers and organizations expressed their concerns about the weather change and asked for assistance; i.e. an early warning system and/or alternative measures to reduce the effect of the frost during flowering/blooming of the almond trees. Some varieties (Nonpareil and Carmel) seemed unaffected by the frost mainly due to their late blooming compared to early blooming varieties such as the Sararbai, Shokorbai etc. Late (spring) frosting should be considered seriously by the government; a huge investment has been done and if the situation continues in the following years the whole almond sector in the north will be severely damaged. The almond growers (and industry) in the north lost millions of dollars this year.

On 26APR14, we conducted a coordination meeting with Haji Bashir the head of the recently established Kunduz Province Fruit and Almond Cooperatives. They are registered with the MAIL and Ministry of Justice and intend to perform similar activities to AAIDO. A similar association in Samangan Province has also recently registered with the Ministry of Justice. They aim to promote Afghanistan nuts and dried fruits products. We had an introductory meeting on 23rd April 2014 with Ab. Khalid Mobariz in Aybak District, Samangan Province.



On 03JUN14, we visited the Dry Fruit Seller Association of Samangan Province in their office in Aybak city Samangan Province. They have 98 members and are currently in the processes of receiving a loan (\$400,000) from ADF. Aybak municipality has provided them with 2 jerib land to construct a building for the association and they have requested support in establishing a processing and packaging house. Currently about 500 poor women are working mainly processing pistachio and almond in their houses. We also visited AAIDO office and met Mr. Qasim Ali khan to brief us about AAIDO activity in Samangan.

On 16JUN14 we met with Mr. Bashir the head of orchard and almond producer cooperative in Kunduz Province. Under this primary cooperative 9 secondary cooperatives are functioning. The establishment of these cooperatives had been facilitated by IDEA NEW in 3 districts of Kunduz (Imam Sahib, Qala I Zal and Chardara).

On 17JUN14 we met Mr. Farid Qasimi in GIZ office in Kunduz, who said that GIZ has established dry fruit association and provided almond processing machinery to the association but the head of the association took the machinery to his home and left the country without ever operating the machinery. The team also met the AAIDO Representative in Kunduz who informed us that AAIDO had cooperated with ADF (Agriculture Development Fund) to distribute fertilizer as well as loans to almond growers but due to the frost the farmers did not get the expected yields and now they are facing problems with the repayment of the loans.

Sub activity 2.3 Support AAIDO to progress in sales in its food retail outlets

The SO3 Marketing and Procurement Officer joined the team in May-14 and he is undertaking an on-going market survey with retailers for both fresh and dried fruits including nuts. The survey includes potential retail outlets.

R3. Pilot fresh fruit value chains for local fresh fruit marketing established and improved to raise standards and compete with imports

Sub activity 3.1 Survey, analysis and description of fresh fruit value chain in Kabul and other urban areas; open markets, supermarkets, best retailers



Survey, analysis and description of fresh fruit value chain in Kabul and other urban areas has been initiated in coordination with the SO3 Post-Harvest & Quality Control Intl'l Consultant. Further inputs are expected by the anticipated mobilization of the SO3 Horticulture Value Chain Nat'l Consultant in the coming months. Initial attempts to identify suitable cherry private partners for potential pilot interventions under this activity were abandoned for now since considerable efforts were required to mobilize sufficiently the otherwise disorganized cherry farmers which required more than the currently available capacity and time. Nevertheless, we had prioritized the identification of partners and interventions for fresh grape producers this year. Interventions for other fresh fruits will be considered in the following year/s.

R4. Standards of quality for fresh, dried and processed fruit are raised and capability of quality control structures enhanced

Sub activity 4.1 Development of fruit processing and drying parameters and methods at PHDC pomology laboratories and link them to drying and processing laboratory facilities in public and private sector

In cooperation with the SO3 Post-Harvest & Quality Control Intl'l Consultant, we conducted field visits to the PHDCs and Pomology lab in Mazar-i-Sharif, Balkh and Kunduz Province respectively to assist the PHDC staff and instruct them on proper and safe use of the new pomology laboratory equipment as well as explain and demonstrate to them in detail the maturity index measurements.

Sub activity 4.2 Establish working relationships with private sector entrepreneurs to establish improved systems for processed fruit production

We conducted a series of meetings in Qala-i- Chinar Village and three more surrounding villages to assess the current status of prune (plum) production and local farmer processing capacity to examine potential partnership/s opportunities. The area is home to 2,050 families producing high quality Aloo Bokhara prunes. Local traders and middlemen procuring their production which however is mixing at a later stage with lower quality prunes; i.e. negatively affecting the high quality Aloo Bokhara prune market name. Last year, yellow color prunes were sold at 700 afs per seer and red color ones at 400 afs per seer. That constituted a considerable decrease in farmer income; in previous years the price was 1,500 afs per seer.



A Prune Orchard in Farza Valley

Approximately 455 jeribs of land are allocated to plum production with an average yield of 1550 Kg/year resulting to an estimated annual production capacity of 700Mt of fresh plums.

Challenges faced by the Farmers:

- Farmers lack access to markets for the prune & and dried plums. They obtain low prices for their products by the middlemen/local traders
- Farmers lack processing and packaging facilities and equipment.
- Farmers have not organized in farmer groups or cooperatives.

Potential areas of intervention:

We could mobilize local prune (plum) farmers to organize in group/cooperative. We could provide technical support on Marketing and Post-Harvest Mngt to build up their capacities and enhance product quality and market access. We could potentially provide them with processing & packaging inputs.

Our intention to consider prune processing as one of the potential interventions and the identification of the prune farmers in Farza District as a potentially suitable private sector entrepreneurs for establishing improved systems for processed fruits production lead to an SO2 team visit in the area to consider the inclusion of prune in the national collection; the relevant staff examined the prune trees to determine if there are different varieties from those that already exist in the national collection.

On 21MAY14, we conducted a field trip to meet with agricultural cooperatives representatives as well as prune and grape growers in Istalif District, Kabul Province. Our visit was facilitated by the Extension Department of Istalif District. Mohammad Nasim (Head of the Agricultural Cooperative of Istalif District),



informed us that three agricultural cooperatives have been established in the district but none of them are currently functional due to outstanding government loan payments.

Challenges and Problems:

- High farmer dependency to aid agencies.
- Unwillingness to contribute in development projects.
- Poor pre harvest practices in orchard management

Potential interventions:

Due to mentioned reasons and project limitations we will not be able to sufficiently meet the project objectives and goals: *unsuitable partners*.

On 24th May 2014, we met with Abdul Wakil Hamid Poor, the Head of Afghanistan Rural Development Program (ARDP) in Charikar Town, Parwan Province. He has developed fruit drying equipment using solar power and in addition to his responsibilities with ARDP he is also an owner of private company by the name of "Yousuf Mosawir".

This company makes equipment which is powered by renewable (solar and wind) energy sources and the project team wanted to be introduced to this technology and to investigate its potential use under the current project. According to Mr. Wakil, they are using local materials which are available in the country and farmers can easily access. He has already performed some tests in Kabul, Jalalabad, Herat, Balkh and Kandahar provinces and identified that different humidity levels affect the drying process. Humidity level was easily controlled by installing extra filters to accelerate the drying process.



They are able to manufacture drying equipment with different capacities/ sizes to meet different customer needs. The different prices of the available models including transportation, installation and training are:

- Process capacity of 50kg which dries fruits & vegetables within 48 hours @ \$800
- Process capacity of 500kg which dries fruits & vegetables within 48 hours @ \$12,000
- Drying plant with capacity of 500kg which dries fruits & vegetables within 24 hours @ \$24,000

Sub activity 4.3 Survey of existing public and private structures for quality control. Identification of weaknesses and intervention for improvement

The reference GoA department for the QC tests regarding fresh & dried fruits in Afghanistan is (or at least has been since currently we are witnessing a transition phase) the Afghanistan Raisin Fruits and Vegetables Promotion Administration (ARFVPA). They are performing mainly aflatoxin and ochratoxin tests for Afghan exported goods and issuing certificates against a fee. Once the goods are analysed, the laboratory issues a Quality Certificate to the MAIL (Quarantine Dept.) and to the Chamber of Commerce for the analysed sampled goods. Then the Quarantine Department provides the Phytosanitary Certificate and the Chamber of Commerce provides the Certificate of Origin to the customs. In the last year, according to the Rapid Alert System for Food and Feed (RASFF), a key EU tool to ensure the cross-border follow of information to swiftly react when risks to public health are detected in the food chain; many Afghan export consignments (mainly raisin, almonds, pistachio and saffron) have been rejected at the EU borders. This situation has ignited an internal discussion between different departments on the role and the reliability of the ARFVPA.

Overall, quality control is a complex system and embraces many different actors/sectors. Quality Control starts from the Good Agronomic Practices to the final steps of packaging and export procedures. For this reason many institutions and stakeholders are involved. The project team (accompanied by the consultant) visited the following national and public quality control institutions in order to understand their status and needs for further support enabling them to contribute more in promoting Afghan export and products. The following Institutions have been visited:

21APR14 - Export Promotion Agency (EPA) in Balkh Province: Mir Haidar Hashemi provided us with brief information about the agency and their activities on quality control, technical staff capacity and laboratory equipment in Balkh province. Currently, EPA Balkh does not possess any technical staff. He had several times requested the assignment of lab technician/s but at last he was informed that EPA cannot provide him with staff at least for the time being. He had packed all the lab equipment in carton boxes to keep them safe. He and the office cleaner are the only EPA staff in the province. He said that unfortunately



they have to issue certification without performing tests for the traders who exporting nuts and dried fruits abroad. These types of certification (without performing tests) often result to the rejection of Afghanistan exported products that are getting tested at their last destination.

13MAY14 - Ministry of Commerce, Director of SME Department: - The efforts of the ministry to achieve and promote exports were discussed in detail. Their objectives and intentions overlap with our project. The SO3 project team has actively participated in the first task force meeting on Agribusiness Sector Action plan for 2013-2016 that was jointly organized by SME Department of the Ministry of Commerce and the MAIL.

13MAY14 - Department of Quarantine: We focused on pest management and Phytosanitary Certification and export clearance issues. Phytosanitary certification is used to attest that consignments meet phytosanitary import requirements and is undertaken by an NPPO (National Plant Protection Organization). Phytosanitary certificates are issued to indicate that consignments plants, plant products or other regulated articles meet specified phytosanitary import requirements and are in conformity with the certifying statement of the appropriate model certificate. The relevance of such certificate for exports is high and the Quarantine Department asks for more equipped laboratories and skilled personnel despite that we did not observe such operational shortages. 14MAY14 - Commerce Chamber: During the discussion with the Director of the Industries and Export Promotion Department our attention was drawn to the existing limits on the export procedures. At the moment, the only institution that can provide the Certificate of Origin is the ARFVPA. ACCI wants to establish other five laboratories in five major cities of Afghanistan for issuing a Quality Control Certificate and improve the general quality control practices.

18MAY14 - Ministry of Public Health-Food Drug Quality Control Laboratories: They analyze a broad range of products (from antibiotics to food) for different institutions and purposes. Regarding the agriculture sector they operate on secondary products (chocolate, biscuits, juice, milk and in some cases water) and controls are made both for imported and exported products. They release an export certificate but currently they have not received any requests.

19MAY14 - Afghanistan National Standard Association- Director of Standards and Building code: The role of ANSA has been explained and detailed. ANSA is establishing a Laboratory Centre in which all the tests linked with Standards will be performed. This included also food tests. The laboratory will be opened within weeks, lab equipment and instruments are installed and technicians are already trained. The project team has requested for a visit as soon as possible. The aim of this new laboratory is to cover the existing quality control gaps. In theory, this ANSA laboratory will become the reference laboratory in Kabul for standards' verification and for the Quality Certificate in the near future. This situation might be a problem for the current project arrangements where ARFVPA has been initially listed (before the project start) as a potential partner.

26MAY14 - Afghanistan Raisin Fruits and Vegetables Promotion Administration (ARFVPA) - ARFVPA is operating under the Ministry of Commerce and Industry of Afghanistan. Sayed Azim Mustafa Hashimi, ARFVPA requested for the following inputs under the MoU that was signed with ANHDO before the current project start date:

- Instruments and reagents for the EPA laboratory
- Training possibly abroad for their EPA laboratory technicians
- Technical support and mentoring to reach ISO standards.

It is apparent that we need to investigate further the future mandate of ARFVPA under the GoA quality control policy before we can commit any inputs to them, especially considering the newly established Afghanistan National Standard Association (ANSA) structure.

All these different QC institutions are involved in the quality control process in import, export and local food controls at different levels. According to the MoU between the Ministry of Agriculture, Irrigation and Livestock (MAIL) and the Ministry of Public Health (MoPH); the MAIL is responsible for testing the quality of raw/unprocessed agricultural product and MoPH is responsible for testing processed food (e.g. juices).

MoPH has an internal laboratory with advanced laboratory equipment but part of these (at least 3 HPLC) are not used. Capacity building and training is needed for the laboratory technicians. MAIL has different laboratories in different departments, however the Food Quality Control Department (FQCD) was folded and according to our current understanding its tasks are now falling under Seed Certification. However this particular issue requires further assessment.

On 30JUN14, we visited the MAIL Deputy Minister to obtain the recent developments but more importantly the future policy and perspective of the MAIL in regards to QC issues. The MAIL attempted in the past to oblige export traders to product quality control testing through EPA laboratory (under the Afghanistan Raisin Fruits and Vegetables Promotion Administration) receiving a formal analytical result



for each submitted good. Unfortunately, EPA immediate response was to increase the test fee from 15 to 25 USD without however increasing the test reliability that unfortunately was and remained low. Traders and other institutions complained and the MAIL was forced to remove the traders' obligation. MAIL current policy is to set-up independent laboratories in the EX-QC Department in Badam Bagh and in the near future (within the next couple of years) these laboratories to become the sole references for QC in Kabul with similar laboratories to be established in the other provinces. Currently the political situation is not clear and in the near future policy changes may still occur. Although, the future (and current reliability) of EPA is not promising, it's not advisable to cut the relationship with EPA based on this unique interview.

A confirmation to this latest information was sought in the Kabul Customs Office but they were not cooperative at all and no information regarding export documents or EPA was obtained. EPA future is probably inescapable but ANHDO has signed a formal MoU with the EPA laboratory and the President Mr. Hashemi formally requested our support for training and equipment and ISO consultancy. A solution might be to start from the latter point (ISO procedures). This will give us time to see the development of the whole situation and at the same time we'll accomplish part of the MoU. Moreover EPA will be involved in the inter laboratory test ring.

Sub activity 4.5 Survey and analysis of existing packages facilities

We have met with many traders and processor that had had complains about the quality and strength of the packaging carton that produced in Afghanistan and the current trend is that they prefer to use Pakistan made ones. A carton making (packaging) factory in Kabul was visited during June-14. They are able to produce packaging cartons but they are bringing the printing material from Pakistan. Further survey and analysis will be continuing during the following months.

Sub activity 4.7 Organize study tours

We partnered with Tabasom Company to provide the necessary support to one (1) of the Tabasom's Quality Control laboratory technician for a capacity building Study Tour to Italy in April-14. Tabasom Company formally approached ANHDO on 14APR14 requesting support to cost share the capacity building costs of a training for Mohamad Alias Osmani, Tabasom Export Manager and Head of QC Laboratory and HACCP team on advanced training in the Ochratoxin test (ELISA kit). Following an MoU, Mr. Alias received the specialized 2 days long training in Triest, Italy provided by TECNA (specialized food safety assurance company) during 18-19APR14. The related costs were shared (50%-50%) by the two partners. Mr. Ilia successfully completed the training and he is expected to utilize his newly acquired capacity and experiences to train other laboratories technicians in the future.

We facilitated the participation of the head of Ahmad Tamim Co.Ltd (Mr. Haji Bashir) in Halal Exhibition in Moscow that was organized for four days in June-14. Mr. Bashir in his report said that he had the opportunity to meet with traders from all around the world and discuss export possibilities of Afghan products. The Afghan Commercial Attaché in Moscow provided him with an appreciation letter praising his active participation in undertaking the promotion of Afghan products in international markets.

Sub activity 4.9 Support the 6 pomology laboratories in the 6 PHDCs to work on characterization of varieties

The PHDC in Mazar-i-Sharif has a farm size of around 25 jeribs (5 hectares) and they currently host 13 collections of fruit trees which are suitable for the Balkh climatic conditions; mainly, almonds (100 varieties), apricot (130 varieties), grapes, pears, plums, peaches, pomegranates etc. The Pomology Laboratory there currently performs tests regarding the fruit size, PH, hardness and sugar contents. They are planning to work on maturity index for the fruit varieties they have available in the PHDC.

The PHDC in Kunduz has a farm size of 24.5 jeribs and includes different types of trees. The center is also used for technical trainings for the Kunduz Agricultural Faculty. The demo orchards mainly include almonds, apricots, peaches, grapes and plums. The center also has an equipped Pomology Laboratory, currently performing pomology tests but they are expecting to receive soon additional instruments, too. Kunduz climate is suitable for almond, apricot, peaches and also grapes with good harvest potential but due to high humidity levels, it does not favor raisin production especially in lower altitude lands.

The SO3 team accompanied by the Post-Harvest & Quality Control Int'l Consultant visited the Pomology Labs in Badam Bagh - Kabul, Mazar-i-Sharif and Kunduz PHDCs to install and test the newly delivered equipment for soil and water testing. Equipment is ready for use, however, in Mazar-i-Sharif and Kunduz laboratories further specific training for the efficient use of the instruments is required. The instruments are not complicated and it was considered during the procurement stage to be easy-to-use; however, data interpretation requires further specific training. The operational capacity of the Pomology Laboratories in terms of their analytical potential has now increased considerably. With the right training,



ANHDO should become a reference for soil and water analysis and tests, not only for their members but for other institution, too.

Sub activity 4.10 Measurement of species and variety specific maturity index, shelf life and others fruit quality parameters of the main recommended varieties

Post-harvest tests have been planned with the Pomology Laboratory PHDP/II Expert Dr. Monica Berti and the sub activity is ongoing; PHDC Pomology Laboratories are conducting measurements on specific maturity index.

Specific Objective 4:

A soundly based and profitable citrus industry in eastern Afghanistan is developed

R1. The newly reborn citrus industry in the eastern region of Afghanistan reaches significant levels of production and quality standards and provides increased regional economic opportunities

Sub activity 1.1 Value chain analysis and introduction of new varieties

The Citrus Value Chain Expert (Int'l Consultant) recruitment was on-going during the reporting period with Dr. Luigi Catalano (sole source approach based on a recommendation by PHDP) not being available to perform his 1st mission in early May but instead later – October-14. He is expected to undertake drafting the questionnaire for the citrus value chain survey after reviewing the current situation of citrus in Afghanistan.

We have collected some basic information from MADERA, RoP, IDEA-NEW and NHLP regarding the current status of the citrus industry such as citrus market surveys, lists of citrus growers etc.

Sub activity 1.2 Planting of citrus orchards of commercial size, at increasing level. (1500 ha of orchards planted by 2017)

A local farmer who is interested in establishing a commercial size fruit orchard visited PHDC-JAL on a number of occasions during the reporting period. He wishes to lease 30 Jeribs (6 hectares) of land from the NVDA and use this land for planting half of it with early peach varieties and the other half with new citrus varieties. In order to promote the newly imported highly recommended citrus varieties, we need similar people who wish to invest in the citrus industry. Unfortunately, most farmers in eastern Afghanistan don't have sufficient land to establish commercial size citrus orchards. Similar initiatives are essential for others to see the benefit of commercial size citrus orchards and become interested in this approach.

Sub activity 1.3 Expansion of citrus nurseries

The chairman of Nursery Growers Association (NGA) in Kunar contacted us to advise them on which citrus varieties (with a potentially good marketing value) they should use for grafting on their available rootstocks. We provided them with the list of recommend citrus varieties based on the past results of the National Collection and the past years' marketing performance.

NVDA has some citrus rootstocks and part of them (appr. 20,000) will be ready for grafting this season. NVDA is looking for sources of bud wood. They have contacted us to coordinate with them and support them with the provision of certified buds from mother stock nurseries (MSNs). We have conducted a meeting with NVDA and guided them how to proceed. They have been guided to request ANNGO for citrus bud wood for this (as well as the upcoming) season/s. However, it seems like there will be a big number of rootstocks ready for grafting in the upcoming (fall) season but the certified bud wood available may not be sufficient. ANNGO must try to address this issue accordingly and find a way to successfully satisfy the nursery grower's demand; maybe with a balanced distribution of bud wood between the nursery growers.

We visited the two citrus Mother Stock Nurseries of NVDA and Nangarhar NGA and provided guidance for the anticipated summer seasonal activities in the citrus mother stock nurseries. We are regularly monitoring these mother stock nurseries and we are encouraging the owners to keep the trees healthy to produce more buds. If we don't have enough production of buds we will not be able to expand the citrus nurseries and produce enough certified saplings. Without sufficient certified saplings, we can't expect to meet demands for commercial size citrus orchards.

ANNGO inspection team together with Nangarhar NGA Field Manager visited PHDC-JAL and SO4 PM. There was a discussion on how to properly perform the inspection of citrus nurseries in the east.



Sub activity 1.4 Expansion of biotechnology laboratory capacity for continued monitoring of disease status in orchards and nurseries

Over the last three years the biotechnology lab has been conducting a CTV monitoring campaign. For 2014 once again we had the plan to conduct another monitoring campaign but for some technical reasons the campaign have been postponed. The reason was to correctly identify the specific Afghan CTV strain before we conduct further monitoring. The issue was coordinated with a number of universities in Italy to potentially conduct a research on the Afghan CTV strain and the sour orange rootstock used in the past. This will include sending samples of CTV infected materials abroad therefore the biotechnology lab assisted by the project team and citrus promotion group members conducted a sample collection activity where we collected 200 samples from two orchards in Nangarhar province. These orchards were monitored since last year and there had CTV infected trees. We will identify the infected trees and marked them accordingly for future use as the reference trees.

As a conclusion of the latest coordination between PHDP/II, PBTL, SO4 team with the University of Florence - Italy (Department of Agri-Food and Environmental Science) and the University of Bologna - Italy (Department of Agricultural Sciences - DipSA) to study with sound scientific methods the effect of Citrus tristeza virus (CTV) infection on the productivity of citrus in the area of Nangarhar Valley and address the choices related to the use of rootstocks for the future citrus industry of Afghanistan; a three (3) year project plan has been drafted under the name "Research on Citrus tristeza virus infectivity in citrus orchards in Nangarhar Valley, Afghanistan". The project aims to determine which one (or more) of the following conditions occur in the Nangarhar environment: a) the presence of a mild strain of CTV; b) the existence of tolerant/resistant sour orange rootstock clones; c) the environmental (climate and soil conditions) inhibits the infectivity of CTV. The proposal of this project is submitted for funding to the French Development Agency (AFD) pending MAIL no objection letter and final donor approval.

The plant biotechnology lab has the capacity to examine bacterial and fungal plant diseases. Last year we have found that some trees in the citrus rootstock trial were infected by phytophthora gummosis. After the diagnosis, we were able to treat the infected trees and prevent other trees from infection. This season once again the biotechnology lab collected samples from citrus national collection and other trees for diagnosis of fungal and bacterial diseases.



We were carefully monitoring the growth of the citrus indicator plants and we try to keep in a healthy condition as they should be. Since these saplings were imported from Europe most of them were initially shocked but recently they have shown positive signs that they start growing again. We shared the indicator plants issue in Facebook.



Sub activity 1.6 Marketing and awareness campaigns

As part of our promotion of the new certified citrus varieties we intend to install billboards in front of the PHDC-JAL farm along the Jalalabad-Torkham road. The benefits of these billboards will be to give the message to the stakeholders that there is an ongoing citrus project in the eastern Afghanistan for the development of citrus industry. The billboards will be included in the Visibility Plan of the project.

A local educational & vocational magazine published by the Nangarhar Agriculture & Veterinary Institute included a topic on citrus with our technical support during the reporting period.



R2. The citrus value chains and market-links are developed in order to meet international exports-standards

Sub activity 2.1 Continue variety trials and evaluation of results

We are evaluating the results of the citrus varieties existing in the citrus National Collection of PHDC Jalalabad. In coordination with SO2, we started drafting the descriptor lists for studying flowers and flowering characteristics for each of the citrus species. We intend to use these descriptor lists throughout the project cycle and finally develop the Description of the Citrus Varieties in Afghanistan.

Last year, we didn't have fruits in the citrus net house. This may have occurred due to poor pollination so this year we tried to pollinate some of the trees with air blower and hand pollination. Our intention was not only to produce fruits in the net house but to present to other farmers how important pollination is.

The project team is working on an important trial of citrus rootstock together with the PHDC-JAL. In Afghanistan the conventional rootstock for grafting citrus has traditionally been the sour orange rootstock which is easily accessible in the area. However, since the citrus tristeza virus (CTV) was detected in Afghan citrus trees with sour orange rootstock; it has been classified as a bad rootstock due to its sensitivity to CTV.

Sub activity 2.4 the current Citrus Promotion Group is supported and long term organizational arrangements made (Citrus Growers Association)

On behalf the Citrus Promotion Group (CPG), the SO4 Project Manager presented the CPG in the Horticulture Workshop that was organized by PHDPil in Badam Bagh, Kabul between 21–24JUN14.

R3. Private & public stakeholders strengthen their partnership around the agreed strategy for the Citrus industry

Sub activity 3.1 Coordination of public and private stakeholders

We are in frequent contact with private nursery staff (NGAs) and public staff (NVDA) in order to strengthen their partnership and act as a mediator between public, private and other NGOs working in citrus industry such as NHLP, RoP etc.

An orchard has been planted by NHLP in Rodat District, Nangarhar Province where NHLP bought the certified citrus saplings from one of the Nangarhar NGA/ANNGO members. The NGA member mistakenly provided lemon saplings with orange labels and during a monitoring field visit by the Nangarhar DAIL staff the mistake was detected. ANNGO certification scheme is strict thus it is very important to avoid this kind of errors in the future. On 24APR14, Mr. Abdul Latif (Head of Horticulture and Genetic Resources, Nangarhar DAIL) conducted a coordination meeting with the support of the SO4 project team to address the issue regarding miss labeled citrus certified saplings.

We attended Technical Working Group meeting of all the organizations working in Agriculture and Rural Rehabilitation sector. The meeting was organized by the Nangarhar Agriculture Directorate. This meeting is taking place almost every month aiming to avoid duplication of activities and to share activities' progress among the participants.

PHDC-JAL organized a Stone Fruit Field Day for the early peach and nectarine varieties. Senior officials of the sector attended this event including the MAIL Research Director, Nangarhar DAIL Director, NVDA Director and others. We introduced the new project to the audience and also had a brief tour to the citrus national collection.

Back in 2010 some low chill peaches and apricot varieties have been imported from Italy to Afghanistan and these varieties have been included in the stone fruit demonstration orchard in PHDC-JAL. The result was impressive since the early matured fruits could arrive to the market while common peaches were still not matured.



Early peach variety (Plawhite)

ANHDO is a well-known organization in eastern Afghanistan and has a high profile among senior officials in the region. Our peach and nectarine fruits were delivered to the Nangarhar Governor via Nangarhar DAIL Director and the feedback from the Governor was very impressive. He was very happy to receive



the products of Jalalabad and it was exciting for him to see the good quality nectarines and peaches produced in such an early time in the season in Jalalabad.

A coordination meeting was held with Roots of Peace about CTV campaign. As usual while collecting samples for testing CTV the members of citrus promotion group has to take an active role in collecting the samples. After the coordination meeting the Roots of Peace staff collected samples from two different orchards in Nangarhar. Please also see activity 1.4.

IDEA-NEW (USAID funded project) intends to support some nursery growers through the provision of greenhouses for citrus seedlings production. In addition to greenhouses they will also provide the citrus seeds. IDEA-NEW needed to know more about the production of citrus saplings in eastern region to find out how much seed they have to provide to the NGAs. We had a coordination meeting and discussed all related issues.

Mr. David (Seed and Planting Material Specialist) and Mr. Mahboob Nang (Seed and Planting Material Advisor) from Landell Mills visited PHDC-JAL. They have been briefed on all the current programs and activities of PHDP and ANHDO, the management of the national collections and mother stock nurseries. They also had the chance to visit the citrus national collection and citrus mother stock nurseries.



Sub activity 3.2 Capacity building and training activities planning

Laghman University Agriculture Faculty organized a field training visit to PHDC-JAL in Apr-14. The University provided the necessary arrangements and we performed as the trainers. The number of students was high so they had to be divided into three groups. Each group was trained for a whole day; so we were engaged with them three days in total. They have been introduced to the national collections (in particular the citrus national collection), the ANNGO certification scheme, the mother stock nurseries, practical training on orchard layout and other PHDC-JAL related issues. We focused on subjects related to citrus and the rest of topics were covered by the Field Horticulturist of PHDC-JAL.



Traditionally, every May we receive a high number of student visitors in need of technical guidance and information because they are preparing their last semester thesis. Specifically, in the eastern region, many students are assigned with thesis on citrus related topics. Most of the students refer to us and we are happy as always to be able to support them in their assignments. Thesis topics included citrus mother stock nurseries, rejuvenation of citrus orchards, citrus nurseries routine activities, citrus varieties in eastern Afghanistan, certified planting material etc. In addition to theoretic information and mentoring we were also able to provide them with on the job training and practical activities.

The SO4 PM trained the new Field Horticulturist Assistant together with two other horticulture graduate students on citrus grafting. They have been trained on different methods of grafting in particular T-budding, chip budding and top-working.

We have published technical material via Facebook and Youtube. As a result some students from Shaikh Zahid University, Agriculture Faculty visited us in Jalalabad PHDC to collect CDs and DVDs of technical information along with brochures, catalogs, posters and other training materials to be distributed among the students and some of them to be kept in relevant departments in the faculty.



Sub activity 3.3 Organize study tours

Four (4) participants undertook a Study Tour to Pakistan (12th to 18th June 2014) aiming to assist the PBTL's further study of the Afghan CTV serotypes strain by investigating the research developments and the CTV serotypes present in the nearby Pakistan. Dr. Shamsur Rehman, PBTL Manager (Plant Virologist) and Jamil Ahmad, PBTL Deputy Manager (Plant Virologist) participated in the tour to expand the biotechnology laboratory capacity for continued monitoring of disease status in orchards and nurseries (main focus CTV) and the Afghan citrus industry.



Big and high quality screen house for indicator plants.



CTV Symptoms in Musambi orange tree

A detailed report is provided as **Annex-C**.

3. Strengths, Successes & New Opportunities:

During the reporting period, we managed to complete the remaining in all Specific Objectives. A great degree of coordination between ANHDO, RI and PHDP TA team was maintained ensuring that all relevant actors remained aligned to the Action Plan. The main strength was the part of the project related to the continuation of past activities mainly for SO1, SO2 and SO4. However, after the completion of the recruitment of the SO3 staff; the SO3 team was successful to kick start the related activities successfully with considerable progress.

During the reporting period, the following successes were achieved:

- SO1: Establish a very good level of coordination with ANNGO, completed the recruitment and capacity building training for the FMs that were seconded to the NGAs and produced a draft document for the revision of the ANNGO by law.
- SO2: Continuation of research activities and in collaboration with PHDP II the publication of the National Collection Procedure and initiated the Pomology Laboratory work on fruit quality, maturity index, packaging trials, etc.
- SO3: Selection of target areas and initial partners for the grape and raisin pilot projects, assessment of the Quality Control sector in Afghanistan and organized successfully study tours for partners.
- SO4: Maintaining a high level coordination role in the citrus sector in eastern Afghanistan and its role as the key technical body in the sector. Successfully undertook a Study Tour to Pakistan to assess the research developments and the CTV serotypes present in the nearby Pakistan.

During the reporting period, the following new opportunities started to arise:

- SO2&3: The operational capacity of the Pomology Laboratories in terms of their analytical potential has now increased considerably. With the right training, ANHDO should become a reference for soil and water analysis and tests, not only for their members but for other institutions, too.
- SO4: A new three (3) year project named "Research on Citrus tristeza virus infectivity in citrus orchards in Nangarhar Valley, Afghanistan" to study with sound scientific methods the effect of Citrus tristeza virus (CTV) infection on the productivity of citrus in the area of Nangarhar Valley and address the choices related to the use of rootstocks for the future citrus industry of Afghanistan has been devolved and is currently pending funding by the French Development Agency (AFD).



4. Problems/Challenges Found in Project Implementation and Suitable Solutions:

The recruitment of International Consultants has proven a challenge during the reporting period. Major obstacles included the presidential re-elections, the unavailability of consultants in specific periods and occasional the very high fee expectations they had in comparison with the available budget resources. Nevertheless, we have managed to successfully amend our initial consultant mobilization plan in close coordination with PHDP TA without facing significant delays in the project implementation.

SO1 field activities faced minor problems since the recruitment of the Field Managers that were seconded to NGAs faced minor issues including the delay of the recruitment of three (3) FMs for Herat, Kunar and Zabul NGAs for almost a month and additionally the resignation of two of the newly recruited FMs (seconded to Chongar and Bagram NGAs) due to family and health problems respectively. The recruitment for their substitution is on-going.

SO2 faced a delay with the Almond NC register proof reading process by the MAIL Horticulture directorate and the Director of Information and Public Relation. After resubmitting the register to HE the Technical Deputy and Director for Monitoring and Evaluation, Ministry of Agriculture, Irrigation and Livestock (MAIL) for final verification; this version was approved and the first color draft would be printed soon.

SO3 activities include coordination and support AAIDO; however the initial assessment of the AAIDO capacity and status is currently looking less than promising. Potential alternative partners in the almond sector are currently explored as part of a contingency plan. At the same time, the MAIL is undertaking a revision of the QC policy in Afghanistan making the implementation of related activities difficult considering that if we start to provide inputs to certain institutions now we are facing the risk to see these institutions losing their current mandates in the near future. A careful examination of the situation is necessary and we may need to postpone for a year any hard inputs (other than capacity building) to allow for a concrete government policy to emerge.

5. Conclusion: Lessons Learned and Recommendations:

The project activities have achieved a good implementation momentum during the reporting period. Especially, SO3 activities that practically missed the 1st Quarter period have come up to meet the expectations. Minor sub-activity delays have been experienced but do not pose a considerable threat to the projects objectives since we are only at the half of the 1st year of the 4 years long timeframe.

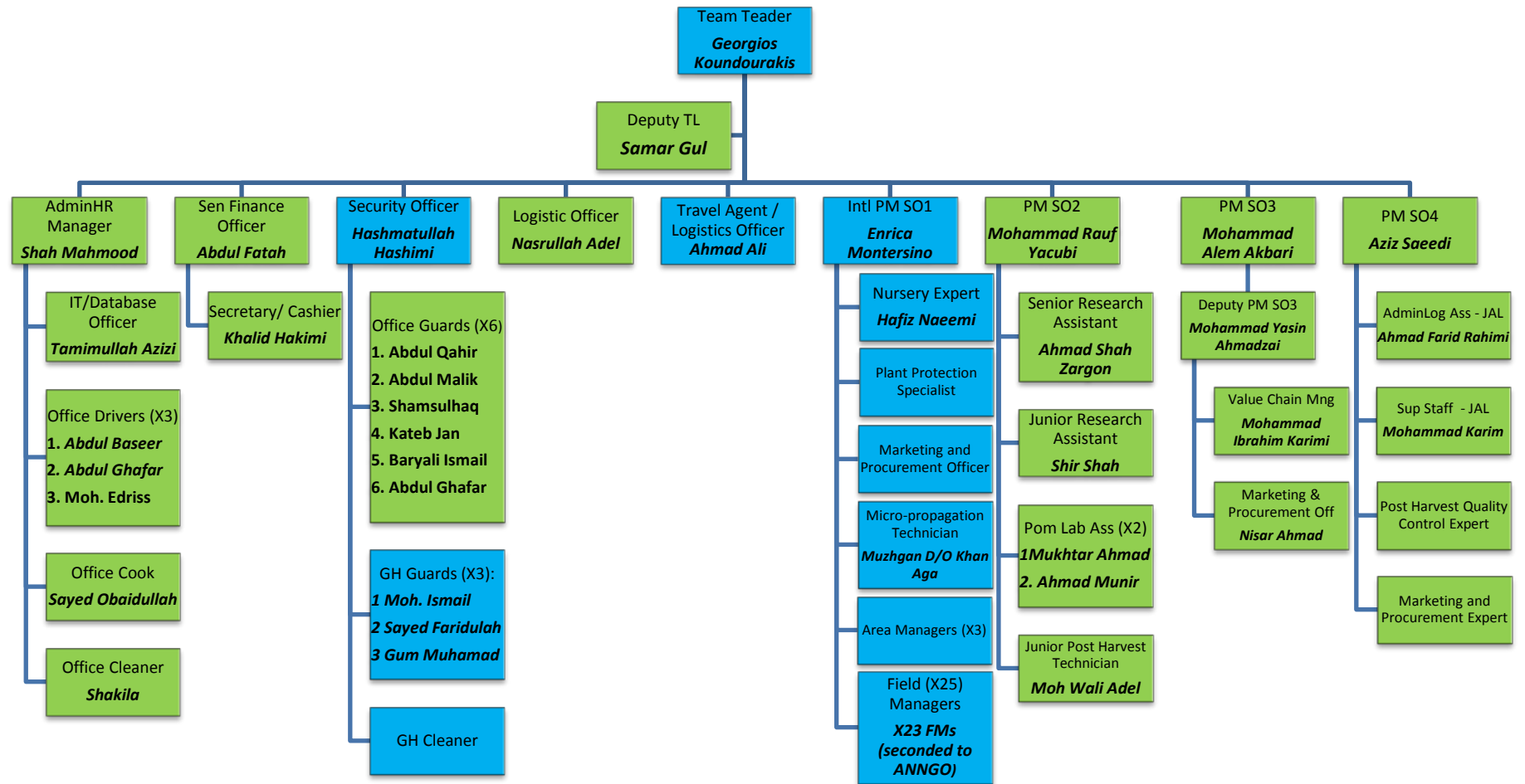
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Support to the Development of Perennial Horticulture Private Sector ANHDO - Relief International, Kabul - Afghanistan Organization Chart – 30 June 2014

Green - ANHDO staff
Blue - RI staff



HPS - 2nd Quarterly Progress Report Matrix (01-April to 30-June 2014)

“Support to the Development of Agriculture Private Sector” Perennial Horticulture Program		Work Progress Report					
PROGRESS REPORT MATRIX		Progress Achieved (%) - 1st Qtr 2014	Apr-14	May-14	Jun-14	Progress Achieved (%) - 2nd Qtr 2014	Overall Progress Achieved (to date)
Overall Objective: Contribute to the uplifting of horticulture (yields, quality standards, market value) and enhancement of capabilities of the private sector, through specific pilot actions in target areas.		2.0%				4.7%	6.7%
Specific Objective One: The Afghan private sector nursery industry and its associated organizations and institutions meet the demand, nation-wide, of Afghan farmers for certified perennial plant material for increased planting of modern orchards and vineyards.		2.7%				4.9%	7.7%
SO-1: Result 1	All large scale and small scale nursery producers join in building up ANNGO as an independent organisation driving forward progress in the fruit tree and general nursery production.	4.2%				5.5%	9.7%
1.1.1	ANNGO review its by-laws and adjusts its membership criteria to become a fully inclusive organisation open to all nursery growers in Afghanistan that follows the regulatory system	14%	7	9	9	25%	39%
1.1.2	ANNGO incorporates support functions to local NGAs currently run by two NGO consortia	14%	7	2	2	11%	25%
1.1.3	ANNGO provide services to local Nursery Growers Associations (NGAs). 26 NGAs and 800 active members assisted.	8%	4	2	2	8%	16%
1.1.4	ANNGO membership and service fees are raised gradually to move towards self sustainability within ten years	0%	0	0	0	0%	0%
1.1.5	ANNGO develops other paid services and sources of funding for activities in order to move towards sustainability.	0%	0	0	0	0%	0%
1.1.6	ANNGO develops market planning and promotional efforts	0%	0	0	0	0%	0%
1.1.7	ANNGO participate to and promotes business interaction among its members, including outsourcing between large and small nurseries.	0%	0	0	0	0%	0%
1.1.8	One study is organized for 6 ANNGO technical staff and visits to events and workshops for ANNGO officials	0%	0	0	0	0%	0%
1.1.9	ANNGO periodically review the performance of its members (including number of saplings produced and sold, payment of memberships fees, etc.)	6%	3	2	2	7%	13%
1.1.10	ANNGO promotes the development of ornamentals and forestry trees within the NGAs members	0%	0	2	2	4%	4%
SO-1: Result 2	The technical level of the fruit tree nursery industry in Afghanistan is raised to standards appropriate to the development of a modern orchard industry	1.3%				4.0%	5.3%
2.1.1	80% of nursery associations have provision for access to registered mother stock nurseries that meet current ANNGO standards for trueness to type, freedom from disease and vigour of scion or cutting materials (capacity for 7,000,000 plants per year by 2017)	0%	3	3	2	8%	8%
2.2.2	80% of nursery association members are able to produce, lift, label and pack fruit trees to the standards set by ANNGO	0%	0	3	3	6%	6%
2.2.3	Production capacity of certified planting materials is increased of 30 % per year with the further planting of mother stock trees and increase in production areas	4%	0	2	2	4%	8%
2.2.4	Nursery growers increasingly use modern clonal rootstocks across a range of species (600,000 annually by 2017, of which 400,000 apple rootstocks and 200,000 citrus rootstocks, tolerant to CTV)	0%	0	0	2	2%	2%
2.2.5	In partnership with ANHDO, AAIDO and other stakeholders, ANNGO perform periodical screening of the varieties/clones introduced in the MSNs in order to focus on the marketable varieties. At least 65 MSNs are ANNGO registered and function by 2017. At least 20 new marketable varieties are introduced in the MSNs by 2017 and the list of recommended varieties (at least 25) is issued jointly by ANNGO, ANHDO and AAIDO.	4%	0	2	2	4%	8%
2.2.6	ANNGO facilitate for its associated, the access to specialized services such as budding, pruning, monitoring of pest and diseases, input supply, etc. ANNGO will extend its services to third parties (public and private). At least 4 type of services are provided by ANNGO to 800 beneficiaries.	0%	0	0	0	0%	0%
SO-1: Result 3	The planting material registration and certification system increases its operations to meet increased demand	2.7%				5.3%	8.0%
1.3.1	At least 30 qualified inspectors Field Officer and Field Managers, are inspecting and monitoring standards in a timely manner	6%	3	2	2	7%	13%
1.3.2	Increased numbers of planting materials that meet the required standards, issued with certificates/labels (indicatively, 1,500,000 certified saplings in 2014; 2,500,000 in 2015; 3,500,000 in 2016; 5,000,000 in 2017)	2%	3	3	3	9%	11%
1.3.3	Three ANNGO regional offices established (Mazar-e-Sharif, Herat, Jalalabad).	0%	0	0	0	0%	0%
Specific Objective Two: Adaptive research and technical development programmes are successfully providing the technical solutions to increase orchard and vineyard productivity and value to the consumer at household, and national level		2.8%				5.6%	8.3%
SO-2: Result 1	Obj.2: Result 1: Adaptive research and technical development programmes are successfully providing the technical solutions to increase orchard and vineyard productivity and value to the consumer at household, and national level	2.6%				5.9%	8.4%
2.1.1	Cross pollination programmes in almonds, apricots and plums have identified suitable pollinators and combinations for each of the major varieties (30 in almond, 15 in apricot and 3 in plum)	4%	2	2	2	6%	10%

HPS - 2nd Quarterly Progress Report Matrix (01-April to 30-June 2014)

PROGRESS REPORT MATRIX		Progress Achieved (%) - 1st Qtr 2014	Apr-14	May-14	Jun-14	Progress Achieved (%) - 2nd Qtr 2014	Overall Progress Achieved (to date)
2.1.2	Suitable combinations of imported and local varieties of different species for cross pollination Sufficient information to be obtained on at least 10 varieties of Almond, Apricot and Plum	2%	4	4	4	12%	14%
2.1.3	Information on self and cross pollination characters is disseminated to nursery growers (through the ANNGO catalogue) and orchard growers through to other horticultural projects (NHLP, CHAMP, AREP, AGRED, etc.). It will also be shared with MoAIL (ARIA, Directorate of Horticulture) and other horticultural research and education entities. An estimated number of 7000 orchard growers and 6 Agricultural Universities will be the recipient of this information.	3%	2	3	3	8%	11%
2.1.4	Adaptive research into fruit characteristics, identify opportunities and constraints for the harvesting, packing, storing, shipping and processing of the different varieties and their consequent marketing potential. An estimated number of 900 accessions of 12 main species of the National Collection will be characterized for approximately 30 characters per species. The description will be published in the NC Register in collaboration with PHDPIL.	5%	3	3	3	9%	14%
2.1.5	Repeatable protocols and procedures for the monitoring and quality control of varieties of fruit in the national collections are developed in the pomology laboratories of the PHDCs. Maturity and shelf life indexes are identified for and estimated number of 60 varieties of the major species	3%	1	3	3	7%	10%
2.1.6	Engage university students as horticulture-interns; and provide employment opportunities for fresh graduates. An estimate number of 200 students and fresh graduates will be involved field and laboratory research activities, of with an estimated 40% will be female.	2%	1	4	4	9%	11%
2.1.7	Promote professional post graduate training programs (potentially leading to a Master Degree) focused on the ongoing "adaptive- research". 60 person/day of post-graduate training will be provided.	0%	0	0	0	0%	0%
2.1.8	One study is organized for 5 member of the research team.	0%	0	0	2	2%	2%
2.1.9	One (1) manual of pomology laboratory protocol and procedures issued	4%	0	0	0	0%	4%
SO-2: Result 2	Breeding programmes for improved apricot and almond varieties based on the best combinations of Afghan and imported germplasm have produced varieties for production testing and as a basis for further long term development.	3.0%				5.3%	8.3%
2.2.1	Field testing of (10-5) breeding lines of almond from crosses made in 2008 and open pollinated lines from 2009 and 2010 with release of superior varieties in 2017 and 2018	4%	0	2	2	4%	8%
2.2.2	Initial evaluation of 200 lines from targeted crosses made in 2012, 2013 to impart late flowering, self fertility and higher productivity into Sattarbai almond types, with a concurrent shorter term programme to improve productivity with some improvement in later flowering. Further 5000 lines expected to be planted out 2017	2%	0	3	3	6%	8%
2.2.3	Initial evaluation of 1200 lines from crosses made in 2012 and 2013 in apricots to introduce early season production, early maturity of plant and adaptation to warmer areas of the unique Afghan Amir types	2%	0	0	3	3%	5%
2.2.4	Facilitate the recruitment of talented fresh graduates. 3 interns and 2 Research assistant to be recruited	4%	2	3	3	8%	12%
Specific Objective three: Pilot demonstration of enhanced post-harvest management systems and market driven value chain development for key perennial horticulture crops within target areas and target groups		0.2%				2.9%	3.1%
SO-3: Result 1	Grape & raisin value chain improved with enhanced harvest and post harvest systems for exports and home market	0.0%				5.0%	5.0%
3.1.1	Number of producers & vineyard area involved	0%	3	3	3	9%	9%
3.1.2	Number of traders & processors involved, quantity of product processed	0%	0	4	3	7%	7%
3.1.3	Existing producer organizations surveyed and further organizational development facilitated	0%	0	3	3	6%	6%
3.1.4	Domestic and exports initiatives supported and quantities traded with innovative & rational packages. Possibility of development of a brand name studied	0%	0	0	3	3%	3%
3.1.5	Value chain analyzed and described in details.	0%	0	0	0	0%	0%
SO-3: Result 2	Almond Industry value chain supported and enhanced	0.0%				0.0%	0.0%
3.2.1	Survey of production and marketing levels and trends published by AAIDO including specifications of products and values	0%	0	0	0	0%	0%
3.2.2	Almond value chain is analyzed and described, including improved production systems and introduction of new varieties, and improved packages.	0%	0	0	0	0%	0%
3.2.3	AAIDO demonstrates ability to progress sales with the newly developing food retail outlets in Afghanistan and abroad	0%	0	0	0	0%	0%
3.2.4	Others a similar nuts value chain like pine nuts, walnuts, pistachios are analyzed and described.	0%	0	0	0	0%	0%
3.2.5	AAIDO provides a forum for the industry and publishes a long term strategy	0%	0	0	0	0%	0%
SO-3: Result 3	Pilot fresh fruit value chains for local fresh fruit marketing established and improved to raise standards and compete with imports	0.0%				3.0%	3.0%
3.3.1	Quantity of fresh fruit of two species marketed with better packages by ANHDO in partnership with private sector traders, to: 1) market fresh fruit, 2) to the Kabul supermarket 3) best fruit retailers	0%	0	0	0	0%	0%

HPS - 2nd Quarterly Progress Report Matrix (01-April to 30-June 2014)

PROGRESS REPORT MATRIX		Progress Achieved (%) - 1st Qtr 2014	Apr-14	May-14	Jun-14	Progress Achieved (%) - 2nd Qtr 2014	Overall Progress Achieved (to date)
3.3.2	Quality parameters identified and described	0%	2	2	2	6%	6%
3.3.3	Value chains improved and described in details including harvest, transport, suitable pre-packaging and cool chain distribution	0%	2	2	2	6%	6%
3.3.4	Marketing initiative analysis & value added	0%	0	0	0	0%	0%
SO-3: Result 4	Standards of quality for fresh, dried and processed fruit are raised and capability of quality control structures enhanced	0.8%				3.6%	4.4%
3.4.1	Survey of existing public and private quality control laboratories completed	4%	0	4	4	8%	12%
3.4.2	Capacity building actions undertaken for existing quality control laboratories	0%	0	4	4	8%	8%
3.4.3	Survey of existing package facilities and type of packaging available completed	0%	0	0	0	0%	0%
3.4.4	Survey of existing storage and cold chain facilities completed.	0%	0	0	0	0%	0%
3.4.5	Training programme and 3 study tours for 7 lab. Technicians (public and private) are implemented	0%	0	0	3	3%	3%
3.4.6	Capability of pomology laboratory at the 6 PHDCs enhanced	0%	0	3	3	6%	6%
3.4.7	Harvesting index, fruit processing and drying parameters and methods are defined based on work at PHDC pomology laboratories and related drying and processing laboratory facilities	0%	0	0	2	2%	2%
3.4.8	Partnership with a selected group of private entrepreneurs is established and processing systems are improved	2%	0	0	2	2%	4%
Specific Objective Four: A soundly based and profitable citrus industry in eastern Afghanistan is developed		2.3%				5.3%	7.7%
SO-4: Result 1	The newly reborn citrus industry in the eastern region of Afghanistan reaches significant levels of production and quality standards and provides increased regional economic opportunities	6.2%				3.8%	10.0%
4.1.1	Citrus value chain is analyzed and described, including improved production systems and, introduction of new varieties, and improved packages. No. 25 new varieties and rootstock introduced. One value chain analysis performed.	8%	4	0	0	4%	12%
4.1.2	Increased planting of citrus orchards of commercial size (1500 ha of orchards planted by 2017)	4%	2	0	0	2%	6%
4.1.3	Increased capacity of citrus nurseries (no. of certified saplings produced and sold. Indicatively 300,000 by 2017.	4%	2	2	0	4%	8%
4.1.4	Increased biotechnology laboratory capacity for continued monitoring of disease status in orchards and nurseries (main focus CTV) in orchards and nurseries (4 sampling campaigns, 10,000 tests by 2017)	4%	0	2	7	9%	13%
4.1.5	Increased number of citrus varieties released to ANNGO NGAs (25 new varieties).	11%	0	0	0	0%	11%
SO-4: Result 2	The citrus value chains and market-links are developed in order to meet international exports-standards.	0.0%				1.8%	1.8%
4.2.1	No. 10 of best marketable varieties selected and multiplied to meet market demand	0%	3	3	0	6%	6%
4.2.2	Packing, storage and market linkages developed. Estimated potential tons of marketable production; 50 T. in 2014, 100 in 2015, 200 in 2016, 400 in 2017 and 7500 tons by 2020 with continuing increase of new orchard area.	0%	0	0	0	0%	0%
4.2.3	Market awareness developed for the new varieties in domestic market (3 test marketing campaigns with 10 varieties & 2 awareness campaigns)	0%	0	2	0	2%	2%
4.2.4	Consolidation and support of the current Citrus Promotion Group with long term organizational arrangements (development of statute, no. of meetings, list of activities undertaken) leading to the establishment of a Citrus Growers Association	0%	0	0	1	1%	1%
4.2.5	Development of storage, grading, packaging & quality control facilities starts in the area (capacity of approximately 500 tons/ day)	0%	0	0	0	0%	0%
SO-4: Result 3	Private & public stakeholders strengthen their partnership around the agreed strategy for the Citrus industry.	0.8%				10.4%	11.2%
4.3.1	A permanent coordination between stakeholders is assured	0%	0	1	3	4%	4%
4.3.2	Capacity building undertaken for private and public stakeholders	4%	2	2	3	7%	11%
4.3.3	No 1 Study tours organized for 10 stakeholders	0%	0	1	40	41%	41%
4.3.4	Participation to regional and international events is organized for 6 stakeholders.	0%	0	0	0	0%	0%
4.3.5	No. 6 short and focused training events are organized	0%	0	0	0	0%	0%



AFGHANISTAN
NATIONAL
HORTICULTURE
DEVELOPMENT
ORGANIZATION



“Support to the Development of Agriculture Private Sector: Perennial Horticulture” (HPS) Project

DCI-ASIE/2013/335-321 (Europe Aid/133-872/L/ACT/AF)

SO4 Study Tour to Pakistan - Report

12 – 18 June 2014



Figure 1: Al Rafiq Kinnow processing factory in Sargodha, Punjab, Pakistan.

The Study Tour to Pakistan aim to assist the PBTL's further study of the Afghan CTV serotypes strain by investigating the research developments and the CTV serotypes present in the nearby Pakistan. This will support PBTL to develop a suitable disease control strategy for the citrus industry in Afghanistan.

A. Purpose

Although the main aim of this study tour is to develop further our understanding of the Afghan CTV serotypes behavior by investigating the research developments and the CTV serotypes present in Pakistan, we anticipate understanding further the following topics:

- Understand the CTV serotypes in Pakistan
- Understand the current strategy for CTV control in Pakistan
- Understand how Pakistani scientists use sour orange rootstock in spite of CTV existence
- Understand the rootstock strategy for citrus in Pakistan
- Establish a scientific link between our PBTL with Pakistani research and academic institutions.
- Assess citrus processing unit/s to enhance our capacity for installing a suitable packing and grading facility for citrus growers in eastern Afghanistan.
- Investigate techniques of citrus nurseries and orchard management in Pakistan

Pakistan is a main citrus fruit producer in the region and currently the main exporter of citrus fruits to Afghanistan. The main production area is Sargodha and the relevant laboratory is located in University of Agriculture Faisalabad relatively close to Sargodha. Moreover, Pakistan and Afghanistan have a long natural border, where frequent exchange of planting material occurs. The chance of the citrus germplasm of one country to affect the other is enhanced.

B. Participants

- a. Dr. Shamsur Rehman, PBTL Manager (Plant Virologist)
- b. Jamil Ahmad, PBTL Deputy Manager (Plant Virologist)
- c. Muhammad Aziz Saeedi, SO4 Project Manager
- d. Samar Gul Ahmadzai, Deputy Team Leader
- e. Dr. R. Basharat Ali Saleem, Horticultural Officer, Department of Agriculture – Extension

In order to enhance our understanding of the sector developments in Pakistan as well as facilitate the arrangement of the scientific meetings and field visits with citrus farmers and tours to citrus processing facilities; PBTL has identified a suitable facilitator (Dr. R. Basharat Ali Saleem) to support us with Study Tour activity.

C. Daily Activities

- | | |
|---------|------------------------------------|
| 12 June | Kabul to Peshawar (road trip) |
| 13 June | Peshawar to Faisalabad (road trip) |



14 June	Meeting with key staff of Department of Agriculture, Horticulture extension-Sargodha, PPT of Pakistan citrus industry by Dr. Basharat Ali, visit to Al Rafiq Kinnow factory.
15 June	Visit to Sargodha drip irrigated and high density citrus orchards. Visit to private citrus nurseries.
16 June	Visit to Citrus Research Institute (CRI) in Sargodha. PPT by the CRI director about the CRI activities and achievements. Field visit to CRI farm.
17 June	Meeting with Horticulture Director of Faisalabad University of Agriculture and workshop with the staff of Horticulture directorate. Visit the plant virology lab (Department of Plant Pathology), citrus sanitation and tissue culture labs (Department of Horticulture) and virology lab in CABB Faisalabad to Peshawar (road trip).
18 June	Peshawar to Afghanistan (road trip).

D. Summary Findings vs Purposes

- Understand the CTV serotypes in Pakistan

According to the Pakistani scientists, there has been no specific characterization of the Pakistan CTV strains. They apply only the ELISA technique.

- Understand the current strategy for CTV control in Pakistan

In regards to the nursery certification scheme, CTV is considered the most dangerous pathogen in Pakistan like in other countries but practically they do not provide enough effort to implement in full the certification protocols for the citrus nurseries in Pakistan. They are mostly focus on pest control and diseases that adversely affect the fruit quality and quantity and directly influence exports.

- Understand how Pakistani scientists use sour orange rootstock in spite of CTV existence

We found out that although use of the sour orange rootstock is also not recommended in Pakistan; nursery growers are using this rootstock probably due to availability and compatibility to orange varieties. Sour orange rootstock is not used in Punjab for Kinnow.

- Understand the rootstock strategy for citrus in Pakistan

In Punjab Province they use Rough Lemon as rootstock for all citrus species based on its adaptation and it's compatibly to Kinnow mandarin. But in KPK province, they use sour orange for almost all citrus species in general and specifically for oranges. There is do not have a clear rootstock strategy there. In Punjab the seed source is the Rough Lemon trees planted around the Kinnow orchards as borders. They just collect the seeds from those border trees.

- Establish a scientific link between our PBTL with Pakistani research and academic institutions.

In this study tour we have visited many institutions including different labs (for instance the virology lab) and we establish a link with them that could probably allow for a joint research project on CTV in the future.



- Assess citrus processing unit/s to enhance our capacity for installing a suitable packing and grading facility for citrus growers in eastern Afghanistan.

Citrus (Kinnow) processing units has been visited and we have found that the whole system is made in Pakistan and the whole fittings were done by Pakistanis. We could easily set up the Pakistani citrus processing unit in Afghanistan due to (i) reasonable price, (ii) availability of spare parts, (iii) availability of experienced technicians for maintenance, 4) adoptability to our requirements.

- Investigate techniques of citrus nurseries and orchard management in Pakistan

Based on observations, citrus saplings and fruit production is based on traditional methods. Pakistani scientists are working on introducing new techniques and technology; however, growers are not keen to accept those new technologies. So the nursery industry and orchard management status was found to be relatively weak.

E. Review of the Pakistani Citrus Industry

Pakistan is blessed with vast agricultural resources on account of its fertile land, well-irrigated plains, weather conditions, and centuries old agricultural tradition. It is because of its central importance in the economy that the Government considers agriculture as one of the four major pillars of economic growth. Currently, the total value of agriculture production is estimated at Rs.550.268 billion, mainly divided into major crops Rs.407.623 billion and minor crops including horticulture Rs.142.645 billion. The horticulture crops (fruits, vegetables & condiments) alone contribute Rs.116.645 billion, equivalent to US\$ 2 billion, which represent the 26% of the total value of all crops and 81.8% of the total value of minor crops.

Pakistan annually produces about 12.0 million tons of fruits and vegetables. Citrus fruit is leading in term of production followed by mango, dates and guava. Potato and onion are leading among vegetables and condiments. Fruit and vegetable export trade in Pakistan amounts to US\$ 134 million (2003/04), of which fruits account for US\$ 102.7 million (76.6%), vegetables US\$ 25.7 million (19.2%) and fruit & vegetable juices US\$ 5.6 million (4.2%). Their share in Pakistan's total exports is slightly over one percent. Pakistan has unique but unsophisticated network of up to six or seven intermediaries between the primary source (producer and growers) and the end user. Because of the presence of so many layers and the lack of adequate marketing infrastructure facilities, 30 to 40% of the perishable produce gets spoiled before reaching the final consumer.

Citrus fruit (mandarins, clementine & oranges) is the most important tree fruit crop in the world. It is consumed direct as a fruit as well as juice (fresh & concentrated). Citrus fruits include oranges, mandarins (Kinnow), grapefruit and lemons, of which mandarins (Kinnow) is of high significance to Pakistan citrus industry. Kinnow is a cross between 'King' & 'Willow-leaf' species of Citrus Fruit, successfully breed at the Citrus Research Centre, University of California, USA in 1951. Both of the parents have Indo-China origins. The soil and climatic conditions in Pakistan have given 'Kinnow' a unique flavour which distinguishes it from other comparable cultivars (mandarins) grown around the world. The world market for citrus is expanding. Exporting countries are striving to further expand their market share as new markets open up with world trade liberalization. (*Source: citrus marketing strategy May 2005*).

F. Rootstocks and Nursery Management.



In Punjab province the conventional rootstock for citrus is the Rough Lemon (*Citrus x jambhiri*). But in Khyber Pakhtunkhwa (Peshawar) the conventional citrus rootstock is the sour orange. This is probably due to the compatibility of sour orange rootstock with orange varieties (KPK mainly produces oranges). It is said that they were using sour orange rootstock in Punjab long time ago but trees grafted on this rootstock face some problems such as gummosis in the graft union and other problems. Because of this they stopped using sour orange and currently prefer rough lemon as rootstock due to its drought and heat tolerance and good compatibility with Kinnow mandarin. But they didn't stop using sour orange rootstock due to the existence/threat of CTV.

They have trials of other imported rootstocks, for the time being besides rough lemon the other rootstock they are recommending for Punjab region is the C35 citrange.

There is no proper certification system in Pakistan for sapling production similar to the ANNGO one in Afghanistan. It is very difficult for them to implement such a certification system because their citrus industry is already established and they need a very huge amount of saplings every year (1,500,000 saplings for filling gaps and new orchards). However they have some mother blocks in the research stations and they claim that they can provide bud wood from those trees to nursery growers, but we question their capacity to do so.

Nursery growers collect seeds for rootstock production from Rough lemon trees planted around the orchards and when the rootstocks are ready they collect bud wood and graft the rootstock. But still true to type-ness is in place because they have only Kinnow orchards and they produce Kinnow saplings; so wherever they may collect the buds are Kinnow. In Punjab the conventional time for orchard establishment is August because the weather in summer is very hot so they do the plantation in August where the coming winter is mild and the hot summer has almost passed. They sow rough lemon seed in August, transplant the seedlings from bed to nursery in Feb, graft the seedlings in August and transplant the majority of the saplings in next August. In Afghanistan we don't recommend transplanting in August because the coming winter is cold which can damage the saplings or at least the winter will not let the saplings grow properly so it is better to plant in spring.

In the research station, the container grown citrus saplings were very healthy. The media was top soil+ sand+ alluvial soil. However, this media is not enough, they have to provide twice a year NPK either foliar application or soil application and besides they provide plenty of N (twice a month 1 teaspoon Urea/ sapling). The soil type was almost the same as our soil (Soil pH range is 7.5-8.4). In order to produce healthy citrus saplings we should follow the same procedures, in particular N application. In some cases they were spraying NPK every month and the saplings treated this way were very healthy. So we have to make some trials on the application of different fertilizers to find out the best fertilizer application plan for our citrus saplings.



Container grown citrus saplings with a specific fertilization plan.



The local nursery growers sell saplings for 40-60 PKR/sapling (almost 0.5 USD/ sapling). The research station was selling the saplings at 150PKR/sapling (1.5 USD/sapling).

G. Orchard Management.

Punjab has a vast agriculture land and the soil is saline and heavy (in particular in Sargodha) where the land is almost level resulting in poor drainage and creating salinity problems.

Sargodha is the main citrus production area in Pakistan; producing mainly Kinnow in large quantities. Although, they produce considerable quantities of Kinnow they still don't manage their orchards in a proper way. They are growing very dangerous intercrop inside the citrus orchards such as wheat and corn. They do this intercropping in each citrus orchard twice a year, it means they sow wheat and after harvesting wheat they sow corn. Occurrence of most pest and diseases are mainly the side effect of this improper intercropping.

The rootstock they are using is Rough Lemon and this rootstock is susceptible to Phytophthora gummosis disease; this is most susceptible when the graft union is at the ground level or below. Most of the trees are suffering from this disease because they are flood irrigating the orchards while the rootstock is rough lemon and the graft union is very low. They flood irrigate not only for the citrus trees but also for the wheat and corn crops. The research and extension people are against this type of irrigation and intercropping but still the fruit growers at the end are doing what they want. Due to bad orchard management besides the Phytophthora the trees are suffering from nutrients deficiency and other pest and diseases.



Improper intercropping of wheat and corn in citrus orchards.

There is a very early citrus variety in Pakistan which is always the 1st citrus fruit arriving to the markets. Locally it is called fruiter but it is Feutrell's early mandarin. Also, there is a variety of limes in Afghanistan commonly named Chinese lime but its real name is Eustis lime.

Pakistan has the best climatic conditions for Kinnow production and the total area of citrus growing is 500,000 acres and the average production is 11tonnes/Hectare (Kinnow start commercial production at 6-7th year). Average production is 145kg/tree equivalent to 800 fruits/tree when in some good managed orchards it can reach up to 40tonnes/hectare.

Pakistanis have advised us to focus on orange production rather than other mandarins because we have cold winter in Eastern Afghanistan which means oranges can be produced in good quality. Kinnow works better in Punjab that is why they are focusing on that otherwise orange is much better than kinnow; especially fruit price is much higher and the international demand is



higher compared to Kinnow. Since the winter is mild in Punjab thus they can't produce good quality oranges. However, they still manage to produce low quantities of oranges, too.

H. Kinnow Processing Factory.

There are more than 250 citrus (kinnow) processing factories located only in Sargodha. Besides packing and grading there are some concentrated juice factories, too. The product from the unit we have visited was mainly exported to Russia. Iran, Russia and China have given their own standards for importing citrus products from Pakistan. The citrus fruit exported to Russia is checked by a lab in Lahore which charges each container 500USD.

Quality A is exported to Russia, Iran and China and the rest is consumed locally. For long distance exports (for instance Russia) they ship the fruits by sea inside refrigerated containers where they keep the temperature 3-4 C and shipments arrive to their destination after a month. They are following the Global G.A.P rules for citrus exporting and they claim for SPS and IPM measures but mostly theoretically.

They start processing from mid November to end of March. This factory have contract with some kinnow producers and the factory has some technical staff who advise the farmers to maintain the orchards in good condition to produce good quality fruits.

The factory labors pick the fruit from the orchards and this factory deals with farmers based on fruit weight. They contract them in different stages in particular in flowering stage and then they buy the fruit based on weight while the fruit is weighed and graded in the field. So in this case no body is harmed. Besides this, they also have other contractors who are supplying fruits directly to this factory. The payment is done by installments where the factory owner pays the grower a ¼ of the total value at the 1st installment immediately after the harvest and the rest is paid later. The factory also provides farmers with loans. This discussion was important to us because later on in SO4 we will make a collection center of citrus fruit and these rules and arrangements could help us.

The factory has a process capacity of 150T/day but due to the existence of many factories in area and low quality orchards they only process 80T/day. They process an average of 350 containers per year. Each container holds 24 tones. Our peek processed production in NVDA was 8000 T/year but this factory only can process more than 8000 T/year. They were grading Kinnow fruit in eight grades 54, 60, 68, 70 fruits per crate. They don't apply commercial de-greening in citrus. Smoking can be tried for citrus greening (smoke of dunk or straws).

The factory we have visited was a good one and the equipment was made in Pakistan (this factory was a copy of a European one). We prefer to use the same standard equipment for the packing and grading and cold storage facility in SO4 project. Because the equipment is available in Pakistan, we can handle it, training can be easily obtained, and spare parts are easily available.

I. Pests and disease.

Common pests and diseases of citrus crops were, Phytophthora (Gummosis), caterpillar, citrus mealy bugs, citrus white fly, bacterial canker, fruit fly (quarantine pest), scale, nematodes, thrips, citrus greening, fruit scab, citrus psylla and CTV.

Rough lemon rootstock is also affected by CTV. The honey combing and pitting we have seen in an orange tree was grafted on rough lemon rootstock. But the rough lemon could be less sensitive to CTV compare to sour orange.





Symptoms of CTV in Musambi orange tree grafted on rough lemon rootstock.

Pakistanis opinion was that if the problem is below the economic threshold you don't have to worry a lot. Just go ahead and continue the production in spite of the presence of Phytophthora, canker and CTV.

Citrus greening is more dangerous in Pakistan than CTV. So their main concern is the citrus greening now.

For gummosis prevention they use Bordeaux pest at ration of 1:2:12 respectively copper sulfate, lime and water. They use it twice per year, at the beginning of winter and summer.

Chemicals:

Azoxystrobin @1gr/liter water for scab control.

Amister Top for scab and Melanose controlling.

Copper Hydroxide (Champion or Koside 3000) for scab and cankers.

Dimethoiate for thrips control.

Task TM (Metaldehyde) for snail control.

J. Citrus GPU and MSN.

They have a collection of citrus varieties and they call it Germplasm Unit (GPU). The GPU was isolated from the citrus production areas and they didn't let us to visit that place. They recommended us to keep the GPUs far from production areas to avoid pest and disease problems.



Citrus Germplasm/MSN under net house. The trees are planted in the ground.



They had a kind of citrus MSN under net but it wasn't a real MSN. Because the plants look as if no buds had been taken and there was no specific program for promoting bud wood production with trees getting high enough to touch the net.

However the net houses were designed very nicely with galvanized gaze and the top was very high but they said the materials specifically the gaze was brought from abroad and it is not available in Pakistan.

K. Assessment of CTV in Pakistan.

The CTV is considered the most dangerous virus pathogen for citrus crop. From several surveys performed by PBTL it has been proved that this virus is spread up to a reasonable extent in Nangarhar, Laghman and Kunar provinces of Afghanistan. As Afghanistan has a long natural border with Pakistan, planting material exchange occurs frequently with most of the planting material getting imported from Pakistan. So there is a high risk of movement of contaminated material of citrus with CTV to Afghanistan. In this study tour, it was found that CTV is widespread in the citrus producing areas (Sargodha, Jhang and other districts of Punjab province) for a long time but there is no evidence of severe symptoms of the virus or tree decline citrus orchards. Pakistan scientists consider that this is probably due to a mild strain/serotype of CTV and therefore they are not giving too much attention to these pathogens. For them, the most dangerous problems in citrus are the citrus greening, Phytophthora and canker along with other pest and diseases. On the other hand this virus has no significant effects on fruit quality and quantity in that area, therefore no attention has been given because Pakistan is mostly exporting citrus fruits and not the saplings. The saplings imported to Pakistan are not registered as imported materials. During the tour it was made clear to us that in the nursery certification, CTV is considered the most dangerous pathogen in Pakistan (like in other countries) but practically they do not implement sufficiently the certification protocols for the citrus nurseries in Pakistan. Mostly the attention is given to pest control and diseases that adversely affect the quality and quantity of exported fruits.

In academic and research laboratories, they mostly study bacterial and fungal diseases and characterize them by molecular work. For CTV they use only ELISA technique and no one has done characterization of CTV in Pakistan according to the Pakistani scientists. One reason for the less interest in CTV by the research laboratory is the long chain of the CTV RNA which is a considerably difficult to study.

Compared to Pakistan, the Afghanistan certification system is on good track and it's important to study and characterize the CTV and to identify the serotypes/strains present in Afghanistan.

L. PBTL Recommendations.

i. Acclimatization of rootstocks

Acclimatization of rootstocks is a challenging issue in Afghanistan for PBTL in order to ensure that the medium used in the pots for acclimatization of rootstocks is free of fungal and other pathogens. Sterilization of medium is recommended. Pakistani scientist has promised to assist for finding a suitable steam sterilizer in Pakistan for the PBTL in Kabul.

ii. Maintaining citrus indicator plants in a control environment

In Pakistan the Germplasm collection of Kinnow/Mandarin are kept in big screen houses. It's possible to keep the indicator plants (imported from Italy) for citrus biological indexing in Jalalabad



also in a control environment for seed production in the future. But the current structure of the net house is not suitable (sufficient) for trees to grow and produce seeds.



Big and high quality screen house. PBTL suggests the same structures for indicator plants.

iii. Monitoring of MSNs in Afghanistan

As the climatic conditions of citrus producing areas in Afghanistan are almost similar to the citrus producing areas in Pakistan; along with the virus monitoring, MSNs and National collections should be also monitored for those pest and pathogens present in Pakistan.

iv. Assessment of area for the establishment of new MSNs

It's highly recommended that before establishing an MSN, the vicinity crops should be checked for pests and diseases. The same practice was suggested by Pakistani scientists. And it has been suggested that the mother stock trees should be far away from the groves of the same species.

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