



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

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

4TH QUARTERLY PROGRESS REPORT, 01 OCTOBER - 31 DECEMBER 2014



SO2 Study Tour to AgFair Interpoma of Bolzano, Italy



**AFGHANISTAN
NATIONAL
HORTICULTURE
DEVELOPMENT
ORGANIZATION**

In consortium with



List of acronyms used in the report:

AAIDO	Afghan Almond Industry Development Organization
ANHDO	Afghan National Horticulture Development Organization
ANNGO	Afghan National Nursery Grower Organization
BoD	Board of Directors
CC	Coordination Committee
CHAMP	Commercial Horticulture and Agricultural Marketing Program
CPN	Certified Production Nursery
CU	Central Unit
CPG	Citrus Promotion Group
CTV	Citrus Tristeza Virus
FFS	Farmer Field School
FH	PHDC Field Horticulturist
FM	SO1 Field Manager
GA	General Assembly
IDEA-NEW	Incentives Driving Economic Alternatives for North, East, and West
MAIL	Ministry of Agriculture, Irrigation and Livestock
MSN	Mother Stock Nursery
NC	National Collection
NGA	Nursery Growers Association
NHLP	National Horticulture and Livestock Program
NNGA	Nangarhar Nursery Growers Association
NVAC	Nangarhar Valley Agricultural Company (ex-NVDA)
NVDA	Nangarhar Valley Development Association
PBTL	Plant Bio Technology Laboratory (Badam Bagh)
PHDP II	Perennial Horticulture Development Program
PHDC	Perennial Horticulture Development Center
RI	Relief International
PPP	Public Private Partnership project agreement
SAGAL	Strengthening Afghan Governance and Livelihoods (
SC	Steering Committee
SO	Specific Objective
TA	Technical Assistance
ToT	Training of Trainers
TL	Team Leader



1. Executive Summary of the Quarterly Activities:

SO1 activities included continued (in close coordination with PHDP II TA) institutional support to ANNGO for review of the ANNGO Bylaw. A Legal Advisor Nat'l Consultant has been mobilized to provide capacity building to ANNGO BoDs on legal issues and facilitate the revision process. The Dari and Pashto translations of the first draft version of the revised ANNGO bylaw were provided to the ANNGO Board of Directors in October. ANNGO board members had the opportunity to continue discussions and the review of the draft document. During the ANNGO BoDs meeting on 24NOV14 some changes were discussed with PHDP TA. By the end of the reporting period, the draft remained under discussion within the ANNGO board members. Future steps include the distribution of the final draft among the NGA chairmen and a training seminar on the new legal responsibilities for the board members and all NGA chairmen. This should take place just before the GA currently anticipated in late January.

Twenty five (25) SO1 Field Managers (FMs) are recruited (and seconded to ANNGO) to support the NGAs and their national representative organization ANNGO in implementing the certification scheme as well as provide MSNs and production nurseries with technical support and advice. FMs mainly supported the NGAs with the certified sapling sales to NHLP and conducted field visits to certified production nurseries (CPNs) in order to collect certification documents and provide them with technical support. FMs provided ANNGO with the label requests and ANNGO after completing the necessary inspection process completed the distribution of the certification labels to the NGAs. Currently they are collecting the fees. The FMs performed capacity building trainings in five (5) NGAs where in total 72 NGA members participated and received training mainly on seed stratification, labeling and sapling handling.

PHDP TA (with the assistance of SO1 team) reviewed the draft English version of the ANNGO 2014-15 Catalogue and provided their feedback to ANNGO for improvements. ANNGO initiated the translation process into Dari and Pashtu during December with anticipated completion in early January before the review and finalization of the files for printing. Printing is expected to take place in early February 2015 after the ANNGO GA. ANNGO requested HPS to support them with the cost of the publication and HPS will support ANNGO with the related costs.

We initiated a survey of the nursery companies that are not currently operating under the ANNGO umbrella. The assessment is anticipated to be completed by March 2015. We will coordinate closely with ANNGO on this and present ANNGO with our findings / recommendations that shall enable them to finally decide on their future potential expansion. Moreover, we initiated a NGA marketing assessment that could permit them in the near future to potentially prepare business plans. This is a potential service that ANNGO could provide to the NGAs in the future. In cooperation with ANNGO, the agreement for the ornamental sector pilot project (under HPS/SO1) that they would like to implement in cooperation with the Baboor Garden Foundation was drafted. The signature of the MoU is pending the decision of the new board of Baboor Garden Foundation.

Description of the National Collection and the adaptive research activities continued in the PHDCs (under the MAIL Directorate of Research authority and PHDP II TA supervision) with the continuous support of the SO2 team. We engaged in reviewing the adaptive research protocols and participated in the preparation of the 2015 annual plan for the research activities. Moreover, we participated in the preparation of final reports on the trials' results. Adaptive research activities were on going. Cross pollination trials in the apricot (Amiri) accessions shall be discontinued with new accessions to be selected for self-fertility if not previously assessed. Statistical analyses showed that the dose for the Gibberellin treatment in Shundakhani grapes was non-significant and this trial shall be repeated next year in commercial grapevine orchard/s owned by grape growers linked with HPS/SO3 in Shamali. A new trial (14-07) regarding the comparison of different citrus varieties on a range of rootstocks in Jalalabad has started. Trial protocols and trial assessment forms have been prepared for this long term (multiyear) citrus variety x rootstocks trial.

Completion of the registers for the different species in the national collections remained the priority in the technical programmes (including HPS) under the MAIL Directorate of Research authority and PHDP II TA supervision. Work was on-going including further data collection on accessions and verification of previously collected data. SO2 main activities focused on supporting the preparation for the Apricot Register publication. At the same time the Pomegranate Register started to get developed too with all involved stake holders waiting for the anticipated arrival of the SO2 Horticultural Research Specialist Int'l Consultant (Gregory Cullen) to finally review the English draft document in February. Both these Registers will be published within 2015. Moreover, we anticipate that further Registers on Apricot, Cherry,



and Plum may also be published within 2015 pending the progress of work and data evaluation. The national collection of Apple is starting to bear fruits and the descriptors were revised in Kabul. The Loquat is flowering in Kandahar and the format for the description was prepared and shared with the PHDC FH.

The Study Tour to Italy (Rome, Faenza and Florence) was successfully concluded on 04OCT14 with the return of SO2 Project Manager, SO2 Senior Adaptive Research Assistant and an ANHDO Board member back to Kabul. The participants increased their technical capacity in germplasm management, nursery production under a certification scheme, fruit production and marketing, including sensorial evaluation etc.

The Interpoma Bolzano International Trade Fair in Italy in late November was considered a great opportunity for PHDPH and HPS to organize another complementary (2nd) Study Tour; to Italy (Bolzano) for Naseer Omarkhel (PHDC Kabul Field Horticulturist) and Popal Bashir (ANHDO Board member, fruit trader and exporter) to visit the AgFair Interpoma and the agricultural area around the provinces of Bolzano and Trento which is the most intensive apple producing area in Europe. Participants departed to Italy on 19NOV14 and the tour lasted nine (9) days giving them the opportunity to increase their technical capacities on intensive apple plantations, production technology, farmer associations and the extension services which in this area is considered a sector state of the art.

Regarding SO3 team, we have completed the distribution phase of the post harvesting & processing tools / improved packaging to four (4) grape farmer groups, three (3) raisin producer groups and one (1) prune producer group totaling 319 individual beneficiaries (out of initially 433 selected) in Qarabagh and Farza Districts of Kabul Province, Bagram district of Parwan province and Mahmood Raqi of Kapisa province.

We produced the post-harvest manuals for fresh grape, prune and raisin. The manuals will be used by the technical team during the course of the project and as well for training purposes. The manuals include post-harvest and HACCP good practices, drying standards and post-harvest losses. Further manuals will be developed in relation to the fresh and dry fruits & nuts that we will finally work with during the project.

One farmer from each of the final eight (8) farmers groups that attended the Training of Trainers (ToT) seminar in Kabul in September were employed for a calendar month to perform trainings with the beneficiary farmer group members at the field level during the harvesting period based on the Farmer Field School (FFS) principle. We are undertaking further capacity building trainings on hygienic & sanitary and post harvest best practices. We completed the survey to determine the actual 2014 production levels and the actual sales volumes that our beneficiaries achieved. In total, 100% of the grapes production (1,316 tons mainly Kishmishi), 61% of the raisin production (301 tons mainly Red) and 29% of the prune production (17 tons mainly 1st Grade) were sold by the end of the reporting period. Moreover, we are supporting the raisin and prune producers' groups to develop further marketing linkages to permit further sales of their unsold production. We are currently considering the promotion of Kishmish Khanas for producing high quality green raisins and we are in the processes of producing an improved ventilation design (to reduce the drying cycle) including the use of alkaline solutions, too.

The Marketing Expert – Int'l Consultant conducted a survey of the key stakeholders to understand the current marketing practices and capacities. Moreover, on 25-26NOV14, we conducted a two (2) days long Seminar on "Basics of Agro-Marketing". In total, 25 individuals participated representing the full range of the market chain; fresh and dry fruit producers (grapes, almond, prune, raisin), processors, traders of fresh and dried fruits, representatives from MAIL and DAIL, ANNGO, fruit exporters association and a local development agency CARD-F.

It has been decided that the best way forward in regards to the final decision for a potential inclusion (or exclusion) of AAIDO as a project partner is to re-examine AAIDO's organization capacity and sustainability in spring 2015 while at the same time work on developing a contingency plan including the identification of alternative suitable partner/s. Samangan Dry Fruits & Nuts Association and Kunduz Almond and Dried Fruit Cooperatives in the north as well as the Kabul Dried Fruit Exporters and Processors Association (KDFEPA) are currently considered suitable alternatives to AAIDO. We have mobilized the Horticulture Value Chain Expert – Nat'l Consultant (Prof. Ghulam Rasoul Samadi) to initiate an almond value chain analysis and propose recommendations for potential pilot project/s.

We conducted a survey in in Qara Bagh, Shakardara and Paghman Districts to assess the available cold storage facilities in the area. Moreover, we initiated a survey in Shakardara and Paghman Districts to identify suitable partners for pilot projects in fresh fruit value chains. The areas are suitable for post-harvest related activities and specifically for apples, cherry, apricot and peach value chains.

In the eastern Afghanistan region, the SO4 team completed the citrus growers' assessment in Kunar, Laghman and Nangarhar Provinces. Ten (10) interns were recruited (and trained) to conduct the field survey that took place during the citrus harvesting (November to December) period. In total 1,036 citrus



growers were surveyed and we are currently working to produce the data base for analysis. The survey will allow us to obtain the basic information regarding citrus growers' location, citrus production levels and potential as the 1st step of the citrus value chain analysis as well as support the identification of suitable "citrus grower clusters" that we could consider as project beneficiaries. An introductory Brochure was distributed to citrus growers during the survey including a presentation of the recommended new citrus varieties. The impact of the brochure was very positive since many citrus growers already approached us for consultancy to guide them on their plans to establish new commercial citrus orchards.

Information provided by other organizations indicates that during 2014 almost 208ha of new citrus orchards were established (mostly Sweet Orange variety) for their beneficiaries using certified citrus saplings. Also, another 141ha were established (mostly Sour & Sweet Orange) using non-certified saplings. Planting citrus trees is a first step to establish new citrus orchards. However, taking care of the planted trees and nursing them to allow for normal growth and a fruitful productive life is a very important task, too. This is a necessary and critical requirement especially for commercial citrus orchards where the production volume as well as the fruit quality (appearance, size, juice content etc.) are both critical for marketing purposes and an increased market price that make a business viable and profitable. We plan to proceed with a series of intensive capacity building activities on this and other related issues for citrus orchard management, harvesting and post harvesting "best practices".

We conducted a series of meetings with NVDA Director where we have been able to strengthen further our partnership relations with NVDA. NVDA has finally become a public enterprise with the name NVAC (Nangarhar Valley Agriculture Company). Further coordination will take place in the winter 2015 period to establish an appropriate PPP agreement that is anticipated to lead to the establishment of a fully operational citrus processing facility by autumn 2016. We advertised the vacancy for a SO4 Post Harvest Facility Engineer to identify a suitable Engineer that could be mobilized to design the facility layout and produce the list of machinery and their specifications for an anticipated (summer 2015) tender.

Generally, the citrus nursery industry in eastern region has been successfully moving towards the certification system. During the past years we observed an increased demand for citrus certified saplings with the nursery growers trying to meet this continuously increasing demand. Considerable achievements have been made to date but still many nursery growers can't produce citrus certified saplings to successfully meet both the quality standards and production levels required. We have built a plastic tunnel and sow Volkamer seeds in order to practically examine the possibility of early (October) sowing of Volkamer and Rough lemon seeds to produce rootstocks. The germination rate was high and the plants can get ready for grafting in the right time. If this procedure is used then the nursery growers will be able to graft the rootstocks in a proper height. SO4 has brought new ideas and practices for presenting the nursery growers with advanced and modern technologies to permit them to produce standard citrus certified saplings. In order to practically apply these new methods, we will proceed with supporting NVAC (ex-NVDA) to establish a pilot modern citrus nursery. This will not only permit NVAC to modernize their nursery and expand their nursery production capacity in certified citrus saplings to establish commercial size citrus orchards in their land; but it will also be used as a demonstration site and benefit the private sector nursery growers who will be able to observe how such new technologies practically work. The negotiation regarding the PPP agreement for the provision of HPS support to NVAC to establish the referred nursery is ongoing with the partners currently reviewing the final draft.

The new Nangarhar DAIL Director visited PHDC-JAL and was briefed on the HPS/SO4 project. He was very interested in the citrus value chain survey and expressed his support by issuing a formal letter to all relevant districts to be informed and support us accordingly. National Agriculture Education College (NAEC) organized a field visit for their student to Jalalabad. During the tour, they have visited PHDC-JAL and they were interested in the ANNGO certification scheme. We provided them with a presentation of the ANNGO certification scheme and the example was citrus. After the presentation the students visited the citrus nurseries, citrus net house, citrus indicator plants and citrus national collection.

We successfully conducted a Citrus Field Day for 60 NHLP participants in PHDC-JAL citrus NC to introduce to NHLP lead farmers and related extension workers to commercial growing and enhance their awareness for new citrus varieties. Nangarhar TV produced a program on citrus (new varieties and orchard establishment and management) that has been broadcast more than 10 times in different days/times in the first week and broadcasting will continue until they make a new program. Moreover, TOLO TV (national channel) also produced a similar program that is being broadcast nationwide.



2. Project Implementation Progress and Analysis:

During the reporting period the project team had the chance to step up the implementation momentum and focus on the implementation of most of the sub activities as per action plan. Moreover, supporting activities took place to empower the implementation team to perform its activities successfully:

Staff Recruitment

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

There were minor changes in the national staff (under SO1 Field Managers) after a couple of resignations mainly due to family reasons. The Logistics Officer resigned and a new one was recruited which affected slightly the operational support during October. Moreover, the Travel Agent resigned and the recruitment is on-going.

Consultants Recruitment

During the reporting period, we continued with the announcements of the international consultants' vacancies in accordance with the annual plan 2014 we prepared in close coordination with PHDP TA.

So far the following consultants have been already mobilized (or anticipated to be mobilized) as follows:

Int'l Consultant Mobilization	Name	Mission Duration	WDs	Status
SO3 Post-Harvest & Quality Control	Federico Valori	06MAY14 to 06JUL14	51	Completed
SO3 Post-Harvest & Quality Control	Federico Valori	10AUG14 to 30SEP14	45	Completed
SO1 Nursery Expert - Ornamentals	Cosimo Frati	22AUG14 to 10SEP14	18	Completed
SO2 Horticultural Research Special	Gregory Cullen	27OCT14 to 29OCT14	3	Completed
SO3 Marketing Specialist	Rafiq Sakar	07NOV14 to 11DEC14	31	Completed
SO2 Horticultural Research Special	Gregory Cullen	17FEB15 to 18MAR15	26	<i>Anticipated</i>
SO4 Citrus Value Chain Expert	Gerrit Booyens	23FEB15 to 26MAR15	28	<i>Anticipated</i>
SO3 Marketing Specialist	Rafiq Sakar	27FEB15 to 26MAR15	25	<i>Anticipated</i>

Regarding the mobilization of National Consultants:

Nat'l Consultant Mobilization	Name	Mission Duration	WDs	Status
SO1 Legal Advisor	Musa Fariwar	15MAY14 to 31JAN15	27	On-going
SO3 Raisin Processing & Marketing	Ghulam Samadi	01AUG14 to 30SEP14	50	Completed
SO3 Wholesale & Distribution Expt	Hedayatullah Omarkhel	01AUG14 to 30SEP14	50	Completed
SO3 Horticulture Value Chain	Ghulam Samadi	15DEC14 to 08FEB15	40	On-going

Coordination

Close coordination between ANHDO, RI and PHDP TA from the initial stages of the project, ensured a good team spirit. Key decisions have been taken jointly with all relevant actors and extra care was taken to avoid surprises and maintain the crucial level of trust and cooperation that has been successfully established within the implementing partners.

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

a	7 th Coordination Committee meeting	Saturday 08 th November 2014
b	8 th Coordination Committee meeting	Wednesday 10 th December 2014



Overall Progress Indicator

Based on the activities that took place during the reporting period the fourth (4th) Quarterly Progress Report Matrix is presented as **Annex-B**. Moreover, **Table-A** below summarizes the main related progress information per Specific Objective:

Progress Indicators	Progress Achieved (in 4 th Qtr.)	Overall Progress (by 31Dec14)
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.	6.4%	20%
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.	5.2%	21.7%
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	5.0%	21.7%
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	8.5%	17.7%
Specific Objective Four: A soundly based and profitable citrus industry in eastern Afghanistan is developed	6.9%	17.0%

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

SO1 team activities included continued (in close coordination with PHDP II TA) institutional support to ANNGO. Regular meetings were undertaken with the ANNGO technical staff and board members to coordinate and organize joint implementation activities. Specifically, the following topics were addressed:

13&25OCT14 Label request/distribution processes between ANNGO/NGAs, sold buds numbers, baseline survey questionnaire, review of the documentation received by FMs, field monitoring and inspection issues, the new ANNGO Catalogue, and the pilot ornamental project development.

02&15NOV14 NGA issues, the ANNGO catalogue 2014-15 publication, the pilot ornamental project with Baboor Garden, cooperation issues between ANNGO and NHLP project and review of ANNGO by law.

22&28DEC14 Support ANNGO to coordinate with NHLP to address various cooperation issues. Specifically, they plan to have regular meetings to enhance their coordination, share information and address issues related to the certified saplings market volumes and the non-certified saplings market.

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

The Dari and Pashto translations of the first draft version of the revised ANNGO bylaw document was provided to the ANNGO Board of Directors in mid – October. The SO1 Legal Advisor Nat'l Consultant provided continued support to ANNGO board members with clarifications and discussed potential changes aiming to finalize the draft of the new by law. ANNGO required the support of PHDP TA in the ANNGO BoDs meeting that took place on 24NOV14 regarding the revision process of the ANNGO law. At this meeting, ANNGO BoDs proposed to PHDP TA some changes in the duties and responsibilities.



By the end of the reporting period, the draft remained under discussion within the ANNGO board members. Future steps include the distribution of the final draft among the NGA chairmen, a training on the legal responsibilities of the ANNGO board members and all NGA chairmen just before the General Assembly and the final endorsement (vote) during the ANNGO General Assembly.

The main improvements in the current version of the revised ANNGO law are:

- ✓ The revised by law is in line with the Afghan Law for Non-Profit Organization (NGO) and follows the principles that are mentioned in it;
- ✓ The overall objective of ANNGO is updated to reflect the actual scope of work of the organization;
- ✓ The specific objectives are reorganized and are reflecting the reality of the activities conducted;
- ✓ The membership becomes open to all the legal and physical persons that are working in the nursery growing sector and are willing to implement the ANNGO certification scheme;
- ✓ The membership criteria are clearly stated where it's clearly mentioned the use of ANNGO certification scheme as the acceptable standard for the production of certified sapling;
- ✓ The member duties & responsibilities are updated according to the actual scope of the organization;
- ✓ The organizational structure is now clearly defined with clear duties and responsibilities for both General Assembly and Board of Directors;
- ✓ The duties and responsibilities of the Technical Staff are clearly defined;
- ✓ The voting rights are clearly described;
- ✓ The financial status of ANNGO is reorganized to reflect the actual situation of the organization.

Sub activity 1.4 Organize ANNGO annual general meetings

It is currently anticipated that ANNGO will organize an annual General Meeting in late January 2015.

Sub activity 1.6 Recruitment of additional staff

During the reporting period, the mobilization of the twenty five (25) SO1 Field Managers that are seconded to ANNGO and located in the NGAs continued with minor administrative problems mainly regarding occasional staff resignations. We undertook the necessary HR steps to re-advertise the vacant positions in ACBAR website, perform interviews and obtain the NGA consent on the selected candidate before finally hiring the required staff. Specifically:

- The contract for the newly recruited Field Manager Abdul Qahar) for Herat NGA was signed on 09DEC14. The previous one had resigned from their position in September.
- The FM of Maidan Wardak NGA (Atiqullah Baria) submitted his resignation for personal reasons in December. He agreed to stay on duty until the recruitment process for his replacement is completed.

One (1) intern continues to support ANNGO field inspector in the field monitoring trips, the field inspector & the field manager for the preparation of the certification documents, preparation and distribution of the labels and prepare training and technical cards regarding plant protection and IPM.

The newly recruited SO1 Marketing Officer (Segbatullah Poya) jointed the team on 14DEC14. He will conduct market research, support the development of business plans for the NGAs and conduct trainings on marketing issues for the FMs.

Sub activity 1.7 Staff training programmes

The SO1 Nursery Expert conducted trainings for the FMs of Herat, Chongar, Andarab, Bagram, Paghman and Shakardara NGAs to support them improve their capacities to fill certification documentation and certified sapling labeling.

Two (2) new motorbikes were procured for the FMs seconded to Chongar and Andarab NGAs.

We received information from the FMs seconded to Takhar and Kunduz NGAs regarding a complaint letter from NHPL. NHPL was complaining regarding the presence of nematode infections in certified saplings. ANNGO in cooperation with the SO1 team immediately organized a mission to Takhar, Kunduz and Baghlan to survey the extension of the referred problem. During 25-26NOV14, the SO1 Nursery Expert, the ANNGO Senior Field Inspector and the Head of the PBTL visited eleven nurseries and found out that two (2) nurseries had a significant number, two nurseries had a moderate number and the remaining seven an insignificant number of nematodes observed.



Infected root with galls present



Overall, the results showed an infection of nematodes in the nurseries of Kunduz and Takhar NGAs while the nurseries in Baghlan were not seriously infected as NHLP was claiming. ANNGO provided all the FMs with a specific protocol to prevent this kind of infection in the certified nurseries. ANNGO also decided that they will not provide labels for the infected saplings.

Sub activity 1.9 NGA coordination and training

Provision of technical support to MSNs was on-going during the reporting period. SO1 team continued to support the ANNGO led activities regarding certification by providing mentoring and focused trainings to NGAs and their members through the SO1 Nursery Expert and the Field Managers. During the reporting period, the FMs organized the following activities regarding **Nursery Growers Associations (NGAs) organizational support and training**:

OCT14, Nangarhar NGA: training for 11 NGA members on IPM and pesticide management issues.

19NOV14, Paghman NGA: training for 22 NGA members on certified nursery establishment & management as well as labelling, lifting and packing saplings.

12NOV14, Sayed Khil NGA: training for 32 NGA members on seed stratification and get prepared for the seedling activity.

19NOV14, Takhar NGA: training for 18 NGA members on seed stratification where 2 seeds traders also attended.

16DEC14, Sayed Khil NGA: training for 14 NGA members on how to tie the labels on the certified saplings and how to handle (lift and pack) the saplings correctly.



Takhar NGA Training Activity, 19Nov14

The FMs continued to **provide Mother Stock Nurseries (MSNs) with technical support** to ensure to the NGA members the necessary support in regards to the budding sales season. During October, FM undertook data collection for the sold buds and reported the number of sold buds to ANNGO accordingly.

Furthermore, the FMs conducted **field visits to Certified Production Nurseries (CPNs)** in order to collect certification documents and provide them with technical support. During the reporting period, FMs collected the following certification documents. In coordination with ANNGO TA, the SO1 Nursery Expert continued to review the documents and mentor 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: 71
- Number of Requests to register different planting material for certification: 103
- Number of ANNGO inspectors' reports before issuing the certification labels: 305

The FMs in Laghman, Paghman, Shakardara, Chongar and Ghazni registered new CPNs that will start to produce saplings next year.

Sub activity 1.10 Marketing and promotion

We continued to support ANNGO technical staff to edit the new 2015 ANNGO Annual Catalogue of certified fruit tree species and varieties. ANNGO shared the final draft document with PHDP TA and HPS/SO1 team in October. PHDP TA (with the assistance of SO1 team) reviewed the draft English version and provided their feedback to ANNGO for improvements. By late November, ANNGO accomplished all the necessary changes and finalized the English version. The process for the translation into Dari and Pashtu started in early December. It is anticipated to be completed in early January before the necessary review and finalization of the files for printing.

ANNGO requested HPS to support them with the cost of the publication. HPS/SO1 will support ANNGO with the publishing costs accordingly. As per ANNGO preference, the catalogue will be published after the ANNGO GA in order to include into the catalogue the composition and photos of the new board members.

Regarding the Manual of Procedures for ANNGO regulatory system (attachment to seed & planting material regulations); the draft document (developed in cooperation with PHDP TA and the support of SO1 team based on the European legislation) was finally presented to the MAIL Deputy Minister for his final review in November. ANNGO has not received MAIL feedback yet.

National Horticulture and Livestock Project (NHLP) is one of the biggest ANNGO customers. They are buying certified sapling from the NGAs to establish orchards for their beneficiaries. ANNGO asked SO1



team to accompany NHLP while they were visiting the nurseries for purchasing certified sapling to ensure customer satisfaction and avoid problems. The SO1 FMs have been supported the process accordingly.

During December, the newly recruited SO1 Marketing Officer initiated the NGAs marketing assessment that could permit them in the near future to prepare business plans. This is a potential service ANNGO could provide to the NGAs in the future.

We also initiated the assessment of the nursery companies that are not currently operating under the ANNGO umbrella. Based on SO4 team suggestion, we will assess only those registered under AISA and/or the Ministry of Commerce. We intend to perform an assessment of such companies and present ANNGO with our findings / recommendations that shall enable them to finally decide on their future potential expansion. Assessment is anticipated to be completed by March.



SO1 team visiting Aslamzada LTD

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 produce high quality saplings.

By the end of the reporting period, there were 901 NGA members out of which 315 were certified production nurseries (CPNs) operating under ANNGO certification scheme. NGAs had to exclude 14 members from the ANNGO certification scheme since they were not following ANNGO standards in their production. Specifically, 9 members from Parwan NGA, 2 members from Bamyan NGA and 3 members from Kunar NGA were excluded. Moreover, two new members were registered in Takhar NGA.

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.

The SO1 Micro Propagation Technician (working under the PBTL to produce tissue culture) has propagated 845 clonal rootstock plants during the reporting period to be used currently for the national collection improvement. As the laboratory capacity to propagate clonal rootstock plants may increase further in the future; the production will be allocated to increase the capacity production of the MSNs.

S/N	Rootstock type	Total to date
1	GF677	1,516
2	Pyrold warf	3,500
3	Gisela 5	1,680
4	Fox 16 e	425
5	Farlod 40	40
Total:		7,161



Indian Consultant with Micro Propagation staff

During October, ANNGO invited a consultant from India to introduce the Indian nursery management and techniques to Afghan staff. He has also provided capacity building on tissue culture techniques during 4 days in the PBTL to Micro Propagation technicians.

We are coordinating with the "Support to Capacitate MAIL in Transition for Sustainable Public Services Delivery" project and specifically with the MAIL - Directorate of Seed and Planting Material which



supervise the Plant Biotechnology Laboratory (PBTB) to sufficiently address in the future: (a) the provision of more space for the referred activity to permit the potential increase in the production levels of clonal rootstock currently expected and (b) revise the production protocol to include sufficient safeguards to ensure that an increase of the production will not be negatively affected by fungi & bacterial infection

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.

During the reporting period, FMs in cooperation with the PBTB laboratory collected the following samples:

Month	Samples	Number
Oct14	Chonghar MSN (Apricot/Clone 373 & Plum/Clone 1011)	14
Total during the current reporting period:		14

Relevant tests were performed by PBTB for fungal, bacterial diseases and viruses; both tests were positive and PBTB informed ANNGO for their further actions.

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 12NOV14, ANNGO had a meeting with the Baboor Garden responsible to define the kind of cooperation and discuss the draft agreement for the ornamental sector pilot project under HPS/SO1. PHDP TA and SO1 team proposed to ANNGO some improvements on the agreement that will ensure that ANNGO and Baboor Garden will both benefit by this potential partnership. The signature of the MoU is still pending because they are waiting for the decision of the new board of Baboor Garden Foundation.

On 23DEC14, HPS/SO1 staff had a coordination meeting with the gardens department of the municipality of Kabul. They discussed the possibility for the municipality to become an ANNGO customer.

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

Sub activity 3.7. Issue ANNGO certification labels to materials that meet required standards (indicatively, 1,000,000 of labels in 2014; 1,700,000 in 2015; 2,400,000 in 2016; 3,500,000 in 2017)

During October, the FMs provided ANNGO with the label requests and ANNGO immediately initiated the inspection process. ANNGO managed to complete the inspection and printing / distribution of the certification labels to the NGAs by the late November. Moreover, during December, ANNGO has started to collect the relevant fees from the NGAs. The final update regarding the volume of the distributed labels for the 2014/2015 selling season will be provided after the relevant data is processed by ANNGO. The Table presents the certified sapling sales volume progression per species during the past years:

As we can see there is a significant increase of the printed label volumes, and consequently of the certified production, between 2012/13 and 2013/14 seasons. Also, new species were included under the certification scheme, like cherry and pomegranate.

Moreover, the 2013/14 selling season figure (936,532) indicates that ANNGO can be considered as successfully meeting the annual target of 1,000,000 labels in 2014.

The percentage increase of the production between subsequent selling seasons was:

% Increase between 2011/12 – 2012-13: 26%

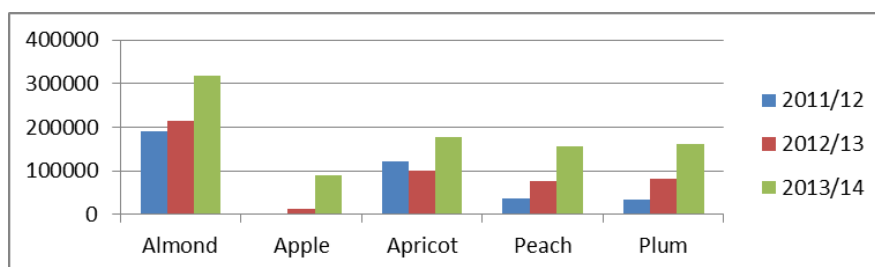
% Increase between 2012/13 – 2013-14: 92%

An increase of at least 82% in the annual sales volume will be required for the 2014/15 selling season target (1,700,000) to be successfully met.

Species	2011/12	2012/13	2013/14
Almond	189530	215327	316923
Apple	0	12932	90826
Apricot	120464	101323	178040
Cherry	0	0	5600
Citrus	5613	0	20537
Grape	0	190	552
Peach	36273	77608	156927
Pear	0	60	5432
Plum	34750	81570	161228
Pomegranate	0	0	467
Total	386,630	489,010	936,532



The next Chart also presents the sales volume progression for the species contributing mostly to the sales volumes increase during the past years.



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

Adaptive research activities continued in the PHDCs (under the MAIL Directorate of Research authority and PHDP II TA supervision) with the continuous support of the SO2 team. Specifically, we engaged in reviewing the research protocols and preparing the 2015 annual plan for the research activities. Moreover, we were working on the preparation of trials' progress reports. PHDP II that has been mobilizing the Horticultural Research Specialist Int'l Consultant (Gregory Cullen) in the past has now shifted the mobilization responsibility to HPS/SO2 since late October 2014. The consultant report is presented as **Annex-C**.

In regards to Trial (13-03) Cross pollination of Apricot accessions in national collection in Kabul; farmers have problems with fruit set in Amiri types. There are 15 Amiri accessions present in the NC. The objective of this trial is to identify varieties that can be grown together and pollinate each other. The trial was conducted in 2014 with conventional hand pollination. The trials conducted on 3 accessions of Amiri types (used as pollen receiver - female) with 4 local and 1 imported Apache varieties (used as pollen donor - male). The trial had a total of twelve one way crosses among the above mentioned accessions. The hand pollination was carried out when the apricot flowers had bloomed 50-90%. The cross of (291 Pir Naqshi x 247 Amiri) fruit sets was recorded as 8% which was the highest fruit set in the trial. The remaining crosses shown a 1 - 2% fruit set rate; i.e. a very low compatibility. More than 50% of crosses did not set any fruit; resulting overall to non-significant adaptability of combination among accessions.

Another cross pollination trial was conducted on the very early variety 746 Farahi as seed parent with three foreign varieties as pollen parents to improve fruit quality from the new varieties that will emerge through the breeding programme. The seeds from resulted fruits sets were collected and used for the breeding program. In mid-December, 196 seeds from 2014 crosses were sown in nursery SO2 Horticultural Research Specialist Int'l Consultant (Gregory Cullen) recommended that cross pollination trials in the Amiri accessions shall be discontinued. New accessions in the national collection should be tested for self-fertility, if not already assessed.



In regards to Trial (14-01) Fertility (cross pollination) of Plum accessions in NC, Kandahar; farmers don't know which varieties should be selected for plantation as pollinizers in the same orchard. The trial aims to identify the suitable pollinizers and provide the farmers with guidance. After self-pollination trials of plum were completed in Herat; the next step was to assess cross pollination potential for different variety combinations in Kandahar. Two myrobalan type varieties 289 Alocha Sorkh, 405 Sorkh and one self-fertile Japanese variety (274 Beauty) were selected (possessing early season fruiting potential and good marketability) to be used as pollen parents for 14 varieties of the Japanese plum providing in total 42 different combinations. Results showed that the best combinations for pollination were accession Sorkh



405 with 43% compatibility as well as Beauty 274 and Alocha Sorkh 289 with 28.5% compatibility among the selected 14 accessions.

In regards to Trial (14-03) Testing of gibberellin treatments on marketability of Raucha grapes, Herat; Raucha variety is one of the most important grape varieties in the western region, especially in Herat. Most of the grape growers already have established vineyards with this variety for many years. The variety produces white and red grapes with a berry size between 8-10mm (less than the Kishmishi variety) forming compact clusters. Current market price is not good compared to the Kishmishi variety due to compact clusters and small size berries. This trial aims to reduce the cluster compactness by reducing the number of berries per cluster during the flowering time and making the size of the berry bigger by using gibberellin. Unfortunately almost all grape production was damaged this year by hail during the spring time (more than 70% grape production was lost in the western part of the country); thus we could not conduct the trial in Herat PHDC in 2014. We plan to do so in 2015 if weather condition will be suitable.



Sample of frost damage in Herat PHDC

In regards to Trial (14-04) Testing of gibberellin treatments on marketability of Shundukhani grapes in Kabul 2014 (repeat in Shakardara in 2015); The trial aims to study the effect of GA3 treatment before flowering on cluster compactness, determine proper dose of GA3 on flower thinning (berry sizing) and evaluate the effects of GA3 treatments on quality, quantity and marketability of Shundukhani grapes. The trial was conducted in the Badam Bagh Research station from April to September 2014. It included 8 treatments and 4 replications (one vine per replication). The trial was laid out on a randomized complete block design basis. After harvesting, data were collected and analyzed accordingly. Results showed that grape clusters had significantly damaged by honey / bumble bees during maturity time and the outbreak of powdery mildew disease. Also, shortage of water (by not respecting irrigation schedule) also badly affected the fruit development and negatively impacted the trial protocol. Data analysis indicated that in some characters there was no significant difference between GA3 treatments. However, considering the negative impact that insects, disease and lack of irrigation had on the grapes; we have decided to repeat the trial during 2015 in suitable commercial orchard/s in Shakardara owned by commercial growers linked with the HPS/SO3 grape value chain.

In regards to Trial (14-07) Comparison of different citrus varieties on a range of rootstocks in Jalalabad; the trial (63 combinations of citrus variety x rootstocks) was planted in Jalalabad in 2012 and the first harvest occurred in 2014. This multiyear trial focuses on the fruit marketing qualities, which require a range of laboratory analyses on data concerning tree, leaf and fruits and subsequent comparisons. Cooperation between SO2 and SO4 will be essential since support by the SO2 to SO4 team in collecting and recording data for this very large and multiyear trial will be required.

Sub activity 1.2 Literature search for existing information on imported varieties

In regards to all adaptive research trials; SO2 team with the support and mentoring of the Horticultural Research Specialist Int'l Consultant (Gregory Cullen) searched and identified relevant publications regarding similar adaptive research activities worldwide aiming to improve further trial methodologies.

We undertook literature research to potentially identify suitable apple varieties adapted to cold climatic zones (like Bamyan Province).

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

Completion of the registers for the different species in the national collection remains the priority for the technical programmes (including HPS) under MAIL Directorate of Research and PHDP TA supervision. Defining the characteristics of all the different varieties of fruit and nuts in the country is a basic requirement for the development of the certified planting material industry and subsequently planting modern orchards of known production potential. The joint efforts that were made in synergy with the EU/MAIL transition project staff throughout 2014 in collecting data for the national collection registers formed the basis of our work. Work was on-going including data collection on accessions and verification of previously collected data. SO2 team continued to support the UPOV data entry process which is received from the PHDCs. We cooperated with the NC Curator to select and prepare in the correct format the most representative and high quality pictures received from the PHD centers. Data analyses, sorting and screening of varieties was undertaken under the supervision and mentoring of Int'l Consultants in support to the NC Curator and the MAIL Research Directorate.



During the implementation period, activities focused on the preparation for the Apricot Register publication. The register fully describes 72 apricot accessions. In cooperation with the NC Curator (and under the supervision and mentoring of PHDP TA) the English draft document was developed and reviewed. Translation into Dari and Pashtu as well as proof reading will take place in early 2015 before finalizing the document in all 3 languages and printing it.

Moreover, the Pomegranate Register was developed further, too. SO2 supported the process by consolidating the different master sheet formats received from Kandahar and Jalalabad PHDCs. Data received from Jalalabad PHDC has been uploaded completely and checked. We also uploaded and checked the data received by Kandahar PHDC; some accessions have been only recently described and staff had to be coached in the use of the adequate descriptors. All stake holders involved wait for the anticipated arrival of the SO2 Horticultural Research Specialist Int'l Consultant (Gregory Cullen) in mid February 2015 to support them finalize the English draft document.

Currently, we anticipate that the relevant Registers for Cherry and Plum may also be published within 2015 while further work will be required for other species (Peach, Grape, Apple, etc.) in the coming years.

The national collection of Apple is starting to bear fruits and the descriptors were revised in Kabul. Some comments on the status of trees (off type, weak) were collected and should be kept in mind next year when relevant data for the apple trees will be recorded. Also, Loquat is flowering in Kandahar and the format for the description was prepared and shared with the PHDC Field Horticulturist.

On 16NOV14, SO2 team participated in the Annual Planning Workshop for PHDCs. The presentation regarding the pomology laboratories, the status of the National Collection and the Demonstration Orchards were jointly (with the Field Horticulturist and DAIL Directors of the relevant provinces) prepared and presented in the workshop. Information regarding description of demonstration orchards that has to be performed during 2015, 2016 and 2017 were shared with the PHDCs' Field Horticulturists and their assistants. The aim of collecting data from demonstration orchards is to compare this data with the data collected from the national collections.



Three important characters (flowering date at (50%) bloom, harvesting date and yield/tree) will be collected for each fruit variety in the demonstration orchards during 2015-7. Beside this, the PHDCs' Field Horticulturists will also have to record information regarding agriculture practices in demonstration orchards for each year. Agriculture practices include irrigation, pest control, weed control, pruning, fertilization and harvesting methods.

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

During October, PHDP II mobilized an international consultant (Federico Valori) to perform the necessary training to laboratory staff for using the new equipment and reagents that were delivered to Pomology Laboratories by PHDP II in September. The SO2 laboratory team participated in the training which was conducted on the following equipment:

- HACHE LANGE instrument (measures soil fertility) can analyze water soil samples by filtering the samples and identify the amounts of elements inside the samples.
- HI 3221 PH/ORP/ISE meter (measures soil pH)
- Spectro-photometer (element identification soil/water) measures the different elements in soil and water solutions like SO_2 , NO_3 , NH_4 , Fe, K, Zn, Cu etc. it can be used only for transparent solutions.



Shelf life trials: have been conducted on seven (7) varieties of Sweet Cherries from the cherry national collection in Badam Bagh research farm. Our aim was to determine the quality changes in sweet cherries if stored in room temperature (25 °C). After harvesting, the sweet cherries were stored for seven days at room temperature and at the seventh (7th) day; four important parameters were observed: heat damage/over mature, water loss, browning of stem and growth of molds. These four factors directly effects quality and marketability of sweet cherries. A report has been prepared and it was observed that sweet cherries will lose their quality in a very short period if not packed and stored properly. Sweet cherries can be kept at room temperature for around 2-3 days before suffering severe quality loss. The proper way to store sweet cherries is to use plastic clamshells or plastic bags in refrigerated conditions. In this case, the quality of sweet cherries can be maintained for one to two weeks. Pre-harvesting factors



and defects as rot, cracks, doubling, bird/insect damage also directly affect the quality of fruits. These factors also directly influence the shelf life of sweet cherries. It is recommended to apply best agricultural and farm management practices. We plan to perform further trials focused on different packaging used for sweet cherries and other stone and pome fruits.

Defining the maturity indexes for the different fruit varieties is very important since it can indicate the appropriate harvesting time to meet different consumer preferences. Fruits harvested immature or over mature are generally not acceptable in fruit markets, so it is essential to define the maturity index for each of the fruit species based on actual consumer preferences.

During 2014, we worked on defining the maturity indexes for Cherries, Apricots and Grapes. All the derived data regarding optimal harvesting dates for Cherry, Apricot and Grapes accessions under this trial can also help us to find early, medium and late ripening varieties which is very useful information for farmers and fruit traders. Such trials will have to be repeated in 2015 to provide us with the necessary comparison data before a final report can be developed.

Physiochemical analysis was performed on different accessions from the Cherry, Apricot and Apple national collections. The aim of this activity was to define minimum quality criteria for Cherries, Apricots and Apple varieties. Physiochemical analysis was performed on ripe fruits at proper maturity stage and harvesting time. The result have direct links with maturity stage and harvesting time of the fruit variety and helps us define what were the physiochemical criteria of a specific fruit variety when harvested at an exact date. Physical characters included weight, diameter, firmness and color and the chemical characters included Sugar content, pH and Titratable acidity. This activity will be repeated in 2015 for comparison of the data.

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

Throughout 2014, this activity has been under the supervision and support of PHDP/II. PHDP/II Int'l Consultant (Monica Bertie) has been working on draft protocols and procedures for fruits harvesting time and maturity indices, including shelf life trials, consumer preference test and Physiochemical analyses. During 2015, however, the responsibility for the mobilization of the relevant consultant/s will be transferred gradually to the HPS/SO2 team.

Sub activity 1.6 Facilitate the recruitment of students

The following interns have been mobilized to assist PHDCs' based activities during the reporting period:

Month	Full Time	Part Time
Oct14	Kabul PHDC (1 intern)	Kandahar PHDC (4 interns)
Nov14	Kabul PHDC (1 intern)	Kandahar PHDCs (4 interns)
Dec14	Kabul PHDC (1 intern)	----

Sub activity 1.7 Organize study tours

The Study Tour to Italy (Rome, Faenza and Florence) was successfully concluded on 04OCT14 with the return of SO2 Project Manager, SO2 Senior Adaptive Research Assistant and an ANHDO board member back to Kabul. Prof Giordani (PHDP TA consultant) facilitated the tour and assisted the team in Italy. The study tour increased participants' technical capacity in germplasm management, nursery production under a certification scheme, fruit production and marketing, including sensorial evaluation.



DISPAA University of Florence labs



DALMONTE micro-propagation plant



BULZAGA commercial garden



The participants visited the Research Centre for Fruit in Rome (CRA), the Frutticoltura (National Collections of Fruits of Italy – Ministry of Agriculture), and various laboratories (pomology and molecular markers), participated in the Fruit Exhibition and seminar on pomegranate, commercial orchards and visited experimental orchards. Also, they visited a micro-propagation laboratory and commercial micro-propagation plant for rootstocks-cultivars, Biofarm, and the Department of Agri-Food and Environmental Science at the University of Florence. A detailed report is included as **Annex-D**.

Unfortunately, another participant (PHDC Kabul Field Horticulturist) that was intended to take part in the Study Tour to Italy failed to obtain his Schengen VISA on time. However, the upcoming of the event Interpoma Bolzano International Trade Fair in Italy was considered a great opportunity for PHDP II and HPS to organize another complementary (2nd) study tour; an initiative which was also very much appreciated by EU Delegation who mentioned the anticipated tour in its weekly media communication. We organized this Study Tour to Italy (Bolzano) for two (2) participants. Naseer Omarkhel (PHDC Kabul Field Horticulturist) and Popal Bashir (ANHDO Board member, fruit trader and exporter) to visit the AgFair Interpoma of Bolzano, Italy and the agricultural area around the provinces of Bolzano and Trento which is the most intensive apple producing area in Europe. In this area the size of the farms is small (similar to Afghanistan) however the small farmers associated in cooperatives of I-st and II-nd degree, which are operating successfully in the global market. Apple and other fruit are grown intensive in plantations often in steep terraces. The production technology, the farmer associations and the extension service in this area is considered as state of the art for the sector.



Stoolbed Management in Nursery, Italy



Visiting a High Density Apple Orchard



MELINDA Consortium Processing Facility

The participants left Kabul on 19NOV14 and the Study Tour to Italy (Bolzano) was successfully concluded on 30NOV14 with their return back to Kabul. PHDP TA had contributed the facilitation (facilitator-guide and local transportation) costs while HPS/SO2 provided for international air tickets, hotel accommodation and per diems. The study tour lasted in total nine (9) days and the participants had the opportunity to increase their technical capacities and visit the AgFair Interpoma of Bolzano, Italy and the agricultural area around the provinces of Bolzano and Trento. A detailed report (presentation) is included in **Annex-E**

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.

In regards to Trial no. 09-06 Assessment of the genetic potential of almond genotypes, Kabul: we continued removing the extra branches from the almond breeding lines. The saplings are growing very good and are under our daily observation. Based on instructions provided during the field observation with SO2 Horticultural Research Specialist Int'l Consultant (Gregory Cullen); he proposed that we should prepare and assign a single code number to each of the saplings. Each sapling should be then assessed individually with the first assessment to focus on the first three UPOV characters. The very weak saplings as well as any saplings suffering from Fastigiated, Drooping or Weeping shall then be removed.



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



Regarding the Trial no. 13-01 Evaluation of first crosses of Afghan & imported germplasm as improvements on existing varieties of Afghan almond in Kabul; saplings are growing well and we continue our field observations until the distribution of the saplings to the almond National Collections in Kunduz and Mazar PHDCs as well as to north and north eastern zones orchard growers. Distribution of these new selections multiplied in the nursery at Badam Bagh on bitter almond rootstock for on farm observation trials shall take place during February 2015.

Regarding the Trial no. 11-01 Use of Afghan & Imported germplasm to develop improved varieties of almond; seeds from the crossed branches were collected and stored until we use them in the breeding program. Work on planning for next year's trials to be conducted at Badam Bagh and Mazar PHDCs was on-going. If possible, we will include some of the transplanted accessions from Mazar and Kunduz to conduct back crossing on the new planted saplings. The saplings contain those new varieties which were not planted at Kabul almond Demo Orchard.

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; saplings are growing well and the collected cross seeds (196) are ready for next years' breeding program. The planned crosses between three Amiri types with three early varieties did not give good fruit set in the spring of 2014. The reverse cross will be used in 2015 for the two Afghan varieties.

During November, all the characters of the apricot lines like tree vigor, tree habit and degree of branching have been recorded for each single line. From a total of 348 lines, 74 lines were rejected and will be uprooted from the field. Instructions were provided by SO2 Horticultural Research Specialist Int'l Consultant (Gregory Cullen) that very weak and weak growing plants should be removed. Also, the extremely upright (fastigiata) and weeping trees should be removed, too. All the trees shall be identified by individual numbers before any trees are removed. This gives a total loss of 21% of the trees. We have been trying to get plenty of plants from each of the crosses to make sure we have a good chance of finding the right combination. We will have 274 plants from the 2012 crossings, and the progenies from the 2013 crossings to assess in 2015.

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

Dehsabz District grape growers group pilot project was cancelled as most of the group members are living in Kabul city and their tenants were not willing to receive the project input items and pay for the 25% beneficiary contribution during the beneficiary distribution phase as per MoU conditions. SO3 team tried its best to coordinate with the owners and organize a public meeting but this was found to be impossible as most of them have other occupations.

Therefore, we continued implementation focusing on the remaining pre identified seven (7) farmers' groups (3 raisin and 4 grapes) as our partners for pilot projects. In total, 340 farmers (190 grape growers and 150 raisin producers) are located in Qarabagh and Farza Districts of Kabul Province, Bagram district of Parwan province and Mahmood Raqi of Kapisa province. The revised land coverage and production capacity of the different groups is presented below:

a/a	District	Villages	Beneficiary		Total Bens	Farmer Group		Land in Jerib	Vines (330 per jerib)	Production in Kg	
			Grape	Raisin		Grape	Raisin			Grape	Raisin
1	Mahmood Raqi	6	60	50	110	1	1	110	33000	346500	86625
2	Bagram	1	60	60	120	1	1	120	36000	378000	94500
3	Qara Bagh	3	40	40	80	1	1	80	24000	252000	63000
4	Farza	1	30	0	30	1	0	30	9000	94500	23625
Total		11	190	150	340	4	3	340	102000	1071000	267710



The selected beneficiaries own appr. 340 jeribs of grapevines (an estimated 102,000 vines) with a combined estimated production capacity potential of 1,071MT of fresh grapes and 268MT of raisins.

On 21OCT14, the SO3 team visited Qalai Qazi Payan Village, Qarabagh District in Kabul Province as part of an M&E process to conduct interviews with beneficiaries and obtain feedback of the project impact. We met Shah Mohammad a member of the Qarabagh Raisin Producers Group. He is one of the forty farmers benefiting from the project implementation with harvesting tools and raisin drying inputs, capacity building training on post-harvest and basic hygiene best practices and the establishment of marketing linkages. Shah Mohammad aged 63 is the head of his family of 9 members.



He said that in the past most of the raisin produce was being damaged by the rain that usually appears during the raisin drying season in mid-Autumn. "I did not know another way rather than drying my raisin in the open field on the ground, a lot of soil and dirt was mixing with my raisins". Every time traders were coming to the village to buy my raisins, they would offer a low price arguing that the raisins are mixed with dirt and they have to put their money and effort to clean them before they can sell them to their customers. "The highest price I have sold my raisin in the past was 170 Afg per seer (7Kg). I was fed up with this issue as I was facing such problems for many years but what could I do?" Shah Mohammad attended the meetings the SO3 team had conducted in his village to mobilize the raisin producers and present them with ideas on how to improve their raisins' quality. "I was interested to become a member of the group and very happy to be part of this activity". During frequent meeting with the ANHDO technical staff we learned more about post-harvest best practices and became more enthusiastic to work closely with them. "ANHDO team discussed with us what tools/inputs were mostly required for processing. We selected them together and agreed to pay 25% contribution to the cost". After applying the good practices learned from the ANHDO technical team I had no more worries. "I lay my grapes on reed mats to get dried so the raisins do not get dirty from the soil. During a rainy day, I covered my raisins with plastic sheeting. Once the rain was over, I discover the plastic sheeting has kept them dry from the rain". Reed mats and plastic sheets were provided by the project as the basic set of producing inputs to enhance raising produce quality. He now claims that his raisin produce quality has improved this year. A trader already offered him 300 Afg per seer (7Kg). "I didn't accept it, I am confident that with the support of ANHDO, I could get a better price". He is confident now that he knows how to produce a higher quality produce and feed his family better.

The baseline survey of producers (and traders) and their organizations was concluded after completing in total 170 questionnaires representing an assessment of 50% of each of the groups' members. The survey includes characteristics and other information related to grape growing and raisin drying techniques and practices, including storage practices and sales information. We will use the baseline information as a design tool to improve post-harvest techniques and furthermore develop marketing linkages to enable producers to improve the quality and sell their products at a better price.

The next table presents the actual land size (jeribs) and number of vines available within the groups as a result of the survey.

S/No	Groups	# of Producers	Land size (Jeribs)	# of vines
1	Grape	190	452	135,270
2	Raisin	150	414	124,067

In regards to the **Grape Grower Groups**, the survey indicated the actual 2014 production levels and the actual sales volumes achieved per grape variety. The most important grape variety is Kishmishi which counts for 88% of the vine trees number and 81% of the production for 2014. Information provided by the beneficiaries indicated that they managed to sell all their production this year. In total 1,316 tons of fresh grapes were produced out of which 1,111 tons of Kishmishi with the remaining quantity including Taifi, Hussaini, Monoqa and Shundool varieties.

Moreover, the table below presents the actual 2014 production levels and the actual sales volumes that our **Raisin Producer Groups** achieved:

S/N	Group Name	District	Province	Produced Raisin in Kg		Sold Raisin in Kg		Lefted amount in Kg	
				Red	Green	Red	Green	Red	Green
1	Qarabagh Raisin	Qarabagh	Kabul	69600	70	30050	0	39550	70
2	Bagram Raisin	Bagram	Parwan	120360	0	65210	0	55150	0
3	M. Raqi Raisin	Mahmood Raqi	Kapisa	110707	750	88640	600	22067	150
Grand Total				300667	820	183900	600	116767	220



It is apparent that in total 301 tons of raisins were produced in 2014 out of which 300 tons of Red and just 1 ton of Green raisins. Moreover, 184 tons of Red raisins were sold representing 61% of the production. Green raisin relevant data is insignificant since production and sales volumes are small.

The survey will assist us to work in the direction of trying to achieve a higher sales percentage for next year's (2015) harvesting season. Moreover, it indicates that there is a significant gap in the production of Green raisins among our beneficiaries that could permit us to work with them in establishing kishmish khanas to boost up the Green raisin production level and work in the direction of an increased quality higher market price product.

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

The preliminary analysis of the grapes and raisin value chains with the support of the Post-Harvest & Quality Control Int'l Consultant (Federico Valori) and the Raisin Processing & Marketing Nat'l Consultant (Prof. Ghulam Rasoul Samadi) permitted us to design the specific interventions included in our pilot projects. However, further analysis of the raisin processing value chain part was completed just recently. The analysis identified certain gaps (and potential interventions) for enhancing raisins' quality:

- Strong support from the MAIL and development organizations will be required for the raisin producers regarding construction of Kishmesh Khana (green raisin) and other drying facilities for red raisin drying to produce high quality green and red raisins for export.
- The raisin producers could diversify their activities by producing different types of quality raisin such as red raisin from different grape varieties, green raisin, black, Abjosh and solar dried raisins.
- Technical support regarding pre-harvest (good agricultural practices) and post-harvest (drying, processing, cleaning, sorting, packages and storage) capacity building activities through agricultural professionals and extension workers for raisin producers, processors and traders is required to produce high quality raisins.
- Access of grape growers to quality agrochemicals to produce high quality produce is required.
- Awareness and technical support regarding IPM technics is required.

It became apparent that raisin processing factories improvements would require very large investments; it could be more appropriate to focus on promoting traditional Kishmish Khanas for producing high quality green raisins. Considering this, we conducted a survey of Kishmish Khanas in the

program targeted districts. The traditional mud built shadow drying structures in the area were damaged during the past decades. Recently NGOs (RoP, NHLP and CARD-F) started rebuilding such structures using a more sophisticated design and burnt bricks, RCC columns and roofing. They have built 11 Kishmish Khanas in Bagram District and 2 in Qarabagh District. In some cases, these structures were built to be used by more than one farmer but due to cultural norms it is difficult to be used as such. The weather condition in Qarabagh district is different from Bagram providing less



Kishmish Khana Standard NGO's Design

wind to accelerate the ventilation. Instead farmers built these structures on top of their dwellings enhancing ventilation. A 20x3x5 (m) size structure can facilitate the drying process of 10,000 kg grapes at a time and will produce raisins at a 45 days drying cycle. These structures use the traditional drying concept without considering any further ventilation system improvements at all. Some producers use alkaline solutions to reduce the drying cycle. The second drying cycle grapes remain in the Kishmish Khanas throughout the winter until the spring which negatively affects the quality and nutrition value of the produced raisins. We are in the processes of producing an improved ventilation design (to reduce the drying cycle) including the use of alkaline solutions, too.

We plan to continue working on designing further interventions to be implemented in 2015 throughout the related value chains in accordance with the project's objectives and capacities.

Sub activity 1.3 Traceability and improvement of the value chain for fresh grapes and raisins throughout the value chains: production, harvest, grading, packaging, storage, transportation, processing



One farmer from each of the farmers' groups visited Kabul in early September to attend a Training of Trainers (ToT) seminar. This team of trainers was employed (09SEP to 08OCT 2014) to perform trainings with the beneficiary farmer group members at the field level during the harvesting period based on the FFS principle.



Grape growers with Harvesting Basket



Raisins produced on Reed Mats

The photos above present some of the basic improvements in practices that the project contributed. Traditionally, farmers dry their grapes by directly placing them under sun light on the bare ground. Consequently, the raisins are very dirty and need to be washed before they can be exported. Alternately, farmers can place the grapes on reed mats that keep the raisin from direct contact with soil and humidity resulting into a cleaner (with less washing processing costs) and a better hygienic produce.

Also, during December we performed a focused training seminar on hygienic & sanitary and post harvest best practices for our beneficiaries in Farza and Qara Bagh Districts of Kabul Province. In total, 156 individuals (out of the 170 group members) participated representing an attendance ratio of 92%. The farmers were very enthusiastic to learn more of the good practices and requested further trainings on management and harvesting best practices. Moreover, after understanding better food safety issues, they became very interested to establish kishmish khanas for healthy and better quality green raisin production even by potentially contributing up to 50% of the costs.



Training activity in Qarabagh

Training activities will continue for producers' groups in Bagram and Mahmood Raqi District in early 2015.

Sub activity 1.4 Quality control analysis (see result 4)

One of the main recommendations of the Quality Control Expert – Int'l Consultant (Federico Valori) during his 2nd Mission that took place during 10AUG - 30SEP14 was that specifically for Mycotoxin (Aflatoxin and Ochratoxin) quality control analysis relevant testing competencies and capacities should be developed in Afghanistan sooner rather than later. He recommended that for the time being the necessary laboratory equipment and reagents should be procured and temporarily be installed in the Pomology Laboratory in Badam Bagh PHDC. The reason of such recommendation was strictly technical: Pomology laboratory, and its personnel, is ready to host such kind of instruments with suitable premises and required accessories already present in the laboratory. Ideally, it will be possible to start performing the necessary trainings (e.g. for ARFVPA staff) and tests immediately after equipment installation.

Moreover, establishing a new laboratory in a processing factory (and/or even within ANHDO premises) maybe technically possible but the actual final cost will be unreasonably high due to the huge numbers of small tools and accessories (glassware, distillation equipment, bench, balance, etc.) required. On the other hand, since the Pomology Laboratory belongs to the MAIL it will be essential to prepare a MoU in which is clearly explained that such equipment is only temporarily placed in the pomology laboratory. As soon as a suitable private QC lab will be identified, ELISA equipment can be transferred there very soon.

Test kits are, of course less reliable with higher detection limits, more expensive and very difficult to find in Afghanistan. On the other hand, they are much more easy to use. In the near future the microbiological tests (traditional or rapid assays) are highly recommended in quality laboratory. The situation of the existing laboratories in Afghanistan, regarding microbiological tests, is not fully clear and should be addressed further in the future.

The Consultant proposed to us the list of equipment and reagents specifically required for Mycotoxin determination and advise us that we should proceed with the relevant procurement so that the equipment could be available during his next mission in 2015.

Sub activity 1.5 Marketing initiatives in domestic markets with traceability, improved quality and improved packages (brand name to be considered)

SO3 team continued to work in the direction of establishing the necessary marketing linkages for the pilot projects' beneficiaries that were initiated this harvesting season aiming to identify suitable traders (see below) for the first grade production with possibility of brand name and traceability and/or purchasing in bulk from the growers/producers. Further work on marketing will be required in the coming year/s to



establish and maintain long term partnerships with traders. We are considering that a potential Marketing Information System could considerably strengthen market linkages between producers and traders and that a relevant Grape / Raisin Production Forum (including producer groups and other key stakeholders) could enhance both product quality and promote marketing activities.

On 07NOV14, the Marketing Specialist – Int'l Consultant (Abdur Rafiq Sarkar) started his 1st mission and a detailed survey of the key stakeholders was conducted including representatives from the MAIL, EPAA, ACCI, fruit traders in Kabul and in two districts (Farza and Quarabagh), exporters, associations, producer groups, processors and packaging suppliers. The purpose of these meetings was to identify the general policy issues on fruit (fresh and dry) exports and familiarize with the current national marketing status. This shall facilitate the identification of constraints / opportunities in marketing.

We visited Kabul Dried Fruit Exporters and Processors Association (KDFEPA). The association has 20 members and it was recently established and registered with the Ministry of Justice. The activities of the association mostly cover the dried fruit and nut sector, processing and export and could be considered as a suitable potential partner for SO3. We are currently coordinating with them to support them with organizational capacity and establishing a data collection and analysis system which they currently lack.

On 25-26NOV14, we conducted a two (2) days long Seminar on "Basics of Agro-Marketing". In total, 25 individuals participated representing the full range of the market chain; fresh and dry fruit producers (grapes, almond, prune, raisin), processors, traders of fresh and dried fruits, representatives from MAIL and DAIL, ANNGO, fruit exporters association and a local development agency CARD-F. On top of the presentation of basic fruits sales and marketing best practices in Afghanistan and abroad, market assessment tools and tactics, market linkages and export procedures; the seminar aim was to encourage the interaction



between the participants and facilitate the establishment of working groups consisting of farmers, traders, exporters and MAIL/DAIL staff to undertake group exercises, role play on sales and marketing and discuss cross cutting issues through practical examples.

The participants had the opportunity to understand that "trust" is the single most essential factor in building a business relationship on a win-win principle. At the end, the participants committed to share the gained knowledge with their fellows and others for the development of the horticultural sector toward gaining a better market share.

The Marketing Specialist – Int'l Consultant (Abdur Rafiq Sarkar) report is presented as **Annex-F**.

Sub activity 1.6 Marketing initiatives in regional markets (i.e. India, Pakistan, Central Asia, Russia) and international high value markets (i.e. EU and USA)

During October, we conducted a number of visits and interviews with the fresh fruit (grape) traders, retailers and super markets to explore partnership potential for our beneficiaries.

Haji Akhtar Mohammad Hedayatullah is a fresh fruit trader purchasing fresh fruits in Kabul, Parwan, Balkh and Maidan Wadak provinces. According to him, he purchased this year 208.3 MT of grapes and apples. He is exporting fresh fruits to Dubai, India, Pakistan and Tajikistan markets. Moreover, he claims that the following problems negatively influence fresh fruit trade in Afghanistan:

- Occasionally the roads get closed and our fresh fruits get spoiled
- Lack of cold storages and chilling houses.
- Lack of a reliable marketing system in the country.

We also visited two fresh grape exporters; Mr. Hedayatullah and Mr. Sajid to facilitate grape producers and trader linkages. As a result, we managed link for the first time the Farza Grape Growers Group with them and facilitate the export of a total of 1.8 MT Shidokhani grapes to Dubai for a farmer price of 36 Af/Kg. The grapes were sorted, graded and packaged in Farza using the Corrugated Fiber Board Cartons provided as project input.



Trimming grapes with Harvesting Scissor



Farmers negotiating price with trader



On 26OCT14, we participated in the 15th Working Group and 2nd Task Force meetings in the Ministry of Commerce and Industries (MoCI). Unfortunately, the MAIL representatives did not attend the meeting resulting to the MoCI disappointment at the time. During an open discussion most of the private sector representatives expressed their concerns about the GoA regulations, taxation and the presence in the open markets of bad quality produce imported from other countries which negatively affect their business. They proposed to GoA representatives to undertake measures for establishing import legislation similar to the ones imposed by neighboring countries to Afghan export businesses and produce. His Excellency the MoCI Deputy Minister replied that he will follow up on this with the concerned GoA institutions and invite the related authorities' representatives in next meeting to receive feedback directly from the private sector. He also complained about the absence of the MAIL ANSA (Afghanistan National Standard Authority) representatives as they had been invited to the meeting. He suggested that the next meeting shall take place in the MAIL to ensure their participation.

The Export Promotion Authority of Afghanistan (EPAA) has recently completed the assessment of the UAE markets and shared their information with us. We will continue to assess potential interventions aiming to facilitate linkages among Afghan and UAE companies for dried fruit exports during 2015.

The assessment for further regional and international market requirements was on-going with the support of the SO3 Marketing Specialist – Int'l Consultant to develop a marketing strategy and determine potential suitable marketing initiatives.

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

We conducted a survey of the main raisin processing factories aiming to identify suitable partner/s and support the organizational capacity. Moreover, we are currently working with the already established 7 farmers' groups (3 raisin and 4 grapes) towards potentially organizing them into associations and enable them to improve their produce and have access to financial services. We aim towards the long term goal to establish a joint Raisin Promotion Group to promote raisin production and marketing as well as contract farming initiatives. Through this initiative, we could also expect the creation of close relations/linkages among the stakeholders involved in the sector for promotion of the raisin industry.

The processing factories in terms of their capacity and quality of their final produce can be divided in two main categories; (a) Good (with modern machinery already meeting to some extent acceptable processing standards) only one factory at the country level – "Tabasom" and (b) Fair (operational but very old machinery operating under overall very poor processing standards). As per the current situation of both the above categories and the type of support they would require for any considerable improvements of the processing infrastructures in order to achieve high produce quality standards; this would require a considerable investment which falls outside the project capacity.

So far, in terms of quality control we have already supported "Tabasom" to enhance their existing internal Quality Control laboratory capacity. The in-house laboratory is very similar to the one of the ARFVPA. In fact, the initial training to Tabasom laboratory staff was provided by ARFVPA staff and the same microbiological kits are currently in use. The only big difference is in the toxin tests: Tabasom is using the ELISA tests (we facilitated the relevant ELISA kit procurement for them as well as a Study Tour to Italy for Mr. Mohammad Alias Osmany to visit Tecna laboratory and obtain the necessary training to perform the tests) which are more reliable and efficient, compared to the fluorimetric tests used by ARFVPA.

The SO3 Raisin Processing & Marketing Nat'l Consultant (Prof. Ghulam Rasoul Samadi) provided us with the following recommendations for improvement:

- Waste water from the raisin processing factories is a serious problem for raisin export and environment, so waste water management is a serious and important issue to be considered;
- Afghan dried fruits are reprocessing in Pakistan or India or others countries, and then export by their brand names to other international markets. Therefore, it is essential to develop the relevant capacity for proper processing and packaging in Afghanistan.
- Standard raisin processing facilities for red and green raisins including cold storage are in need;
- Technical support regarding good manufacturing & hygienic practices to raisin processors is recommended to support them produce clean and high quality produce.

SO3 team met with IDEA NEW program representatives (Mr. Bismillah Muhib Deputy Program Director and Mr. Yasir Khogyani Agribusiness Development Manager). IDEA NEW program started in 2009 in the north, east and west parts of the country. They are involved in different Value Chains such as Fruit, Vegetables, Honey, Poultry, Dairy etc. They were working directly with the farmers from 2013 but since



then their implementation focus shifted to work with agro input suppliers and processors who are supported with grants to develop innovative ideas for improving the value chain including a minimum 25% beneficiary contribution. In regards to potential linkages and synergies, IDEA NEW could include HPS established farmers' groups in their established SMS marketing service that informs farmers about market news, agro chemical information and potential through regular SMS messages.

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

It has been decided that the best way forward in regards to the final decision for a potential inclusion (or exclusion) of AAIDO as a project partner is to re-examine AAIDO's organization capacity and sustainability in spring 2015 while at the same time work on developing a contingency plan including the identification of alternative suitable partner/s. However, we should expect that Result 2 (and relevant indicators) may have then to be reshaped in accordance with the identified alternative partner/s needs.

We have mobilized the Horticulture Value Chain Expert – Nat'l Consultant (Prof. Ghulam Rasoul Samadi) to initiate a value chain analysis for Almond (and Prune) and propose recommendations for potential pilot project/s with relevant partners in northern Afghanistan.

We initiated a detailed assessment in the Northern provinces to provide us with the necessary information required to conclude on the list of suitable partner/s for the almond value chain. Samangan Dry Fruits & Nuts Association and Kunduz Almond and Dried Fruit Cooperatives are currently considered suitable alternatives to AAIDO in the north. We have also been in close coordination with the Kabul Dried Fruit Exporters and Processors Association (KDFEPA) as another potentially suitable candidate.

Sub activity 2.2 Support AAIDO in developing production systems and production capability in almond production, including introduction of new varieties, and improved production methods

In cooperation with the SO1 team, we have facilitated the establishment of links between AAIDO, Kunduz Fruit & Almond Cooperative and Samangan Dry Fruits and Nut Association and the relevant Nurseries Growers Associations (NGAs) for the provision of appropriate and adaptable almond saplings.

Sub activity 2.4 Support AAIDO in developing the value chain of pine nuts, walnuts, pistachios and other related products

The three (3) already identified potential partners cover pistachio, pine nut, dried apricot and walnuts. A further focused value chain analysis is planned within 2015.

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

We initiated the survey of Shakardara and Paghman Districts (Kabul Province) to identify suitable areas/producers and facilitate the selection of further pilot projects for fresh fruit value chains. Further assessment of the fresh fruit (currently we focused on Cherry) value chain is planned for the next months.

Activities were focusing mostly on finalizing the on-going fresh grape value chain pilot projects; however, we also initiated process of:

- Identifying potential partners involved in the transportation and cold storage facilities for fresh fruits value chains pilot projects to be identified and implemented in 2015;
- Developing a feasibility study for a small scale apricot and cherry juice processing facility. The first step will be the identification of suitable varieties and their inclusion in the National Collection. The role of SO3 team is to retrieve the original traditional recipe and study the potential market for such products.

Based on our earlier decision (spring 2014) to prioritize the grape and raisin (Result-1) activities aiming to achieve concrete results by the anticipated harvesting time in September 2014; consequently, we put this sub-activity as a secondary priority in 2014. This now means that we are planning to address it (Result-3) as a high priority in the coming year/s planning according to the relevant harvesting seasonality of the related fresh fruits.



Sub activity 3.2 Identification of key interventions throughout the value chain including traceability, harvesting with quality parameters, appropriate packages and transportation/ storage facilities, etc.

We conducted visits to cold storage facilities located in Qara Bagh, Shakardara and Paghman Districts:

Qarabagh: According the DAIL representative this cold storage has been constructed by financial support of USA – PRT team in close coordination with MRRD. The building size is 22 meter long and 14 meter wide and has a storage capacity of 300 MT. For the first year the farmers could store their produce without any fee and starting from the second year they will be charged a fee based on the fruits sales.

This cold storage is not functional currently due to (a) Electricity shortages, (b) lack of budget to purchase the fuel for the generator, (c) lack of shelves to store the fruits and (d) lack of forklift to load/unload.



Qarabagh Cold Storage Facility

Shakardara: Three (3) big cold storage facilities with a capacity of 5000 MT each will be constructed by MAIL at an estimated total cost of 11 Million USD. Construction work has already started and it is anticipated to be completed within the next 2.5 years.

Paghman: 35 onion storage facilities have been constructed in the area with financial support of EVS organization. 31 have been constructed for individual farmers (storage size is 8x3.5 m) and cost AFN 224,000. The remaining 4 were constructed for cooperatives with 4 rooms each.



Shakardara Cold Storage Facility

Sub activity 3.3 Selection of private partners (producers, traders, retailers, supermarkets, etc.) and partnerships arrangements

Assessment/ planning to identify potential suitable partners for pilot activities for fresh fruit (as well as dried fruits & nuts) value chain interventions was on-going.

In **Shakardara District** we visited Mr. Mohammad Naim (DAIL repr.) to obtain district information:

Grapes (Hussaini, Taifi, Kishmishi, Shondul Khani) are mostly sold fresh (farm gate price is AFN30-40,000 per 560Kg). The farmers also sell their products in Kabul market and the highway. They use mostly plastic bags and some corrugated paper cartons provided by the Afghan and Pakistani traders.

- 129 villages with population 145,000 (approx.);
- Agricultural land: 24,000ha;
- 3 million vine trees (200-300 trellised vineyards);
- 1 million apple trees;
- 300,000 peach trees;



On the basis of field observations; this area is suitable for post-harvest related activities and specifically for grape, apple, peach and apricot value chains.

In **Paghman District** we visited Mr. Saifullah (DAIL representative) to obtain basic district information:

The following NGOs and aid agencies are working in the area:

- a) NHLP has established 46 orchard groups each group consisting of 25 members
- b) One dairy producer association
- c) 4 agriculture and livestock cooperatives (2 are functional and 2 are not functional).
- d) This year NHLP has established 283 orchards (size is one jerib) in total NHLP has established 2,000 orchards in 2,000 jeribs in the District,
- e) SAB was supporting the dry apricot processors in terms of provision of plastic sheets, sulfur, and equipment.

- 188 villages with population 280,000 (approx.);
- Agricultural land: 16,460ha (2-5 jeribs aver.);
- Vineyards: 13.7ha;
- Apple Orchards: 1,184ha;
- Apricot Orchards: 85ha;
- Walnut Orchards: 50ha;
- Plums Orchards: 31ha;
- Sweet Cherry Orchards: 25ha;
- Peach Orchards: 22ha.



The farmers are lacking post-harvest capacities and techniques on the basis of field observations; this area is suitable for post-harvest related activities and specifically for apple, sweet cherry and apricot value chains.

Sub activity 3.4 Procurement of packages & other inputs needed throughout the value chain

In relation to the procurement of improved packaging & other fruit processing inputs needed throughout the value chains for Fresh Grape and Raisin (Result-1) and Prune (Result-4); both the supply and the distribution of the referred inputs were completed during the current reporting period. The following table summarizes the total inputs (quantities and costs) procured, the inputs finally distributed to the beneficiaries and the remaining inputs currently on stock.



a/a	Inputs to SO3 Farmers' Groups	Un. Cost	PROCURED		DISTRIBUTED		REMAINING	
			Qnt	Total (AFN)	Qnt	Total (AFN)	Qnt	Total (AFN)
1a	Corrugated Fiber Board Cartons (14x10x5 inch)	41.82	6,690	279,775	3,390	141,770	3,300	138,006
1b	Corrugated Fiber Board Cartons (15x10x5.5 inch)	45.22	1,800	81,396	1,800	81,396		0
2	Plastic Bags 1Kg capacity	1.02	30,000	30,600	30,000	30,600		0
3	Adhesive Labels – multicolor	1.06	30,000	31,800	30,000	31,800		0
4	Plastic Bags 50Kg capacity (Pakistani)	10.7	4,500	48,150	4,380	46,866	120	1,284
5	Harvesting and thinning shear (Swiss)	1279	746	954,134	518	662,522	228	291,612
6	Plastic Harvesting Basket (Pakistani)	322	1,732	557,704	1,276	410,872	456	146,832
7	Wooden Frame with Steel Mesh (Drying)	856	360	308,160	360	308,160		0
8	Plastic Sheeting (4 meters wide)	75	7,500	562,500	7,300	547,500	200	15,000
9	Reed Mats - BORYA size 1.5x2.7M	160.5	4,500	722,250	4,380	702,990	120	19,260
10	Cloth to cover the drying product in night	48.15	540	26,001	540	26,001		0
			TOTAL	3,602,470		2,990,477		611,994

In accordance to the MoU terms signed with the farmers' groups a Cost Share component was agreed (as 25% of the total supply cost) to be provided by the beneficiaries in cash to ANHDO as a beneficiary contribution. All the related beneficiary contribution cash transactions took place at the time of distribution of the related inputs. They were sufficiently recorded in the Beneficiary Distribution Lists which have been verified accordingly (among ANHDO programmatic & administrative staff) by each individual beneficiary, the relevant farmer's group heads and the relevant DAIL representatives.

The table below presents (a) the input package cost distributed per farmer's group beneficiary member, (b) the summary of the total costs of the relevant distributions as well as (c) the total cost share amount provided in cash by the beneficiaries:

	NUMBER of FARMERS' GROUPS per Category	FINAL NUMBER of Beneficiary Inputs DISTRIBUTED per Group CATEGORY	UNIT COST DISTRIBUTION Input Value per BENEFICIARY	BENEFICIARY COST SHARE Contribution @25% (AFN)	FINAL ACTUAL BENEFICIARY DISTRIBUTION Input Value (AFN) to date	TOTAL BENEFICIARY COST SHARE Contribution
Grape Growers	4	113	AFN 5,101	AFN 1,276	AFN 576,368	AFN 144,105
Raisin Processors	3	146	AFN 12,732	AFN 3,183	AFN 1,858,872	AFN 464,718
Prune Processors	1	60	AFN 9,254	AFN 2,314	AFN 555,237	AFN 138,840
Total	8	319			AFN 2,990,477	AFN 747,663

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

With the support of SO3 Post-Harvest & Quality Control Int'l Consultant (Federico Valori) we have developed the post-harvest manual for fresh grape, raisin and prune. The document is presented as **Annex-G**. The manuals will be used by the technical team during the course of the project and as well for training purposes. The manuals include post-harvest and HACCP good practices, drying standards and post-harvest losses. Further manuals will be developed in relation to the fresh and dry fruits and nuts that we'll work with in the future.

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

The pilot project regarding 60 prune producers from Farza District (Alu Bukhara dried prunes) is ongoing. According to the MoU signed with the Producers' Group; we provided them with capacity building on prune processing and appropriate drying techniques to enhance product quality as well as completed the distribution of post-harvest tools and improved packaging inputs.

A trainer (who participated in the ToT in Kabul during September) was employed for a calendar month (09SEP to 08OCT 2014) to perform trainings with the group members at field level during the harvesting period based on the Farmer Field School (FFS) principle.



Traditional Mesh for Prune Drying.



Improved Mesh for Prune Drying

Furthermore, we visited a number of traders to facilitate the selling process and support the farmers to market their product:

S/N	Date	Shops, Traders, Super markets	Visited	Decision
1	27-10-14	Prestige Super market	Mr. Naweed, talked Farza prune	They are ready to procure Farza prune
2	27-10-14	Finest Super store	Imam Ali Hussaini	They are ready to procure Farza prune, and other dried fruits such as Raisin, Pine nuts, Pistachios.
3	27-10-14	Retailer in Mandawi, Kabul	Noor Mohammad	they are ready to buy prune
4	27-10-14	Retailer in Mandawi, Kabul	Abdul Hadi	He is ready to buy prune
5	27-10-14	Plum/Prune trader	Khan Agha	He is ready to buy prune



Group representative in Finest

We facilitated a meeting with Mr. Khodadad (Finest Procurement Officer), Mr. Imam Ali (Finest Manager) and Mr. Mohammad Arif (Head of Farza Prune Processors Group) where Finest said that they are ready to procure 50-100 Kg of 1st grade prune per week in accordance to market prices. Also Finest is interested to procure green and red raisins and we will present a sample to them.

Similar meetings with Mr. Naweed (Prestige Supermarket Manager) and Hobulmahdi Company representatives have taken place. Hobulmahdi Company was founded in 2010 and located in Saidabad, Kunduz province of Afghanistan. They soon developed into a leading Afghan company exporting a wide range of dried fruits worldwide. Mohammadi Esar (Head of Hobulmahdi Co LTD) showed interest in buying Farza prunes.

On 16NOV14, we facilitated a meeting with Haji Malang who is interested to purchase prunes in Farza to meet directly with the prune producer group and negotiate the price. After discussion with the producers they agreed on the prices below:

- 1st Grade: AFN650 per seer (7Kg);
- 2nd Grade: AFN500 per seer (7Kg); and
- 3rd Grade: AFN300 per seer (7Kg).



The baseline survey of producers (and traders) and their organizations included characteristics and other information related to prune drying techniques and practices, including storage practices and sales information. We will use the baseline information as a design tool to improve post-harvest techniques and furthermore develop marketing linkages to enable producers to improve the quality and sell their products at a better price.

The next table presents the actual land size (jeribs) and number of trees available within the group as a result of the survey.

Product	# of Producers	Land size (Jeribs)	# of trees
Prune	60	62	13,875

We undertook a focused marketing survey to determine the actual 2014 production levels and sales volumes that our beneficiary **Prune Producer Group** achieved. The survey also provided us with the relevant data per grade. Production quality was high with the 1st Grade prune to constitute 82% of the total production. In regards to the prune producer group, the survey showed the following production and sales data:

S/N	Group Name	District	Province	Produced Prune in Kg			Total	Sold Prune in Kg			Total	Lefted amount in Kg			Total
				Grade 1	Grade 2	Grade 3		Grade 1	Grade 2	Grade 3		Grade 1	Grade 2	Grade 3	
1	Prune	Farza	Kabul	14110	2717	373	17200	4405	606	228	5239	9555	2051	355	11961

It is apparent that in total 17 tons of prunes were produced in 2014 out of which 14 tons 1st Grade. Until now we had supported the prune producers to establish market linkages. Almost 5 tons of Grade 1 prunes were sold representing 29% of the production level. 2nd and 3rd Grade relevant data is insignificant since production and sales volumes are relatively small. We plan to continue to support the prune producers throughout the winter to establish further market linkages and sell the remaining prune quantities.

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

MAIL (with USAID support) initiated a rapid assessment for assessing the presence of mycotoxins in the staple food and high value horticulture value chains. MAIL have established a small team of MAIL and private sector staff (that can be expanded as need arises) to coordinate with the USAID team. The team consists of 3 MAIL staff and the ANHDO HPS/SO3 PM; where ANHDO is considered as the private sector representative. This assignment will be implemented under the Bureau for Food Security leadership including a mechanism to assess post-harvest losses.

A consultant was hired to provide the technical expertise to design the assessment in coordination with MAIL. The consultant was responsible for preparing a final report to summarize findings and propose recommendations for follow-up actions including ways to strengthen the institutional capacity of both Afghan government and private sector entities to address mycotoxin contamination especially if this is finally identified as a wide spread problem.

During November, USAID through its Bureau for Food Security approved a mycotoxin assessment project in Afghanistan and awarded the "Afghanistan Value Chain Mycotoxin Assessment Project" to Kansas State University. The project is anticipated to begin in 2015.

Sub activity 4.7 Organize study tours

During the meeting with Kabul Dried Fruits Exporters and Processors Association (KDFEPAT); they were very keen to get help with opening a new export market to Bangladesh as they have information that their exported produce to India is reprocessed there and then exported to Bangladesh. We are currently considering to organize a Study Tour to Dhaka, Bangladesh.

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

Since, the mobilization of a suitable Citrus Value Chain Expert – Int'l Consultant was not successful by mid October; we decided to proceed with the design of a citrus growers' survey in Kunar, Laghman and Nangarhar Provinces during the citrus harvesting season starting in November. This survey will provide



the basic information regarding citrus growers location, citrus production levels and potential as the 1st part of the citrus value chain analysis as well as support the identification of suitable “citrus grower clusters” that we could consider as project beneficiaries.

The citrus growers’ Questionnaire was prepared and ten (10) interns were recruited to conduct the field survey. A training was conducted (15-18NOV14) in PHDC-JAL to enable the newly recruited graduate students (interns) conduct the survey. The field assessments were completed by December. In total 1,036 citrus growers were surveyed.



We are currently working to produce the data base for further analysis.

Introduction of new citrus varieties means two things; (a) identify the best varieties among the new varieties of the citrus national collection (after an evaluation) to be used for further propagation among the nursery growers to produce certified saplings and (b) introduce these new varieties to the farmers and mobilize them to purchase such certified saplings to establish citrus orchards rather than using “traditionally” grown or imported un-know citrus varieties.

Understandably, the evaluation of the new varieties of the citrus national collection is a multiyear process. Of course, since the process is on-going for a few years now (and is anticipated to continue for the next 2-3 years at least); we are currently confident to present and propose to citrus nursery growers (ANNGO NGAs) the following preliminary list of recommended citrus varieties for further propagation under the ANNGO certification scheme:

- # 7007: Orange “Citrus sinensis (L.) Osbek” - Variety: Sanguinello Moscato Cuscuna)
- # 7009: Orange “Citrus sinensis (L.) Osbek” - Variety: Moro
- # 7002: Orange “Citrus sinensis (L.) Osbek” - Variety: Navelina
- # 7106: Orange “Citrus sinensis (L.) Osbek” - Variety: Navelina VCR
- # 7004: Orange “Citrus sinensis (L.) Osbek” - Variety: Newhall
- # 7107: Orange “Citrus sinensis (L.) Osbek” - Variety: Lane Late
- # 7020: Mandarin Group “Citrus reticulata, nobilis, deliciosa & related” - Variety: Clementine Hernandina
- # 7015: Mandarin Group “Citrus reticulata, nobilis, deliciosa & related” - Variety: Clementine Di Nules
- # 7013: Mandarin Group “Citrus reticulata, nobilis, deliciosa & related” - Variety: Avana Apireno
- # 7010: Lemon “Citrus x limon L. Burm.f.” - Variety: Femminello Siracusano
- # 7335 & 6099: Lemon “Lemon - Citrus x limon L. Burm.f./ C. meyeri Y. Tan.” - Variety: Meyer and Tajiki

Pending further evaluation in the coming years we may be able to “expand” or even revise this preliminary recommended list.

Our effort to introduce and promote these recommended varieties to the citrus growers was also on-going.

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

Information provided by other organizations indicates that the following citrus orchards (in hectares) have been planted for their beneficiaries during 2014 using certified citrus saplings:

Organization / Project	Sweet Orange (certified)	Lemon / Lime (certified)	Sour orange (uncertified)	Total Certified (ha)	Total UN-Certified (ha)
NVDA	40+10ha (semi)*			40ha	10ha
NHLP	26+59ha (semi)*	3ha	72ha	29ha	131ha
RoP	91ha	48ha		139ha	--
Total	157+69ha (semi)	61ha	72ha	208ha	141ha

* Semi-Certified are saplings where the rootstock is another species rather than sour orange and the scion is not originating from mother stock nursery. SO4 is promoting to farmers and other organizations to avoid using semi-certified saplings. Semi certified are in fact none certified because the most important part which is the scion is from an unknown origin.

Further coordination will be required to establish and update such a list of established citrus orchards in the future as part of the citrus value chain analysis.



Planting citrus trees is a first step to establish new citrus orchards. However, taking care of the planted trees and nursing them to allow for normal growth and a fruitful productive life is a very important task, too. This is a necessary and critical requirement especially for commercial citrus orchards where the production volume as well as the fruit quality (appearance, size, juice content etc.) are both critical for marketing purposes and an increased market price that make a business viable and profitable.

Many organization, projects and citrus growers have established (planted) orchards. Unfortunately, due to poor capacity of the extension workers and the farmers; they did not take care sufficiently of their citrus trees. It has

been a long time now that citrus orchards were established and such orchards should have already reached a maturity to enter production. In many cases this is not the case.

During the survey, we observed orchards that were established 8 years ago however they are still far from a productive state today. Such orchards should have entered into a production state after 4-5 years from plantation. It is apparent that the trees remained weak and unproductive due to lack of orchard management practices and inputs. We are always advising farmers to pay attention to management practices and necessary inputs rather than only putting trees into holes. Considerable efforts and investment is required for a healthy tree to mature correctly and fast until entering maturity to produce high quality marketable fruits in high production volumes. We plan to proceed with a series of intensive capacity building activities on this and other related issues for citrus orchard management, harvesting and post harvesting best practices.

Sub activity 1.3 Expansion of citrus nurseries

Generally, the citrus nursery industry in eastern region has been successfully moving towards the certification system. During the past years we observed an increased demand for citrus certified saplings with the nursery growers trying to meet this continuously increasing demand. Considerable achievements have been made but many nursery growers still can't produce citrus certified saplings to successfully meet both the quality standards and production levels required.

Conventionally, citrus rootstock seeds are sown in winter which is not the best time for citrus seed sowing, specifically for Volkamer and Rough lemon rootstocks. The seeds of these two lemon varieties mature in October. During the SO4 Study Tour to Pakistan last June, we got the idea to experiment on sowing Volkamer and Rough lemon seeds earlier; we practiced this and it was very successful.

The germination rate is high and the plants can get ready for grafting in the right time. If this procedure is used then the nursery growers will be able to graft the rootstocks in a proper height. Based on these initial successful results, we started to build a plastic tunnel and sow Volkamer seeds.



Currently, they are in a much better condition than before. SO4 has brought new ideas and practices for presenting the nursery growers with advanced and modern technologies to permit them produce standard citrus certified saplings. For instance, we have identified the best sowing time for Volkamer and Rough Lemon, the correct media composition for container grown citrus, the fertilizer requirements according to the existing soil, the optimal time for grafting, the optimal time for transplanting and transplanting methods etc. Our efforts are ongoing to bring the citrus nursery industry to a higher quality standard level.

Following a series of high level coordination meetings conducted during November in Jalalabad with the NVDA Director (Ziarat Gul Rahel); it became apparent that NVDA is currently lacking nursery capacity to accommodate the establishment of more commercial citrus orchards in the coming years. The SO1 Nursery Expert visited Jalalabad in early December to assess the production capacity of the NVDA and the SO1 team developed a pilot project (including the necessary nursery inputs and a greenhouse) that could enable NVDA to modernize their nursery and expand their nursery production capacity in certified



Wrong Orchard Management Practice: Rice Intercrop



citrus saplings. Although such inputs have not been budgeted under SO4 sub budget; they are eligible since they exist as project eligible costs under the SO1 sub budget. The necessary funds could be secured with cost savings under the SO4 sub budget.

To practically apply new methods and demonstrate them, we will proceed with supporting NVAC (ex-NVDA) to establish a pilot modern citrus nursery. This will not only permit NVAC to produce quality standard citrus saplings and establish commercial size citrus orchards in their land. As a demonstration site, it will also benefit the private sector nursery growers who will be able to observe how such new technologies practically work. The negotiation regarding the PPP agreement for the provision of HPS support to NVAC to establish the referred nursery is ongoing with the partners currently reviewing the final draft. Agreement is expected in January and works shall start shortly after.

The table below shows the eastern region NGA sales of citrus saplings during last selling period:

NGA	Sweet Orange		Lemon		Mandarin		Pomelo		Sour Orange		TOTAL CITRUS	
Sapling:	Certif.	Uncert.	Certif.	Uncert.	Certif.	Uncert.	Certif.	Uncert.	Certif.	Uncert.	Certif.	Uncert.
Nangarhar	14,300	77,700	5,350	68,300	3,900	1,100		1,200		179,000	23,550	327,300
Laghman		9,200		7,200						3,500	0	19,900
Kunar	2,700	22,000		14,200						70,000	2,700	106,200
Total	17,000	108,900	5,350	89,700	3,900	1,100	0	1,200	0	252,500	26,250	453,400

The following conclusions can be derived from the referred 2014 data:

- Laghman and Kunar NGAs have a relative low volume of sales compared to Nangarhar NGA;
- Overall, 479,650 saplings were sold of which 26,250 (6%) certified and 453,400 (84%) not.
- Sour Orange (uncertified) saplings sales 252,500 represent 53% of the total sales volume.
- Orange (both sour and sweet) sales comprise a market of 378,400 saplings (only 4% certified)

Taking into consideration that our promotion efforts for certified citrus saplings already started to show signs of improvement with major actors / organizations already shifting their preference to certified saplings and the new recommended citrus varieties; it is apparent that the need for certified saplings in the coming years will intensify putting considerable pressure on the production capacities of the nurseries to meet their demands.

Moreover, following the “collapse” of the sour orange market this year where the farm gate price for sour oranges declined considerably (almost 1 AFN per fruit) when on the contrary sweet orange farm gate price reached 7-8 AFN per fruit; citrus growers have started to become increasingly interested in the newly recommended Sweet Orange and Lemon varieties compared to their past traditional preferences of Sour Orange and Chinese Lime.

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

In citrus NC and in relation to citrus rootstock trial; the 7026 accession variety Tangelo Minneola was shedding leaves and twigs die back. Samples of soil and bark of the sick trees have been sent to PBTL and they have detected the presence of nematodes in the soil. Besides the sick trees, we have also sent soil samples from currently healthy trees and the nematodes were present in some of those samples, too. From further field observation and lab tests, we found that the problem is not due to nematodes only, but it can be associated to this cultivar of citrus. This became apparent since the referred problem occurred only in this accession while we have many citrus accessions in the national collection and citrus rootstock trial. We will continue to investigate the issue further.

During the last CTV campaign, we have included only two orchards of sweet oranges in Kama district, Nangarhar province. The sample collection and the sampling layout (orchard layout) were conducted by RoP and this month we needed to recollect samples. When we visited the orchards for observation and samples collection; we couldn't find those trees because the mapping was inaccurate. In any case, we will have to test these trees again in next spring when they will have fresh leaves.

Sub activity 1.7 Development of storage, grading and packaging facilities in partnership with the NVDA and or other major stakeholder

We had a series of meetings with NVDA Director where we have been able to strengthen further our partnership. Moreover, NVDA has finally become a public enterprise name NVAC (Nangarhar Valley Agriculture Company). The formal Informative Letter is presented as **Annex-H**. Further coordination will



take place by spring 2015 to establish an appropriate PPP agreement that is anticipated to lead to the establishment of a fully operational processing facility by autumn 2016.

We have intensified our efforts to identify a suitable Pakistani Engineer that could be mobilized as the SO4 Post Harvest Facility Engineer that shall design the facility layout and produce the list of machinery/equipment and their specifications for the anticipated (summer 2015) tender process.

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

This is the first year of the citrus rootstock variety trial since some accessions have started producing fruits. In cooperation with PHDP TA Int'l Consultants (Monica Berti and Greg Cullen); we developed the data collection sheets and the relevant database. In cooperation with the MAIL (PHDC-JAL team); we have already started collecting data. Data collection will continue for a couple of years but we currently consider that it is feasible to have the trial results by 2017.

Sub activity 2.3 Market awareness developed for the new varieties

An SO4 introductory Brochure was printed (2,000 copies) and distributed to the citrus growers during the survey phase as part of an awareness campaign for the new recommended citrus varieties. The impact of the brochure was very positive since many citrus growers already contacted and visited us for further consultancy to guide them on their plans for establishing new commercial citrus orchards.



NHLP is working with fruit growers including citrus growers in the eastern provinces.

In order to motivate farmers and extension workers to commercial growing and enhance awareness for the new recommended citrus varieties; a Citrus Field Day for 60 NHLP participants took place during November in PHDC-JAL.



Prior to the field visit to the citrus NC, a presentation on the "Development of citrus industry" took place in the NHLP conference room. A long discussion took place in the national collection and many farmers were amazed by seeing the new varieties and expressed their commitment to establish new orchards with such new varieties.

PHDC-JAL organized a Citrus Fruit Show but it failed to meet expectations. It was anticipated that someone should explain the current citrus situation, the new citrus varieties in the national collection, new techniques etc. Unfortunately, almost all the fruits of the citrus recommended varieties were consumed and there will be no evaluation of the citrus fruits this year. The citrus fruit commercial evaluation was performed consistently since 2011. Most of the citrus fruits were eaten during the fruit exhibition while the remaining citrus fruits were sent to the MAIL. We can only wish that the MAIL (and the transition project staff who are now in charge of the 6 PHDCs) will soon get an understanding of their responsibilities otherwise many results won't be achieved.



We have arranged to make a program with Nangarhar TV on citrus in particular on new varieties and new information about orchard establishment and management. The program has been broadcast more than 10 times during different times of the day during this week and the broadcasting will continue until they make a new program. Such activities have very positive impact in the introduction of new varieties.

Soon after Nangarhar TV another national TV (TOLO) arrived in the PHDC-JAL to make a program similar to that of Nangarhar TV. TOLO is broadcasting all over Afghanistan.

NGR-TV visited us and produced a short clip about general horticulture in Nangarhar and specifically the citrus production.

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

NHLP has adopted as an internal procurement rule to purchase certified citrus saplings and only proceed with purchasing uncertified planting material in the case where certified saplings are not available in sufficient quantities. There has been a dispute between NHLP and the NGAs of east in particular Nangarhar NGA. The issue was that NHLP preferred to contact directly the individual nursery growers (NGA members) in undertaking the procurement activity rather than coordinate the activity through the NGA beforehand. NGA was reacting because of concerns regarding internal NGA management issues (application of the certification scheme) with its members. After three consecutive meetings we are able to facilitate the resolution of the dispute.

The new Nangarhar DAIL Director visited PHDC-JAL and the SO4 team. During his visit he was briefed on the HPS/SO4 project. He was very interested in the citrus value chain survey and he suggested to do similar surveys for other fruits as well. He expressed his support by issuing a formal letter to all relevant districts to be informed and support us accordingly.

The PHDP II IPM expert visited us to obtain information on IPM regarding the different fruit crops of the eastern region in particular citrus. He has been provided with all relevant information such as major pests, their control, pictures etc.

We have participated in the pomegranate field day organized in PHDC-JAL. Since the pomegranate national collection is adjacent to the national collection of citrus and some participants were interested to see the new citrus varieties, many of them were impressed by the Meyer lemon.

We advised PHDC-JAL staff on phosphorus application to citrus and other trees in the farm.

We attended the Technical Working Group (TWG) meeting held by Nangarhar DAIL.

Sub activity 3.2 Capacity building and training activities planning

A graduate student from Nangarhar University has joint an MSc course in Peshawar University, Pakistan. He was confused regarding the selection of his research topic and finally he came to us. He has been given plenty of information to choose the research topic himself, we just helped him understand the development potential for Afghan agriculture in particular the horticulture sector and specifically the citrus industry. He will probably select a research topic on citrus and conduct his research in PHDC-JAL.

National Agriculture Education College (NAEC) organized a field visit for their students to Jalalabad. During the tour, they visited PHDC-JAL and showed interest in the ANNGO certification scheme. We provided them with a presentation of the ANNGO certification scheme and the example was citrus. After the presentation the students visited the citrus nurseries, citrus net house, citrus indicator plants and citrus national collection. The PHDC-JAL Field Horticulturist also presented to them other activities.



3. Strengths, Successes & New Opportunities:



A great degree of coordination between the implementing partners (ANHDO, RI) and PHDP TA team was maintained ensuring that all relevant actors remained aligned to the Action Plan.

Team spirit remains high and a careful balance of “healthy internal” competition between the different SO teams is maintained to ensure sufficient motivation. Although a certain degree of “tuning” is still required, we have already achieved a good level of implementation capacity and productivity.

The end of the 1st year (2014) of implementation finds the HPS project confident for the future. The Central Unit (CU) has adopted fully into providing the SOs with sufficient and timely support that enables them to deliver the expected implementation services and inputs to our beneficiaries. All SOs’ teams were established successfully to achieve and maintain a good implementation momentum.

During the reporting period, the following successes were achieved:

- SO1: Supported the revision process of the ANNGO Bylaw; the initially drafted English document was translated in Dari & Pashtu to assist the ANNGO BoDs (and NGA chairmen) to conduct a final revision before presenting it for endorsement in the anticipated ANNGO General Assembly in late Jan-15. Expectations are high that the revised Bylaw will be successfully endorsed.
- SO1: Maintained a very good level of coordination and cooperation with ANNGO, twenty five (25) Field Managers are recruited (and seconded to ANNGO) to support the NGAs and their national representative organization ANNGO in implementing the certification scheme as well as provide MSNs and certified production nurseries (CPNs) with technical support and advice. Performed capacity building trainings in five (5) NGAs to 72 NGA members mainly on seed stratification, sapling labeling and handling.
- SO1: Supported PHDP TA to review the draft English version of the ANNGO 2014-15 Catalogue and provided their feedback to ANNGO for further improvements. Printing is expected to take place in early February 2015 after the ANNGO GA. ANNGO requested HPS to support them with the publication cost and HPS/SO1 will support ANNGO accordingly.
- SO2: Description of the National Collection and the adaptive research activities continued in the PHDCs (under the MAIL Directorate of Research authority and PHDP II TA supervision) with the continuous support of the SO2 team. We engaged in reviewing the adaptive research protocols and participated in the preparation of the 2015 annual plan for the research activities. Moreover, we participated in the preparation of final reports on the trials results.
- SO2: Supported the development of the Apricot and Pomegranate Register publications under the MAIL Directorate of Research authority and PHDP II TA supervision. Specifically, work included further data collection on accessions and verification of previously collected data. Both these Registers are anticipated to be published within the 1st semester 2015.
- SO2: Conducted two (2) Study Tours to Italy; the 1st study tour (Rome, Faenza and Florence) during 25SEP to 04OCT14 for three (3) participants aiming to increase the staff technical capacity on germplasm management, nursery production under a certification scheme and other fruit production/marketing issues. Also, the 2nd study tour (Bolzano and Trento) during 19-27NOV14 for two (2) participants aiming to participate to Interpoma Bolzano International Trade Fair and increase the staff technical capacity on intensive apple plantations, production technology, farmer associations and the extension services which in this area is considered as a state of the art for the apple industry.
- SO3: Completed the distribution phase of the post harvesting & processing tools / improved packaging to four (4) grape farmer groups, three (3) raisin producer groups and one (1) prune producer group totaling 319 individual beneficiaries (out of initially 433 selected) in Qarabagh and Farza Districts (Kabul Province), Bagram District (Parwan Province) and Mahmood Razi District (Kapisa Province). In total, AFN 2,990,477 worth of inputs distributed and AFN 611,994 beneficiary cost share contributions (25%) collected.
- SO3: Produced the post-harvest manuals for fresh grape, prune and raisin. One farmer from each of the final eight (8) farmers groups that attended the Training of Trainers (ToT) seminar in Kabul in September were employed for a calendar month to perform capacity building trainings with the beneficiary farmer group members at the field level during the harvesting period based on the Farmer Field School (FFS) principle. We are currently undertaking further capacity building trainings on hygienic & sanitary and post harvest best practices.
- SO3: Identified alternative suitable partner/s (Samangan Dry Fruits & Nuts Association and Kunduz Almond and Dried Fruit Cooperatives in the north as well as the Kabul Dried Fruit Exporters and Processors Association “KDFEPA” in Kabul) in anticipation of a potential decision to finally replace AAIDO as a project partner in spring 2015. We have mobilized the Horticulture Value Chain Expert –



Nat'l Consultant to perform an almond value chain analysis and propose recommendations for potential pilot project/s.

- SO4: Maintained our position as the main focal point on technical issues in the citrus industry in eastern Afghanistan. CPG is active and all main citrus stakeholders as well as a good proportion of citrus farmers have concluded on selecting our recommendations on new citrus varieties and the use of ANNGO certified citrus saplings. Conducted a Citrus Field Day for 60 NHLP participants in PHDC-JAL citrus NC. Nangarhar TV produced a program on citrus (new varieties and orchard establishment and management) that has been broadcasted more than 10 times in different days/time in the first week. TOLO TV (national channel) also produced a similar program that is being broadcasted nationwide. The new Nangarhar DAIL Director visited PHDC-JAL and he has been briefed on the HPS/SO4 project.
- SO4: Completed the citrus growers' assessment in Kunar, Laghman and Nangarhar Provinces during the citrus harvesting (November to December) period. In total 1,036 citrus growers were surveyed. The survey will allow us to obtain the basic information regarding citrus growers location, citrus production levels as part of the 1st step of the citrus value chain analysis as well as support the identification of suitable "citrus grower clusters" that we could be considered as project beneficiaries. Develop and distribute (2,000 copies) an introductory Brochure to citrus growers (during the survey) as part of an awareness campaign for the presentation of the recommended new citrus varieties. The impact of the brocher was very positive since many citrus growers already approached us for consultancy to guide them on their plans to establish new commercial orchards.
- SO4: Strengthened cooperation with NVAC (ex-NVDA) General Director. NVDA has finally become a public enterprise with the name NVAC (Nangarhar Valley Agriculture Company). Further coordination will take place in the winter 2015 period to establish an appropriate PPP agreement that is anticipated to lead to the establishment of a fully operation citrus processing facility by autumn 2016. Currently, we review a preliminary PPP draft agreement to support NVAC to develop a pilot modern citrus nursery that (a) allow NVAC expand their nursery production capacity in certified citrus saplings to establish commercial size citrus orchards and (b) benefit the private sector nursery growers who will be able to observe (demonstration nursery) how such new technologies practically work.

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

- SO1: Following the Nursery Expert – Ornamentals Int'l Consultant recommendation for a potential pilot action with Baboor Garden Foundation to support ANNGO to enter into the newly born ornamental plants sector; ANNGO drafted a MoU with Baboor Garden Foundation including a pilot project with HPS/SO1 nursery inputs support. Final endorsement is pending the decision of the new board of Baboor Garden Foundation.
- SO1: Following the recruitment of the SO1 Marketing Officer in early December, we initiated a survey of the nursery companies that are not currently operating under the ANNGO umbrella. The assessment is anticipated to be completed by March 2015. We will coordinate closely with ANNGO on this and present ANNGO with our findings / recommendations that shall enable them to finally decide on their future potential expansion after the anticipated ANNGO revised Bylaw endorsement.
- SO2: Completion of the registers for the different species in the national collections remained the priority in the technical programmes (including HPS) under the MAIL Directorate of Research authority and PHDP/II TA supervision. Following, the anticipated publications of Apricot and Pomegranate Registers within early 2015; further Registers on Apricot, Cherry, and Plum may also be published by the end of 2015 pending the progress of work and data evaluation.
- SO2&3: Following the recommendation of the SO3 Quality Control Expert – Int'l Consultant (Federico Valori) that the relevant testing competencies and capacities to perform Mycotoxin (Aflatoxin and Ochratoxin) quality control analysis in Afghanistan should be developed in Afghanistan sooner rather than later; we are currently considering to proceed with the procurement and installation (by spring 2015) of ELISA test kits in the Pomology Laboratory in Badam Bagh PHDC as the 1st step towards establishing the necessary laboratory capacity. Pomology laboratory, and its personnel, is ready to host such kind of instruments with suitable premises and required accessories already present in the laboratory. Ideally, it will be possible to start performing any necessary trainings (e.g. for ARFVPA staff) and tests immediately after equipment installation.
- SO3: Based on the preliminary analysis of the raisin value chain and the recommendation of the Raisin Processing & Marketing Nat'l Consultant (Prof. Ghulam Rasoul Samadi) that "support from the MAIL and development organizations will be required for the raisin producers regarding construction of Kishmesh Khana (green raisin) and other drying facilities for red raisin drying to produce high



quality green and red raisins for export”; we are currently considering the promotion of Kishmish Khanas for producing high quality green raisins and we are in the processes of producing an improved ventilation design (to reduce the drying cycle) including the use of alkaline solutions, too.

- SO3: Following the successful mobilization of the SO3 Marketing Specialist – Int’l Consultant (Rafiq Sakar) who is a Bangladeshi national; the Kabul Dried Fruits Exporters and Processors Association (KDFEPAT) is keen to explore the opportunity to potentially enter into export activities to Bangladesh as they have information that their exported produce to India is reprocessed there and then re-exported to Bangladesh. We are considering organizing a Study Tour to Dhaka, Bangladesh.
- SO4: NVAC has the long term vision to expand their citrus commercial orchards by planting 100s of hectares of commercial orchards in the coming years. Moreover, they have finally accepted that their best interested is to proceed with recommended new citrus varieties and the use of ANNGO certified citrus planting material. The establishment of the pilot modern nursery in NVAC will provide them with “in house” annual nursery capacity of 25,000 certifiable citrus saplings (ready for plantation by late 2017) which can support the establishment of 60ha commercial citrus orchards per year.
- SO4: Following the long anticipated change in the NVDA status to become a public enterprise; any past concerns regarding the potential “problematic” cooperation with ex-NVDA (under MAIL strict governance at the time) have now been resolved since NVAC has the direct management authority to decide locally and undertake their operations independently. In regards to the Citrus Processing Facility, we have jointly agreed that the mobilization of a suitable Pakistani SO4 Post Harvest Facility Engineer will permit us to achieve a “know how” transfer from the already established and mature citrus (Kinno) processing facilities industry in nearby Pakistan. Moreover, additional benefits will be that by establishing the citrus processing facility using Pakistani made machinery any future M&O issues will be address easily, timely and very importantly (for NVAC) at a relative low cost due to Jalalabad’s proximity with the Pakistani citrus industry located just across the border with Pakistan.

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

CU: Following the donor advance payment in early 2014 when the USD/EUR exchange rate recorded at the time was 1.345; the referred rate has dropped considerably throughout the year reaching levels as low as 1.216 (OANDA) by 31st December 2014 which corresponds to a 10% drop. Further drop is expected to take place within 2015 with the trend currently showing that another 10% drop could easily occur within the year. Indeed the InforEuro rate for Feb-15 is 1.1315; i.e. we are already facing with a further drop of 7%. This trend will most probably negatively affect the financial capacity of the project to address provision of inputs to beneficiaries since during the time that the project budget was developed in late 2013 all related calculations were based on an USD/EUR exchange rate level of the order of 1.35. Apparently, operations were not negatively affected during 2014 and another USD 1,300,000 was left by 31st December 2014 (advance payment balance) to be utilized in 2015 at a favorable rate (1.345 USD/EUR); hence the negative impact in 2015 will be limited. However, if by late 2015 the relevant exchange rate consolidates to levels considerably less than 1.25; this will have a considerable negative impact to the 2016 project’s activities and an appropriate solution will have to be discussed at the time.

SO1: Although coordination and cooperation levels with ANNGO can be considered as very good; there have been times that ANNGO was feeling that the SO1 team was “intruding” into their established authority and responsibilities as an independent organization. At the same time, there were also times that their requests for support and expectations were extremely high especially in regards to related costs. They were also failing to understand that although HPS/SO1 can support them, we could only do so after certain procedural steps (procurement and finance) were followed correctly. Occasional “misunderstandings” occurred even in regards to reporting issues. ANNGO was not happy to see HPS/SO1 engaged into reporting ANNGO related broader activities. This on the other hand was practically very difficult to be avoided since the HPS logical framework (and even some expected results) include the broader range of ANNGO related activities. Preliminary discussions with PHDP TA indicated that we could proceed within 2015 to review the existing HPS logical framework and come forward to EU Delegation with an amendment request to address such issues by the end of 2015. Potentially, we could recommend a change towards a “support towards specific ANNGO activities” approach under the broader ANNGO Work Plan and Business Plan rather than the initial “project oriented” implementation approach aiming to achieve specific results independently when in the reality such results were overall falling under the direct responsibility of ANNGO to achieve.



SO3: The prolonged presidential election period did not permit MAIL to proceed (and conclude) with the revision of the QC policy in Afghanistan within 2014. This made the implementation of related QC activities difficult considering that if we start to provide “hard” 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 developments is necessary and we may need to postpone for another year (or longer) any hard inputs (other than capacity building) to allow for a concrete government policy to emerge. At the same time however we have considered to potentially move forward with a “flexible” implementation approach that will permit us to establish relevant testing competencies and capacities to perform Mycotoxin (Aflatoxin and Ochratoxin) quality control analysis in Afghanistan without the risk of providing them yet to a stake holder that may lose its mandate in the future.

SO3: Project activities include coordination and cooperation with AAIDO; however, we continued (for another quarter) to face difficulties in obtaining the latest info regarding almond production and trade from them. It has been decided (in coordination with PHDP TA) that the best way forward in regards to the final decision for a potential inclusion (or exclusion) of AAIDO as a project partner is to re-examine AAIDO's organization capacity and sustainability in spring 2015. We have already identified alternative suitable partner/s (Samangan Dry Fruits & Nuts Association and Kunduz Almond and Dried Fruit Cooperatives in the north as well as the Kabul Dried Fruit Exporters and Processors Association “KDFEPA” in Kabul) in anticipation of a potential decision to finally replace AAIDO as a project partner in spring 2015. We have mobilized the Horticulture Value Chain Expert – Nat'l Consultant to perform an almond value chain analysis and propose recommendations for potential pilot project/s. However, we should expect that Result 2 (and relevant indicators) may have then to be reshaped in accordance with the identified alternative partner/s needs.

SO4: Although, we managed to overcome most of the challenges regarding the recruitments of International Consultants faced during 2014; the vacancy for the SO4 Citrus Value Chain Expert – Int'l Consultant remains to be a “headache” since mobilization of a suitable consultant by mid October was critical to support us on conducting the value chain analysis within this year's citrus harvesting period. Nevertheless, since this was not possible; the SO4 teams initiated the citrus producers' survey as the first necessary step for the citrus value chain survey and collect the necessary information from the citrus producers during November to December. We will continue to seek the mobilization of a suitable SO4 Citrus Value Chain Expert – Int'l Consultant in early 2015 to support with the citrus value chain analysis. Nevertheless, if we do not achieve the mobilization of a suitable consultant within the first months of 2015; SO4 team with the support of the HPS TL & DTL will process ahead with further surveys to develop the anticipated citrus value chain analysis by the end of 2015.

5. Conclusion: Lessons Learned and Recommendations

Generally, HPS project activities maintained (and in some cases improved considerably) the good implementation momentum achieved during the previous reporting period. Minor delays in specific sub-activities have been experienced but do not pose a considerable threat to the project's objectives since through effective planning we can ensure that there will be addressed sufficiently in the future. This is expected under that assumption that either the implementation environment will become more stable or clear or feasible alternatives will emerge resulting to a timely implementation under more optimal conditions. In any case, since we have just completed the 1st year of implementation (out of 4 years in total); we feel that our strategic decision to focus within 2015 to activities that could be successfully materialized at the time while at the same time postpone and treat others as secondary priority actions until conditions develop further to permit a more effective implementation in the future was correct. Of course, such strategic planning has the side effect of postponing some of the sub-activities (and anticipated results) further but at the same time it is still early in the long term implementation cycle of the project and we did use the time to develop viable contingencies that will not endanger HPS objectives.

2015 will be a critical implementation year, especially considering that the project team has established and already undertook a great first leap in 2014. By the end of the next quarter (31 March 2015), it will be essential to conclude with a number of very serious decisions (eg. replace or proceed with AAIDO as a partner) that will permit us to start up certain activities within that were considered us secondary priority in 2014. The anticipated next (3rd) Steering Committee meeting (late February – early March 2015) could provide an appropriate forum for discussing further such issues and make a joint decision.



Nevertheless, we are currently anticipating that as the HPS project implementation matures during the second year of implementation and in anticipation of the end of the PHDP TA mission (and invaluable support) by the end of the 2015; it should be essential to undergo an “in depth evaluation” of the HPS project during the summer period and review the project expected results after taking into consideration the field realities and limitations. By then, we (and all related stake holders) would have developed a concrete understanding to permit us complete successfully such an exercise. This could result to a potentially project amendment proposal to the donor including a revised log frame and a budget amendment (on a no cost basis) sometime in late 2015 after a necessary successful endorsement by the 4th SC meeting in late autumn. By then we will also have more information to address the USD/EUR exchange rate related issue, too.

Disclaimer:

“This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of Afghanistan National Horticulture Development Organization and can in no way be taken to reflect the views of the European Union.”



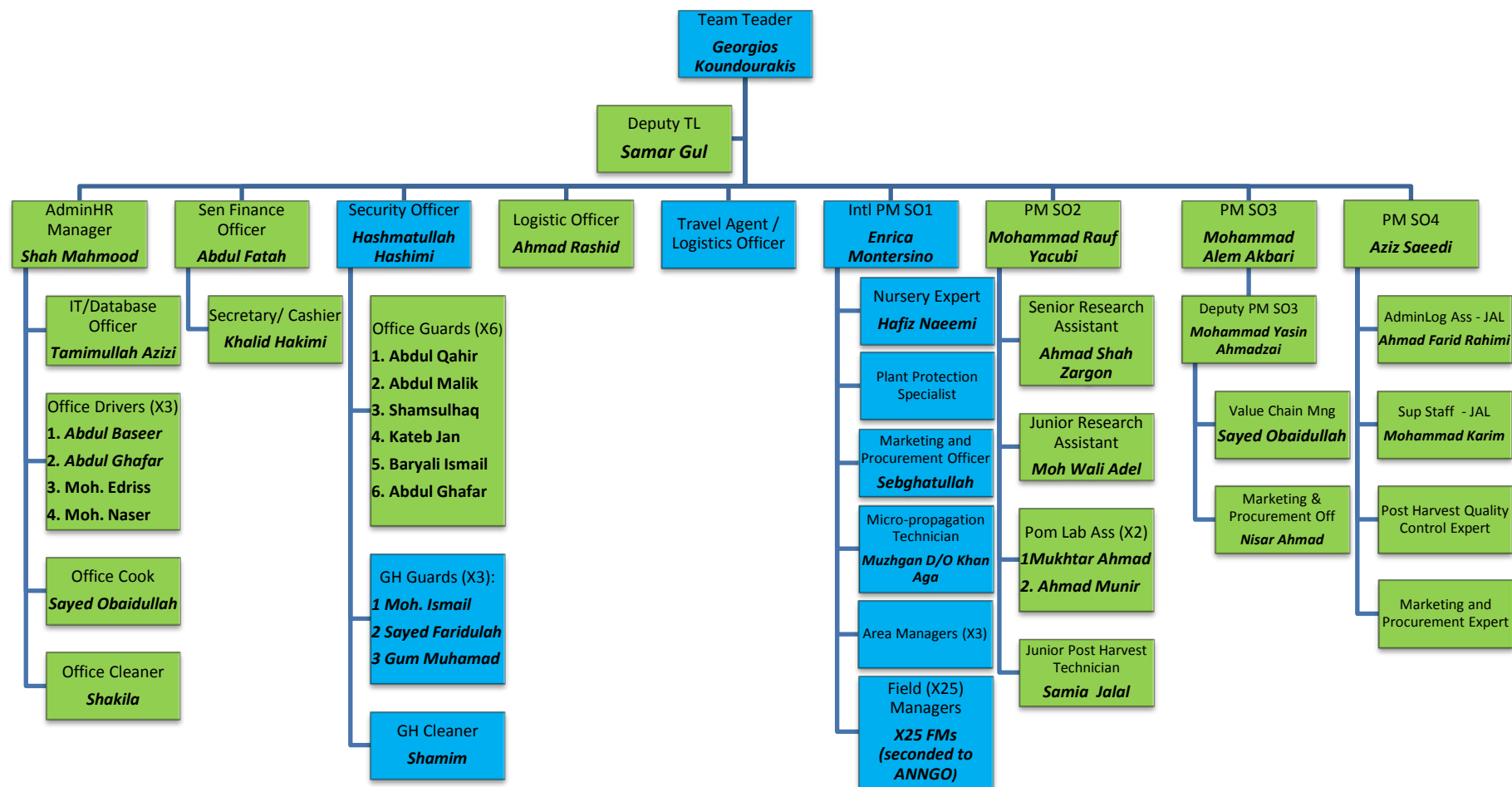
Support to the Development of Perennial Horticulture Private Sector

ANHDO - Relief International, Kabul - Afghanistan

Organization Chart – 31 December 2014

Green - ANHDO staff

Blue - RI staff



HPS - 4th Quarterly Progress Report Matrix (01-Oct to 31-Dec 2014)

“Support to the Development of Agriculture Private Sector: Perennial Horticulture” DCI-ASIE/2013/335-321 (Europe Aid/133-872/L/ACT/AF)		Work Progress Report				
PROGRESS REPORT MATRIX		Progress Achieved (%) 1st Qrt 2014	Progress Achieved (%) 2nd Qrt 2014	Progress Achieved (%) 3rd Qrt 2014	Progress Achieved (%) 4th Qrt 2014	Overall Progress Achieved (in 2014)
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%	6.4%	6.4%	20%
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%	8.8%	5.2%	21.7%
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%	15.4%	5.8%	30.9%
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%	6.0%	5.2%	16.5%
SO-1: Result 3	The planting material registration and certification system increases its operations to meet increased demand	2.7%	5.3%	5.0%	4.7%	17.7%
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%	5.0%	21.7%
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	2.7%	5.9%	12.1%	4.8%	25.4%
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%	4.5%	5.3%	18.0%
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%	6.1%	8.5%	17.7%
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%	8.4%	10.6%	24.0%
SO-3: Result 2	Almond Industry value chain supported and enhanced	0.0%	0.0%	2.4%	4.0%	6.4%
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%	5.0%	6.8%	14.8%
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%	8.8%	12.6%	25.8%
Specific Objective Four: A soundly based and profitable citrus industry in eastern Afghanistan is developed		2.3%	5.3%	2.5%	6.9%	17.0%
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%	3.6%	7.4%	21.0%
SO-4: Result 2	The citrus value chains and market-links are developed in order to meet international exports-standards.	0.0%	1.8%	2.0%	8.8%	12.6%
SO-4: Result 3	Private & public stakeholders strengthen their partnership around the agreed strategy for the Citrus industry.	0.8%	10.4%	1.8%	4.4%	17.4%



**Support to Perennial Horticulture Private Sector
(Europe Aid/133-872/L/ACT/AF)
First Report of the Horticulture Research Specialist
27 October- 29 October 2014**



Inspecting breeding lines apricots from 2012 crosses, Badam Bagh, Kabul October 2014

Relief International

In Consortium with

Afghanistan

**National Horticulture Development Organisation
(ANHDO)**

Abbreviations and Acronyms

AAA	Afghanistan Apricot Association
AAIDO	Afghanistan Almond Industry Development Organisation
ANHDO	Afghanistan National Horticulture Development Organisation
ANNGO	Afghanistan National Nursery Growers' Organisation
DF	Demonstration Farm
DO	Demonstration Orchards
DUS-Test	(for new plant varieties) - distinct (D) from any other variety, sufficiently uniform (U) and stable (S)
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
HACCP	Hazard Analysis and Critical Control Point
HLP	(Emergency) Horticulture and Livestock Project (World Bank)
HPS	Horticulture Private Sector
HVH	High Value Horticulture (Task Force)
LFA	Logical Framework Approach
	Ministry of Agriculture, Irrigation and Livestock
MAIL	<i>Previously:</i> Ministry of Agriculture and Irrigation (MAI) Ministry of Agriculture, Animal Husbandry and Food (MAAHF)
MCPD	Multi-Crops Passport Descriptors
MSN	Mother Stock Nursery
NGA	Nursery Grower Association
NGO	Non-Governmental Organisation
PCM	Project Cycle Management
PHDP	Perennial Horticulture Development Project
PHDP II (PHDP2)	Technical assistance to MAIL to strengthen the planting material and horticulture industry in Afghanistan (Europe Aid/129-320/C/SER/AF/2)
PHD Centres	Perennial Horticulture Development Centres (<i>combined sites incorporating "Demonstration Orchards" and "Germplasm Collections" as well as training centres and some basic laboratory facilities</i>)
TL	Team Leader
ToR	Terms of Reference

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Cover picture: Inspection of breeding lines of apricot made by crossing five Afghan Amiri accessions with three imported varieties. An initial assessment will be made on tree vigour, tree shape and amount of branching, with undesirable plants being removed. It is hoped that some fruit can be harvested in 2015.

Report of the Horticulture Research Specialist

First input 27 -29 October 2014

Terms of Reference SO2 Horticulture Research Specialist

The Horticulture Research Specialist will provide technical advice and support as part of the SO2 component of the HPS project. This technical advice and support will be provided to the Programme Managers, Adaptive Research who carry out trials and coordinate germplasm comparative data collection, and to the six Field Horticulturists who manage the six Perennial Horticulture Centres where most of the adaptive research is carried out, in coordination with their supervisors and managers during the transition of the six PHDCs to the long term MAIL research system.

- In continuous coordination with the Germplasm and Adaptive research specialist, oversee the ongoing characterization of the National Collection accessions as per international standards.
- Oversee the ongoing adaptive research programme, promote its continuity and develop its effectiveness. Promote publication of results relevant to development of perennial horticulture in Afghanistan whenever possible.
- In coordination with the Germplasm and Adaptive research specialists, oversee the preparation of a Register of the NC accessions, to be prepared in hard copies and to be officially delivered to MAIL, and to the main horticultural universities.
- Support the 6 horticulturists in the preparation of their Annual and 6-monthly Work Plans for the management of the 6 PHDCs including maintenance of the National Collections, pomology laboratories, etc.
- Help the TL to support MAIL in the EU-MAIL transition process. Advise MAIL/DAIL in defining the positions that MAIL/DAIL needs to establish in order to form the first service oriented provincial structure of horticulture and be able to take over the 6 PHD Centres and the National Collections.
- Edit and update the Orchard management manual prepared in the first PHDP and prepare its publication by ANHDO.
- Participate with the rest of the team in the preparation of the ANNGO catalogue and other technical publications as agreed by HPS management.
- Report on all activities in accordance with the requirements of the client and as indicated by the team leader.

Management Summary

This was the first input of the horticulture specialist, Greg Cullen, for the HPS project. This input followed on immediately from the seventh and last input with the PHDP II project with very similar terms of reference. The input was severely curtailed by personal family circumstances, but the plan is to have a series of short inputs up until the end of 2017. For this purpose the main outlines of the work to be done in 2015 and for the longer term of the project are taken over from the PHDP II programme, which itself follows from the PHDP programme which started in 2006. The work in development of perennial horticulture is essentially long term, and Afghanistan is very fortunate that the European Union Delegation is supporting perennial horticulture with these long term investments. The EU support is currently given to the remaining period of the PHDP II project and to the EU/MAIL Transition project which supports the transition of many of the original PHDP/PHDP II activities and investments over to the permanent MAIL organisational structures.

The main tasks carried out during this input in support of the permanent ANHDO staff concerned with the SO2 programme included:

- Coordination of ongoing work on national collection register with specification of work to be done until next input on the registers for apricot, plum, cherry and pomegranate (to be done on conjunction with the EU/MAIL transition project staff)
- Preparation for adaptive research programmes 2014/2015; final clarification and instructions for SO2 team.
- Coordination of activities at PHD Centres for the 2014/2015 SO2 programme.
- Setting out the SO2 programme for 2014/2015 and for subsequent years until the end of HPS and beyond. Some additional notes were made to the programme as set out in the final report for PHDP II.

Technical Programmes

The priority in the technical programmes is the completion of the registers for the different species in the national collections. Defining the characteristics of all the different varieties of fruit and nuts in the country is a basic requirement for the development of a certified planting materials industry and the planting of modern orchards of known potential, and thus underpins all development in the perennial horticulture in Afghanistan. Progress was made in the summer of 2014 in collecting data for the national collection registers and the project will move during the winter months to concentrate on the preparation of registers for national collections of apricot, plum, cherry and pomegranate.

Exploitation of these resources for the development of perennial horticulture in Afghanistan is made possible by an adaptive research programme that finds ways to better use existing varieties. In addition, the existing germplasm is used as the basis of targeted breeding programmes. The various aspects of the long term adaptive research programme are brought up to date in the Annex A. The activities in Annex A should be included in the work plans of the relevant staff of SO2. At the same time, there needs to be complementary planning in the Transition Project, which manages the PHD Centres and staff, and SO1, SO3 and even SO4 where the actions envisaged for SO2 impinge on these other projects and project components.

Reports

This report only includes the work done in two days with HPS. Detailed observations on work with the national variety collections, the adaptive research and the maintenance of the databases and website related to SO2 of the Horticulture Private Sector (HPS) Project were reported in the recent input with PHDP II (8-26 October 2014).

Report on daily activities

27 October	Review 2015 programme, clarification further steps apricot, almond national collections, field visit Badam Bagh on almond breeding, grape demo
28 October	Preparation trial assessment forms citrus variety x rootstock trial Jalalabad, clarification issues in apricot national collection register, completion report for HPS
29 October	Travel home to UK via Istanbul

1. Activities 27-28 October

Work continued on directly from the input to PHDPH completed the previous day.

The supervisor of the six PHD Centres for the EU/MAIL Transition project was not able to be present at the pre-planning meeting on 26th October. The opportunity was therefore taken on 27th October to brief Haji Qudous on the relevant sections of the previous day's meeting and confirm certain actions that will be taken in 2015.

It appears that the rooting of GF667 rootstock in Jalalabad from cuttings gives about 50% success. This allows for the planning of an almond comparison trial at Badam Bagh with a traditional bitter almond rootstock compared with the GF677 rootstock. The GF677 rootstock can be rooted in plastic bags to transfer to Badam Bagh for lining out prior to budding later in 2015. The demonstration/trial can then be planted out in March 2017. If there is availability of GF677 from micropropagation those plants will be used instead.

Haji Qudous will make arrangement for rooting cuttings of all the grape national collection varieties in Kandahar to be able to plant a national collection of grapes in Badam Bagh. The budget for trellis for this new plantation should come from the EU/MAIL Transition project. The planting will be in 2016 with trellis and individual vine supports needed ahead of the 2017 spring season.

A demonstration block of grapes was planted at Badam Bagh in 2014. When inspected on 27th October it was seen to have a large number of gaps in it. Growth of existing plants was not outstanding, probably due to lack of weeding, which is the standard for all the MAIL managed blocks in Badam Bagh. Replacement plants are needed for the missing plants. These should be supplied in March 2015. All the vines, both the 2014 and the 2015 plantings will be cut back in 2016 and trellis erected. It is not clear at the moment where the budget for trellis would come from, perhaps from the transition project. The demonstration is meant to be mainly of the international collection of seedless varieties. This will be available for work on trials with gibberellin from 2017 at the earliest. This demonstration plot was supposed to be planted for management by MAIL but it seems it should be looked after by the Transition project to ensure proper management.

A further demonstration block of apples on dwarf rootstock was imported from Turkey by the AAEP project, a USAID project which has now terminated. The range of varieties is not necessarily what HPS would have planted, but the varieties and condition of this block should be looked at so see if this could be a suitable replacement for the intensive apple orchard planted under PHDP in 2008.

The assessment for the almond breeding lines can be tidied up by removing failed saplings and moving some of the remaining saplings. The line of parent plants can be shortened to make room for another parent and to also make more room at the end of the field.

The individual trees in the apricot breeding lines should be assessed for three characters of tree vigour, trees shape and branching habit.

Trial protocols and draft data collection sheets were prepared for the long term citrus variety x rootstock trial in Jalalabad and sent to the project manager SO4. Cooperation on this trial between SO2 and SO4 should help both sides.

2. ANNEX TO THE REPORT

Annex A: Adaptive research programme - outline for 2015

Annex A: Adaptive Research programme - outline for 2015

Almond crossing programme (crossing 2015, sow seed 2016, transplant 2017)

The crossing programme can be carried out in Mazar, or a combination of Mazar and Kabul. The Genco flowering shoots can be collected in Mazar for pollination of flowers in Kabul. If there is frost in Mazar, all the varieties are available at Badam Bagh, but it is not so easy to match flowering of some combinations of varieties.

a) Inclusion of alternative late flowering self pollinating germplasm source

Use of Genco as late, self pollinating variety

Seed parents, receiving pollen from Genco (the varieties and number of flowers that can be pollinated will depend on how successful the flowering periods can be matched. Pollen production from one year old trees is also expected to be very limited).

AFG1003 Abdul Wahidi (re-named Qaharbai Allah Mir)

AFG0172 Kheirodini

AFG0160 Qaharbai

AFG0143 Qambari OR AFG0142 Sattarbai (re-named Qambari)

AFG0159 Sattarbai Bakhmali

AFG2006 Sattarbai Guldar

AFG2011 Sattarbai Sais Aybak

902-22 "Qambari Safid" (white shelled new introduction)

AFG0739 Kaghazi Herati Additional variety, can only be done in Mazar as Kaghazi Herati in Badam Bagh is too probably too immature to set seed.

b) Inclusion of large seeded progenitor, to ensure kernel size is maintained within germplasm pool used in the breeding programme

Use of Kaghazi 739 (re-named Kaghazi Herati) as large seeded progenitor. A limited crossing programme will start in 2015, and this will be increased once the late flowering selections from the crossing programme come into bearing.

Seed parents, receiving pollen from Kaghazi 739 (the varieties and number of flowers that can be pollinated will depend on how successful the flowering periods can be matched. Pollen production from one year old trees is also expected to be very limited).

Ferragnes

c) Repeat of some less successful crosses with Lauranne

Use of Lauranne as late, self pollinating variety

Seed parents, receiving pollen from Lauranne (the varieties and number of flowers that can be pollinated will depend on how successful the flowering periods can be matched. The seed parents selected have some of the greatest differences in flowering time with Lauranne).

AFG1003 Abdul Wahidi (Qaharbai Allah Mir)

AFG0172 Kheirodini

AFG0142 Sattarbai (re-named as Qambari)

AFG0159 Sattarbai Bakhmali

AFG2011 Sattarbai Sais Aybak

902-22 "Qambari Safid" (white shelled new introduction)

AFG0739 Kaghazi Herati Additional variety, can only be done in Mazar as trees of Kaghazi Herati planted in Badam Bagh in 2014 are too probably too immature to set seed.

Apricot crossing programme 2015 (under various trial numbers)

The planned crosses between three Amiri types with three early varieties in the spring of 2014 did not give good fruit set, and the reverse cross will be used in 2015 for the two Afghan varieties. This will complete the ingression of foreign and early materials into the Amiri germplasm.

The following is the list of crosses to be made:-

For 2015, the following crosses can be made, using a different range of Amiri varieties as the seed parents in crosses with each of the imported varieties (reverse crosses compared to 2014).

Early ripening Afghan variety (seed parent)	Amiri types (pollen parents)
746 Farahi (Farahi Zoda Ras)	247
278	
820	

This gives a total of three crosses. 200-300 flowers can be pollinated each time.

746 Farahi is considered self infertile, so can be used as the female parent without the need for emasculation.

Cross pollination for checking Saqi types from Kahmard district, Bamyan province

Four Saqi accessions have been selected from among the trees in Kahmard district in Bamyan province. The trees have traditionally been propagated by seed. In order to use modern budding methods for producing new orchards, at least two compatible lines have to be planted side by side. The four accessions should be cross pollinated between each other according to the usual protocol adapted for just four varieties. Any two compatible lines can then be planted together. The four accessions are very similar, so it is not expected that any other recommendation will be made about which accessions to grow.

Self pollination check for new accessions of apricot

The inventory of the national collection should be checked and any accession that has not yet been checked for self pollination possibilities should be tested using the protocols developed in previous years (including control branches with natural pollination).

Testing for winter chill requirements (new trial to be numbered trial no. 15-01)

Low chill apricots have been used in the breeding of new apricot varieties. In order to make comparisons in future years, some key varieties of fruit will be assessed for winter chill requirement and used for comparison tests in future years.

Previous years' winter chill accumulation (Kabul airport) (Based on approximate calculation from maximum and minimum temperatures only, without cut off at temperatures below zero)

2011-2012

Nov 250 hours

Dec 550 hours

Jan 735 hours

2012-2013

Nov 311 hours

Dec 590 hours

Jan 710 hours

2013-2014

Nov 341 hours

Dec 551 hours

Jan 650 hours

Without continuous reading of a weather station, it is necessary to make estimates of winter chill accumulation based on previous experience. The Kabul winter weather patterns were quite consistent in the previous three winters. We will attempt to identify some key varieties for winter chill and take samples for every estimated accumulation of 250 hours winter chill. Sampling dates could be as follows:-

30 Nov -estimate 250 hours winter chill accumulated

15 Dec -estimate 500 hours

30 Dec -estimate 800 hours

10 Jan -estimate 1050 hours

20 Jan -estimate 1300 hours

30 Jan -estimate 1550 hours

Use of key reference varieties, including varieties with known winter chill characteristics.

Apricot:	Goldkist
	Tomcot
	Aurora
	Farahi 746
Almond:	Abdul Wahidi 1003 (Qaharbai Allah Mir)
	Sattarbai 142 (Qambari)
	Ferragnes
Peach:	Maycrest
Apple:	Anna
	Dorsett Golden
Plum:	Beauty
	Kok Sultan 308

Samples are taken at each date and placed in water in a warm room. Once a variety is shown to break dormancy on a particular date, no further sampling of that variety is needed.

In future years breeding lines of apricot will be compared to these standard varieties for assessing of chilling requirement for those new varieties.

Harvesting of apples (and pears) for optimum cold storage (trial number 15-02)

A number of methods of assessing fruit condition of apples prior to cold storage will be tested to find which methods are easiest to carry out and which are the most reliable and replicable under Afghan conditions. Access to equipment, reagents and cold storage facilities are necessary and arrangements have to be made for autumn 2015. Pears can be assessed using similar methods.

Ongoing trials to continue in the 2015 programme

Trial No.10-01 Cross pollination and self pollination traits of almond accessions in national variety collection

No programme is arranged for 2015. The hand pollination methods used have not been successful in several years due to bad weather at flowering in Mazar and Kunduz. The use of DNA comparison methods when available will give more results more quickly and reliably at much less cost.

Trial no. 13-03 Cross pollination traits of apricot accessions in national variety collection

Cross pollination trials in the Amiri accessions are discontinued. New accessions in the national collection should be tested for self fertility if not previously assessed.

Trial no. 14-01 Fertility trials (cross pollination) of plum accessions in national variety collection

The trial undertaken in 2014 should be repeated for verification of 2014 results. Any varieties missed out in 2014 should be included.

Trial no. 14-07 Comparison of different citrus varieties on a range of rootstocks

This trial was first planted in Jalalabad in 2012. The first harvest is in 2014, and most of the emphasis is on the fruit marketing and eating qualities, which needs a range of laboratory analyses. Yield and field data should also be obtained.

The information on what data should be collected and how it should be recorded and analysed on data sheets developed for the purposes was sent to the project manager SO4. This trial should also be followed by SO2, with perhaps help being offered in collecting and recording data, as this is a very large trial to be run over several years.

Trial no. 10-03 Rooting of clonal rootstocks for stone fruits

The trials with conventional rootstocks is completed and is replaced by:-

Trial no. 15-03 Rooting of clonal rootstocks from micropropagation

This refers to the work mainly of the Plant Biotechnology Laboratory in weaning of the micropropagated plants of various rootstocks and the planting in the field for later budding.

Trial no. 14-02 Comparison of GF677 and seedling rootstocks performance (peach & almond)

Crop yield and other data should be obtained from the trial in Kunduz of peach and almond varieties planted on seedling rootstocks in comparison with peach and almond budded on GF677. The main emphasis should be on obtaining comparative yields on the two rootstocks. Tree vigour should also be assessed, and the productive life of the trees on the two rootstocks needs to be eventually assessed, with tree deaths taken into account.

Trial no. 09-04 Grafting compatibility and rootstock adaptability (pears)

The general health and productivity of the pear orchard on the MAIL managed section of the Badam Bagh fields needs to be assessed. This is planted on quince rootstock. A further small plot of pears on quince is planted at the end of the pear national collection field. Progress of both these pear plots should be assessed and reported for use by the farmers as part of the ANHDO remit.

Trial no. 08-01 Intensive apple orchard

An intensive apple orchard was planted at Badam Bagh in April 2008 with a range of apple varieties on M9 and B9. It is planned to replant a similar orchard in 2016, using information about the

performance of varieties gained from this orchard. For this purpose, the results of this orchards should be reported upon, and the specific lessons learned should be noted down for use by orchard growers. *Alternatively, the intensive apple orchard planted by AAEP project at Badam Bagh in 2014, which is now longer managed by that project due to project termination, may be taken over by the Transition project with data recording done jointly with SO2. The varieties and rootstocks used in that block have to be assessed*

Trial no. 09-07 Extensive apple orchard

Results of the performance of each of the varieties should be recorded every year for publication.

Additional apple spacing and rootstock trials/demonstrations

An apple planting density x rootstock combination trial/demonstration has been planted at four of the PHDCs. A similar trial/demonstration on interstem is also planted. While visitors are shown these trials and demonstrations, no reports on these demonstrations have been produced for those people who have not visited the trials.

Trial no. 14-06 Testing of pruning systems on seedless grapes

This should now be planted in 2015

Trial no. 14-03 Testing of gibberellin treatments on marketability of Raucha grapes

This trial is postponed to 2015 as hail damage in Herat in 2014 did not allow the trial to be undertaken.

Trial no. 14-04 Testing of gibberellin treatments on marketability of Shundukhani grapes

This trial is to be repeated in Shomali with one or more commercial growers linked with HPS SO3 programme for grape value chain.

Trial no. 14-05 Relationships between plum genotypes

The new national collection of plums in Badam Bagh will be assessed for the presence of different plum species and intermediate types.

Trial no. 13-01 Evaluation of first crosses of Afghan & imported germplasm as improvements on existing varieties of Afghan almond.

Distribution of these new selections multiplied in the nursery at Badam Bagh on bitter almond rootstock for on farm observation trials should be done in February 2015.

Trial no. 11-01 Use of Afghan & Imported germplasm to develop improved varieties of almond

The crossing programme for 2015 is provided in detail at the beginning of this annex A.

Two plants of each of the parents of existing crosses and potential parents for the future have been planted in the almond selection plot. Two plants of each of the selected lines from the 2008 crosses are also included in this variety reference section for the early assessment of tree and fruit characters. Two plants of the selection 802/36 should be added to these potential parents. This a vigorous selection from Nonpareil 171 x open. It was rejected by the 2013 variety assessment panel after being selected by the 2012 assessment panel. The saplings in the nursery rows were less vigorous than the 802/13 but much more vigorous than the purely Afghan types. 802/36 was

slightly preferred over the 802/13 by the 2012 assessment panel as the nut was a bit nearer the Afghan Qaharbai type. It has potential as a breeding parent, particularly if it has a suitable flowering time.

In order to make room for the two saplings of 802/36, and to tidy up the assessment field, the dead saplings in the first assessment row should be removed and the remaining progenies replanted in the spaces freed up, taking care not to mix the progenies. The last two varieties in the parents block should be replanted, together with 802/36, in the end of the second row. This replanting can be done within the next few days before the temperatures drop.

Trial no. 10-06 Use of Afghan germplasm to develop improved varieties of apricot

The crossing programme for 2015 is provided in detail at the beginning of this annex A.

NEW:

Trial no. (to be allocated) Testing of gibberellin treatments on a range of grape varieties

The demonstration block of various grape varieties planted at Badam Bagh in 2014 is missing a lot of plants which need to be replaced in March 2015. This block is to be cut back and shoots trained on a trellis from 2016, with no suitability for gibberellin trials until 2017. The trial can be numbered at that time.



EUROPEAN UNION



In consortium with:



**“Support to the Development of Agriculture Private
Sector: Perennial Horticulture” (HPS) Project
DCI-ASIE/2013/335-321 (Europe Aid/133-872/L/ACT/AF)**

***SO2 Study Tour to Italy – Narrative Report
(25th September – 4th October 2014)***



Tuesday 28 October 28, 2014



This program is funded by European Union

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Summary:

The study tour was planned for 2 HPS SO2 staff, the Kabul PHDC Field Horticulturist and one ANHDO board member for nine days in Italy including two days for air travel. The study tour aim was to gain experience & technical capacities regarding germplasm collection maintenance and expose the participants to horticulture best practices.

The participants visited the Research Centre for Fruit in Rome (CRA), the Frutticoltura (National Collections of Fruits of Italy – Ministry of Agriculture), and various laboratories (pomology and molecular markers), participated in the Fruit Exhibition and seminar on pomegranate, commercial orchards and visited experimental orchards. Also, we visited micro-propagation laboratory and commercial micro-propagation plant for rootstocks-cultivars, Biofarm, and the Department of Agri-Food and Environmental Science in the University of Florence.

A. Purpose

The purpose of the study tour to Italy was to exchange the views and learn more techniques regarding to Germplasm Collection, Maintenance and Evaluation as Italy is producing yearly over 20 million metric tons of different fruits (such as apples, pears, stone fruits, grape, citrus, olives, persimmons, kiwifruit, etc.). The Italian fruit industry links together tradition (for instance by using local varieties for specific products and by taking into account the historical knowledge on fruit characterization and evaluation), and innovation (e.g. adopting the most efficient techniques of training/pruning, water use, crop protection, quality assessment and certification), in order to obtain from controlled production chains (e.g. from nursery up to packaging and marketing) the best quality fruits and byproducts (such as olive oil). Another purpose of this study tour was to increase the technical capacity of local staff in the horticulture sector, and namely in germplasm management, in nursery production under a certification scheme, in fruit production and marketing, including sensorial evaluation.

The core of the study tour was to allow the staff to have a sound overview of very up-to-date techniques related to the different segments of fruit industry:

- commercial nurseries adopting in vitro micro-propagation techniques
- very high density orchards
- under-net insect protecting plantations
- innovative sorting-packaging machine operated practices
- Visit, discuss and understand the different instruments of the Labs.
- visit the ornamental and fruit tree nurseries
- See the different machineries using in orchard management and nursery industry.
- Share and get ideas for a better orchard management in Afghanistan.

B. Participants

It was planned four people participate in this study tour to Italy; but unfortunately Mr. Naseer Ahmad Omarkhel did not received the Italian visa on time and missed the study tour. The following individuals participated in the study tour:

- i. Mohammad Rauf Yaqubi, SO2 Project Manager
- ii. Ahmad Shah Zarghon, SO2 Senior Research Assistant
- iii. Mohammad Fawad Rahimi, Member of ANHDO Board of Directors

Professor Edgardo Giordani (PHDP II Consultant) was mobilized as the tour facilitator to present the Italian sector developments to the participants as well as support them with the facilitation of scientific meetings, field visits and traveling within Italy. Monica Berti (PHDP II Consultant) also assisted the team while in Italy. Their inputs were essential for the success of the tour.

C. Day to Day Activities Report



Thursday, 25 September – Trip from Kabul to Rome

Air Trip from Kabul to Rome (via Istanbul) with Turkish Airlines. Arrive to Rome at 23:50.

Friday, 26 September – Trip from Kabul to Rome

Visited Agriconsulting Company (with which we were working during the first years of PHDP2) and their GIS laboratories.

Agriconsulting has a large and highly skilled permanent staff working on projects all over the world covering the different areas of activity where the Company operates and providing technical assistance services on a short or long term basis in projects both in Italy and abroad. Agriconsulting operates with the most advanced IT systems including sophisticated GIS and image processing. In addition, Agriconsulting uses state of the art software to better respond to its clients' needs. The visit was very useful and informative for us. Their GIS system to identify soil and water problems in the provinces was very effective.

We also had the opportunity to visit some hazelnut chestnut orchards in Vico Lake outside Rome. Unfortunately the fruit was harvested earlier but we had the chance to observe the application of "best practices" in orchard management.



Saturday, 27 September - Rome

Morning: CRA – Frutticoltura (National Collections of Fruits of Italy – Ministry of Agriculture) – Visited the National Collection of Fruit Tree Species of Italy – Visited the Laboratories (pomology and molecular markers)

The CRA-FRU is home to the National Centre of fruit germplasm and is involved in genetics, development and characterization of fruit species, with main activities in the areas of plant breeding, propagation, cultivation technique, defense and post-harvest, with particular reference to sustainability, quality and resistance to biotic and abiotic factors of production.

They are also involve in Biology research and experimentation aimed at the determination and evaluation of the nutritional characteristics of the fruits of commercial varieties and old - both indigenous and foreign sources - stone fruit, pome fruit, berries, kiwi, pomegranate and fruit in general.

Bacteriology

This center is working on phenotypic and molecular characterization of plant pathogenic bacteria of crops with particular reference to the bearing, also developing protocols for the early detection of plant pathogenic bacteria in plant propagation material.

In vitro cultures

Caulogenesis from axillary bud and adventitious root formation for the development of micro propagation protocols and characterization of physiological, biochemical and molecular processes Conservation of germplasm for the protection of biodiversity 'of fruit species, by "slow - growth" and cryopreservation and molecular characterization of processes and genetic stability. Application of the in vitro culture for the production and study of secondary metabolites



Genetic Improvement

In this center more than 160 cultivars of different species of fruit: apricot, cherry, strawberry, raspberry, apple, Japanese medlar, pear, peach and nectarine, plum (varieties and rootstocks), table grapes were formed.

Several of these cultivars had (and still have) a great importance for the Italian fruit industry and got widespread internationally (strawberry Sugar Lia, Addie, Paros, Cesena, Queen Elisa, Wave, raspberry: Erica; melo: Summerfree, Golden Orange, Forlady, but : Early Fiorano, Tosca, Carmen; peach: Rome Star, Tirrenia, Romea, Sagittaria, Kalos 4, 3 UFO, UFO 4; nectarines: Weinberger, Nectaross, Venus, Orion, alitop; plum tree (rootstock): Penta, Tetra; table grapes: Matilde).

Currently the activity is carried out mainly on kiwifruit (production of new selections female yellow flesh and green), peach (production of new types of fruit with low acidity and blood) and raspberry for the production of new varieties.

Molecular Genetics

Activities study of the genome of the fruit tree species with particular reference to the peach tree species considered to be the model for the family Rosaceae. In particular, during the recent years they performed structural analysis of the genome and the study of the variability within the germplasm of peach tree in order to identify useful alleles in the activity of genetic improvement.

The study includes the identification of molecular markers, their localization in linkage maps and their correlation with characters that are of agronomic importance such as disease resistance and quality of fruit. Recently, they coordinated the Italian participation in the international project to sequence the genome peach (IPGI).

As part of this initiative was also involved in the molecular characterization by next generation sequencing (NGS) of 36 accessions of Prunes allowing the identification of about 1 million SNP markers distributed throughout the genome. Currently the aim is to identify a direct correlation between the phenotype and the genotype, i.e. to establish how the sequence differences between individuals are translated into different phenotypes that are observed among individuals of the same species.

Afternoon: Participated in the Fruit Exhibition and seminar on pomegranates

Field visit to the Fruit Tree Research Centre (CRA-FRU) located in Ciampino, Rome. Dr. Flavio Roberto De Salvador (Director) welcomed the visitors and provided a presentation on the activities of the Centre on pomegranate and in particular an overview of the pomegranate project. During the seminar, Prof. Edgardo Giordani had the opportunity to include the presentation of Afghan pomegranates and their Afghan national collections. The study tour participants had short meetings with all the participants of seminar.



We also participated in 57th Fruit Fair at Chiampino Research Station where many fruit varieties were exhibited. A fruit exhibition is held twice a year in this center. We had a tour of the different species germplasm and research trials conducted in this center for rootstocks improvement and release of new commercial varieties. They did research on different aspects of pomegranate production (e.g trials were conducted on dwarfing rootstocks for pomegranate and also breeding trial for finding single steam rootstock for pomegranate was carried out). They got some remarkable results,



especially on dwarfing trial, regarding single steam rootstock very primary result was gained, among breeding lines only one exemplar progeny showed result. We visit pear, pomegranate, apple and apricot germplasm collections, too.

Sunday, 28 September – Emilia Romagna Region

Morning: Tour of the archeological museum and other historical places in Rome.

Afternoon: Road Traveled from Rome to Faenza by car

Faenza which is an industrial city also it is a well-known place for the production of different horticultural crops and fruits such as grape, apricot and kiwi with high density plantation. The city is located north of Rome around 450 km away.

Monday, 29 September – Emilia Romagna Region

Meeting with CAV (Centro Attivita Vivaistiche) and visited their laboratories in Tebano

CAV (Centro Attivita Vivaistiche) is a nursery owners' cooperative whose main goal and objective is the genetic and phytosanitary certification of nursery material for horticultural production while achieving the highest quality standards. CAV had conservation, multiplication and premultiplication centers. They own all the infrastructure facilities necessary to carry out the steps of conservation and small seed propagation material in the context of national certification of fruit plants. Such structures are mainly represented by:

- greenhouses screen - houses necessary for the maintenance of the plants in the isolated environment of pre-basic and basic category (over 2000 square meters of covered area);
- Air-conditioned box (total 192 sqm) intended for biological assays;
- greenhouse air-conditioned 120 square quarantine;
- cell thermotherapy for the remediation of virus of the candidate material to enter the certification process.



networks with house anti-aphid



Interior house screen



Conservation strawberry (CP1)



Conservation leaves

CAV has an accredited laboratory capable of performing the necessary Phytopathology analysis on



material in storage for every nursery producer. CAV has been credited on behalf of the Agriculture Ministry, the Regional Phytosanitary Service of Emilia-Romagna:

- For carrying out plant health tests on plants and fruit and vegetable propagating material for mites, insects, Phytoplasmas, Bacteria, Viruses, Fungi and Viroids and for carrying out analysis of compliance variety of fruit trees and vegetables;
- For carrying out plant health tests on propagating material of ornamental plants for Phytoplasmas, Bacteria, Viruses, Fungi and Viroids.

Regarding the activity of checks and analyses that regulate certification, they apply:

- biological techniques (transmission to herbaceous indicators juice, for coupling to carriers and guests arboreal animals);
- optical microscopy (direct and phase contrast: DAPI);
- microbiological techniques (Isolation and identification);
- serological techniques (ELISA direct and indirect IFAS);
- molecular biology techniques (PCR, RT-PCR and PCR REAL TIME).



During the recent years, the accredited laboratory of CAV has performed an average of 22,000 analyzes fitopatologiche / year, broken down as follows:

Health checks for release in the certification process

CAV laboratory is accredited by MIPAAF and Sinal for performing all plant protection tests required for certification of fruit plants.

Tests in Sanitary Certification Program

CAV's laboratory is officially recognized to carry out phytosanitary tests by Sinal and MIPAAF.

Thermotherapy

The CAV has the facilities and tools to perform thermotherapy for the improvement of plants by viruses. CAV works in order to infect varieties recovered with the thermotherapy.

Support for the introduction of new accessions in the certification process

Consulting for compiling and assistance for registration of varieties in the National system of



certification.

CAV's Activity In Certification Program

CAV's activity is devoted to finding essentially nursery "source" material with the best genetic and sanitary quality.

Conservation and Pre-Multiplication

CAV is accredited by MIPAAF to perform the service of conservation and seed increases in screen-house for the main species of fruit trees. CAV has got a screen house where the plants are conserved and multiplied virus free nuclear stock material.

Essays health laboratory and biological

Besides testing according to the protocols of certification, the laboratory CAV can perform all tests required. Moreover the analyzes are carried out in vitro on indicator plants through the technique Indexing.

DALMONTE – Visit to the DALMONTE Nursery and a commercial micro-propagation plant for rootstocks-cultivars

We visited nurseries located in Dalmonte. Dalmonte Vivai is a specialized nursery which selects, produces, controls, sells and provides assistance to orchard growers. Dalmonte is part of the fruit farm system as far as the role of the nurserymen is concerned, that is providing high quality trees able to fully meet the needs of modern fruit and grape growing. The region in which they are located is ideal for fruit and grape growing. They are producing certified fruit trees since the beginning of the 1980s following the regulatory system. Now they guarantee their products at the highest quality level.



According to Mr. Raberto Savini (Director) they produce different types of saplings from different species like; grape, cherry, walnut, pear, apple etc. The most interesting part of the visit from Dalmonte nursery was that they own a very big grapevine nursery (seven hectares) where different varieties were budded and producing around 1,000,000 saplings.

We visited the recently established Tissue Culture Lab and met with the head of the Lab Mr. Giorgio De Paoli who is one of the most famous tissue culturists in Italy. He explained that the Lab was established three months ago and by now they have produced around 250,000 saplings of GF677, Myrobalan and etc.



Vivai Battistini (Micro-Propagation Laboratory) Nursery and Tissue Culture Laboratory

Battistini dott. Giuseppe is a family company with a worldwide reputation in the fruit crop nurseries and "in vitro" propagations of rootstocks, fruit trees, ornamentals and forestry plants. They are one of the most important nurseries for propagating with a high number of specialized technicians involved to improve the micro-propagation process and apply the latest bio-technological acquaintance. Laboratory annual productions: 4.000.000 of plants. Main species propagation includes:

- Rootstocks and Grafted plants: Peach, Plum, Apricot, cherry, apple, pear, etc.
- Self-rooted plants variety: Kiwi, Blueberries, Raspberries, Blackberries, Pear, Peach, Plum, Cherry, Jujube, etc.
- Nut crops: Almond, Hazelnut, Chestnut, Walnut.
- Tropical crops: Ananas, Babaco, Banana.
- Forest trees: Taxus, Pawlonia, Poplar, wild cherry, Walnut,
- Vegetables: Artichoke, etc.

Areas of Activity

Micro-propagation and standard propagation for:

- Woody fruit plants, indoor and outdoor ornamental plants, forest trees, self-rooted fruit variety (Kiwi, Berries, Pear, etc.)
- Cutting of ornamental indoor and outdoor plants
- Stone fruits, pear, apple grafted plants.

Research and experimentation:

- Techniques improvement plant tissue culture
- Automation in micro-propagation plants.
- Genetic Engineering and Somatic Embryogenesis on fruits plants

Services

- Meristem culture for virus eradication
- Propagation of virus-free foundation stock material.
- Technical assistance for choices fruit variety, growth and pruning.
- Embryo-culture for breeding programs.

Laboratory facilities

- 1 Big Autoclave of 1000 jars capacity.
- 2 Vertical Autoclaves, 80 jars capacity.
- 1 Washing glass jars machinery and semi automatically filling system jars.
- 20 Laminar Flow Cabinets seats.
- 3 Growths rooms 35.000 culture jars capacity.
- Green houses for acclimatization, 6.000 m2.

Tuesday, 30 September – Travel from Faenza to Florence

Morning: Visited some commercial orchards of peach, plum, apricot, grape, cherry, pear, apple, kiwifruit, and persimmon in different places of Faenza.

Italy is the second kiwifruit producer in the world after China. In recent years the marketable production has reached 460,000 tons although it has sometimes exceeded 510,000 tons, highlighting its great production potential. The Kiwi orchards were impressive with the region of Emilia Romagna producing around 16% of all production of Kiwifruit. The maximum yield is estimated at 45tons per hectares.



Visited The Bulzaga Naturalmente Ornamental Garden Faenza



The garden was founded in 1995 by Bulzaga family in the cultivation of plants. The garden is oriented to design and broadens its offering with all the furnishings for the garden, to become a benchmark for the entire north-central Italy. An area of 7,000 square meters is utilized for this beautiful garden, the garden owned very nice ornamental plants, bushes, flowers etc and also provides the following services:

Gift packs

They are providing gift packages by booking and home delivery

Garden Design

They are also working on design of Terraces for green areas, provide services offered in collaboration with external

Consulting Do-it-yourself

They are providing advices for the farmers (do-it-yourself), cultivation and pruning.

Expert advice

Diagnosis and tips on everything plant disease to the farmers and orchards growers.



Afternoon: After our arrival to Florence at 03:30PM we had a short tour of the city of Florence and visited some historical and touristic places.

Wednesday, 01 October – Florence

Visit the Nursery Piante MATI in Pistoia, meeting with Mr. Cosimo Frati and Visit to Agraria Checchi equipment for nurseries

Gruppo Mati

The company was set up to provide a complete service for the design and implementation of gardens and green space projects. The company has four divisions that are able to fulfil the requirements of any project and its implementation. The gardens created by Gruppo Mati have a unique style, each one taking into consideration various factors in order to obtain results that are more than satisfactory in the short time it takes. Specifically,

Mati Trees



They are producing different varieties of ornamental trees like Maples, Birches, Hornbeams, Ashes, Magnolias, flowering Apple, Pear and Cherry trees, Poplars, Lindens, Oaks and other trees in the best varieties and selections are plants resulting from a long and careful research directly in their nurseries by using modern technologies combined with traditional systems, often starting from certified seeds or mother plants selected.

Ornamental trees for parks and gardens, natural trees for works in the landscape, “technological” trees for urban avenues and industrial areas are available in our nurseries.

The geographical position of Pistoia is particularly suitable for the quick growth of outdoor plants and there are production nurseries, situated in different areas of the Pistoia plain, Mati Piante apply cultivation techniques suitable for each species, some plants are cultivated in the ground with the traditional nursery techniques; other ones are cultivated in container and in airplant so that they are available very soon and ensure strong root systems.

To make plants cultivated in the ground available to transplantation throughout the year, they apply the Plant-Plast technique. In this way the root ball is protected stimulating the production of capillary roots, this is an additional guarantee they offer to the customers.

Young plants and trees grown in containers

Available in different sizes for a lot of uses they offer young trees 1 to 1.50 m high useful to consolidate washouts, carry out landscape barriers, reforest (no large-scale), recover quarries and landfills. They have a selection of trees 2.50 to 4 m high (trunk girth 12/14 - 14/16 - 16/18 – 18/20 cm at one meter from the ground) being very suitable for landscape works, for the carrying out of private and public gardens, roundabouts and avenues. The trees are relatively small sizes, quick growth; these trees are besides suitable for the carrying out of fast-growing screens, spots and grooves.



The selection and cares reserved let them have a good vegetative recovery and a quick growth after transplantation.

Traditionally grown trees

Plants are grown in the ground according to the over 150 year-old tradition of Pistoia which modern technologies join. These plants meet the requirements of the international quality standards to ensure a rapid engraftment and good foliage. 2.50 to m 5/6 plants are available (cm 14/16 to cm 20/25 trunk girt)



Potted conifers

A wide range of plants from 1 to m 5 high are grown in containers. These plants are ready for any kind of works throughout the year.

Exemplar plants in root ball, washtub and Plant-Plast®

A selection of adult plants having got over the years constant cares and explants to guarantee quality and safety of transplantation. They are suitable to create spectacular effects in any garden, for restorations, expansions and integrations in parks and gardens.



Special plants in container and Plant-Plast

There are very large plants useful to create large screens or barriers. They are available in washtub or Plant-Plast with heights varying from three to ten or more meters for transplantation.



Studio Mati

They also provide information related to garden designing, creating and developing gardens and landscapes with passion, it is a family tradition that goes as far as 1920.



Baggiolo Processing Factory

The BAGGIOLO began in the 1980's to produce multiple types of Jam and Juice with a total investment of this small company being around 200,000 Euros. Four permanent staff is working in the factory and more than 15 farmers who collect berries and other fruits are seasonally involved. The company is processing around 80 tons of wild berries into Jam and Juice. The goal of establishment of this company was to increase job opportunities in the mountains of Pistoia, an area particularly difficult in offering job opportunities. Baggiolo Company gathers the fruits found in the woods and prepare them into jams and liqueurs according to the ancient traditions of the Tuscan Apennines. All of the products are of excellent quality. They make biological jams and juices from wild bilberry, blackberry, raspberry and strawberry.



We also, visited a small wild blueberry, raspberry and strawberry project supported by the Italian Ministry of Agriculture in collaboration with the University aiming to identify high yielding wild varieties of berries suited for the high land of Pistoia.

Thursday, 02 October – Tuscany

Biofarm – Production of useful insects/formulates for pest control

Meeting with Prof. Belcari and Dr. Patrizia Sacchetti, Entomology Laboratory of the Department of Agri-Food and Environmental Sciences – University of Florence. We submitted the fruit flies which were collected from different places in Afghanistan by using some insects attracting fermions in cooperation with the entomology laboratory of Florence University. They promised to work on identification of those insects and will report the results to us as soon as possible. Also they showed the Afghan team all laboratories working on diagnoses of insects problems. They were currently working on identifying a solution to overcome the pest problem on olive trees. In 2014 the olive production in Italy suffered significant losses due to fruit flies and most of the areas were infected by a pest due to heavy rains during the spring and summer time. In this center they were producing environmental friendly and useful insects or natural predator of pest to control it.



Istituto Agronomico per l'Oltremare

We met with Dr. Nicola Arbace (Director), Mr. Marco Focacci (responsible for the Afghan project) and Mr. Giuliano Ramat (Project Coordinator in Afghanistan for the project of Technical Assistance and Support to Line Ministries in the Agriculture sectors with Emphasis on Olive production in Afghanistan, Pakistan and Nepal).

We also had the chance to visit the library of the institute including very old universities and institute scientific journals.

The Institute has started a two years Master of Science course on land and water management with the support of Italian Cooperation. Fifteen (15) African students will get two year scholarships and the course will mostly focus on tropical agriculture and livestock. The program is implementing in close coordination with Florence University. The institute is also involved in projects in Myanmar, Afghanistan, Nepal and Pakistan.

The Institute works on olive production project with NVDA in Jalalabad. According to Mr. Giuliano Ramat the heavy pruning of olive trees in 2008 caused tree un-bearing fruit until 2011, which was not a sound technical decision on that time.



Friday, 03 October – Meeting with Agri-Food and Environmental Dept.

Visit of Department of Agri-Food and Environmental Science – University of Florence: lectures on the evolution of Italian fruitculture and its relation with germplasm, Meeting and visit of Horticulture department at the University, visited the laboratories of university with Mr. Biricolti.

Department of Agri-Food and Environmental Science – University of Florence



The Department of Sciences of the agricultural food production and the environment (DISPAA) was born from the merge of the Department of Agricultural Biotechnology (BOM) and the Department for Crop Production, Soil and Agro-forestry (DiPSA) and began its activities on January 1, 2013. It offers the following Bachelor programs: Agricultural Science, Sciences nurseries and Faunal Sciences; and the following Master course of Science: Agricultural Science and Technology, Rural Development, Science and Resource Management Wildlife Reserves and Tropical Rural Development.

In particular, some of the scientific activity of the university include:

- biology, physiology, propagation and characterization of tree and shrub species of agricultural interest, not only for the sustainable management of cropping systems aimed at the production of fruit and biomass, but also for ornamental, landscape and environmental protection;
- the development of diagnostic methods with molecular approaches; epidemiological aspects of plant pests and the spread of alien species in relation to climatic change;
- interactions biochemical and molecular plant-pathogen-agent of harm;
- design, management and evaluation of sustainable cropping systems for food and non-food production, ornamental, recreational, ecological, also in view of environmental recovery and also with systems without soil;



Leaves of plum and apricot National Collections of Afghanistan were sent in the past to these laboratories for molecular markers and molecular characterization; unfortunately however the activity is pending and they are going to find proper methodology for analyses of these species at a later stage.

Agraria Checchi Company

We visited Agraria Checchi Company which is one of the biggest companies for supplying of agricultural materials in Italy as well as exporting to the other countries, too.

Afternoon:

Train Trip from Florence to Rome (Flumicino – Leonardo Da Vinci) int'l Airport

Air Trip from Rome to Kabul (via Istanbul) with Turkish Airlines. Departure from Rome at 07:05PM.

Saturday, 04 October – Trip from Florence to Kabul

Arrive to Kabul at 09:30AM.

D. Lessons Learned

- Exchange of ideas and information and learn new technique regarding orchard management
- Visited micro-propagation laboratories and commercial micro-propagation plant for rootstocks
- Visited for the 1st time chestnut and hazelnut orchards which are not common in Afghanistan
- The team was impressed by observing MATI Piante ornamental nursery production which applies a very useful growing nursery technique in the different pot sizes which are easily transported and transplanted as well as witnessed “best practices” in nursery management.
- Kiwi fruit production and orchards management of that was very interesting for all the team
- Good linkage has been made with all above visited institutions and research centers.

Disclaimer:

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ANHDO & PHDP II Study Tour of Italy 19-26 Dec 2014

By: Naseer Ahmad Omarkhil
Field Horticulturist Kabul PHDC

10 Dec 2014



Objectives:



- To participate at the INTERPOMA 2014, BOLZANO, ITALY
- To visit the most important apple cultivation area in Europe.
- To see the high-density apple plantation in the mountainous areas of Bolzano and Trento.
- To see the technological advancements in nursery production, certification, packaging, marketing and processing.

Participants:

Popal Bashir, fruit trader and member of ANHDO board of director.

Naseer Ahmad Omarkhel, horticulturist, member of ANNGO, manager of Kabul PHDC.

Tutor:

Giancarlo Curzel, International Horticulturist.





What is Interpoma



- ❑ International trade fair for apple growing, storage and marketing

- ❑ **History of Bolzano Fair**

Bolzano has a long tradition in the fair industry The first modern fair was held in 1948, In the Seventies a phase of development started for the Bolzano Fair Organization Today's programme of the Bolzano Fair includes 19 annual and biennial exhibitions, around 8 guest shows, together the events attract more than 220,000 visitors.



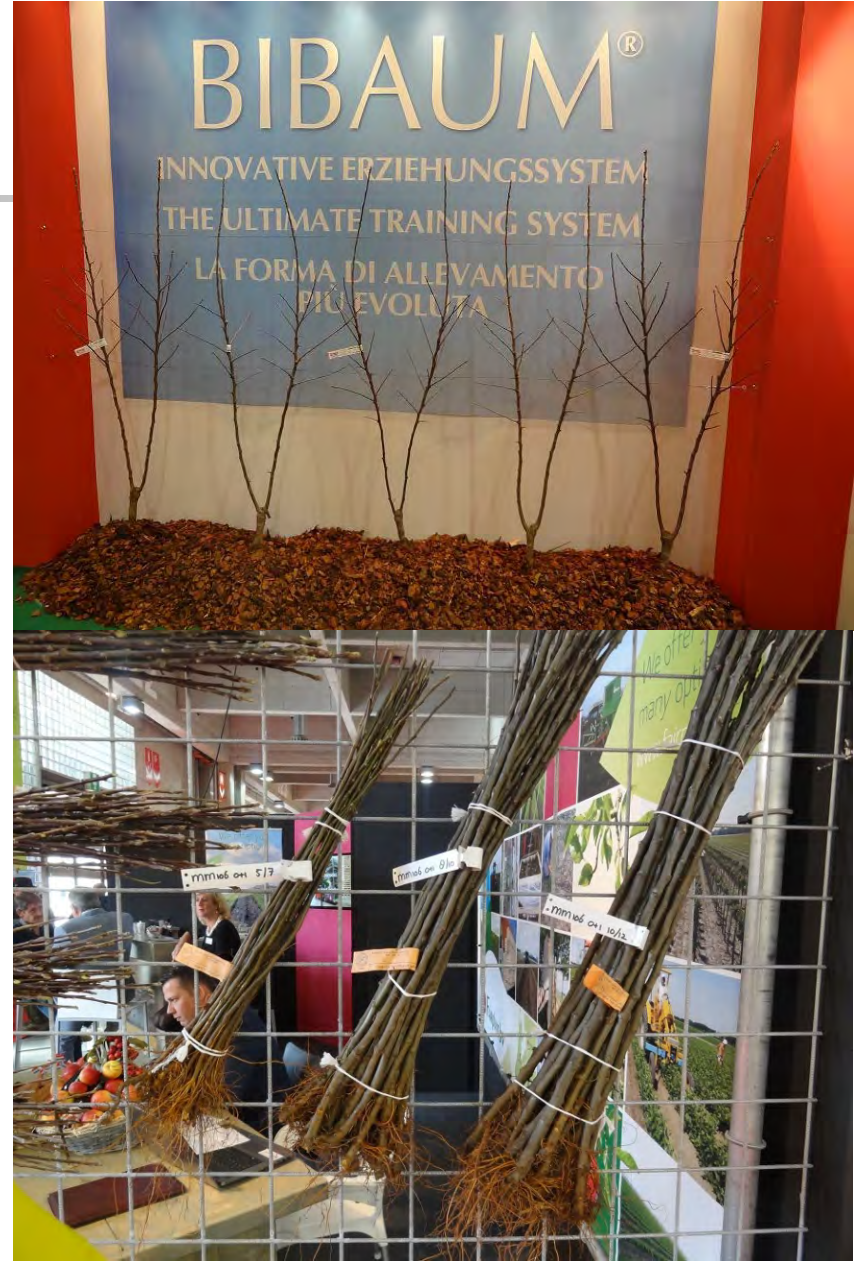
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20 - 22 Novembre 2014

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 DINAMIKUS LÉSTER SZÁRMAZSÁGÚ FRUIT CONTROL
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 DE DYNAMISCHE ATMOSFERE VAN FRUIT CONTROL
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Interpoma 2014: a fruitful success



- *The success of Interpoma 2014 confirms Trentino-South Tyrol as the homeland of the apple.*
- *Almost 18,000 sector operators visited Interpoma 2014,*
- *Causing the ninth edition of this event to notch up a 12.5% increase in attendance.*
- 423 exhibiting companies from 20 different nations, plus 17,974 visitors from over 70 countries
- Three quarters of the visitors come from outside South Tyrol, with a large proportion coming from all over Europe - especially from Eastern Europe Serbia, Moldavia and Poland – and from over 70 nations worldwide, including: Afghanistan, Algeria, Argentina, Australia, Azerbaijan, Bangladesh, Belarus, Brazil, Canada, Chile, China, South Korea, Egypt, Ecuador, Georgia, Jordan, Japan, Haiti, India, Iran, Israel, Kazakhstan, Lebanon, Libya, Morocco, Mexico, New Zealand, Pakistan, Peru, Russia, South Africa, Tunisia, Turkey Ukraine, Uruguay, Uzbekistan and the USA”, states **Reinhold Marsoner**, the Director of the Fiera Bolzano Exhibition Centre.

Interpoma Study Tours



- ✓ Visit to South Tyrol area Apple Orchards on M9 rootstock.
- Orchard management
 - ❑ Plants per hectare 2500
 - ❑ Hand pruning in winter 90 hours 3 workers
 - ❑ Thinning, flower by chemical & hand in June, 80 hours/h.
 - ❑ Growth regulators used to reduce excessive vegetative growth, to modify tree form or to initiate fruiting, depend on the varieties.
 - ❑ Age of tree on M9 from 25-30 years





Visit of Consortium



**HAUPTSITZ
SEDE**



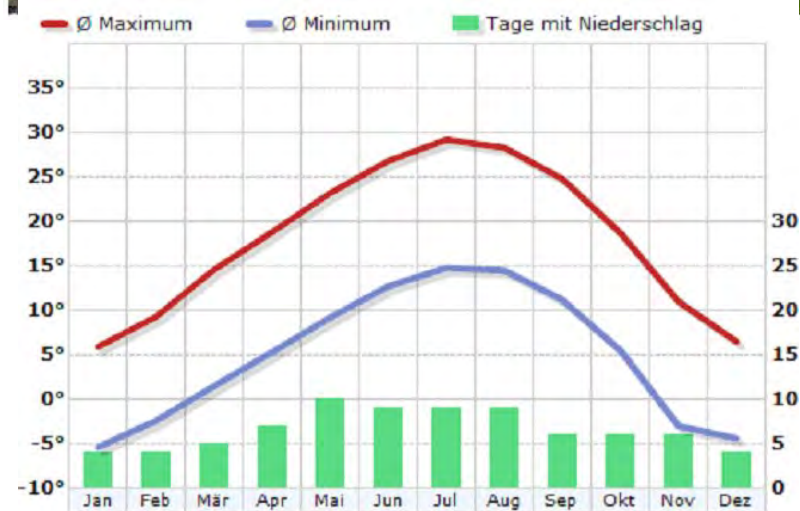
Apple production in South Tyrol and the South Tyrolean Extension Service for Fruit & Winegrowing



South Tyrol is Italy's northernmost province and forms together with Trentino.

South Tyrol:

- Area: 7,400 km²
- Population: 515,714 (2013)
- Capital: Bozen/Bolzano
- Official languages:
 - German (69%)
 - Italian (26.5%)
 - Ladin (4.5%)
- Average precipitation 800 mm/year
- Average temperature 11°C



Agriculture in South Tyrol



➤ 5% of South Tyrolean working population is employed in the agricultural sector mainly on apples, wine & dairy production

Apple production in South Tyrol

- About 18,400 ha apple production
- Between 200 and 1,200 m above sea level
- About 8,000 family owned farms
- Average farmsize 2.5-3 ha



Apple production in South Tyrol



- Organization in coops two umbrella organizations



16 member-coops with 5,200 growers



7 member-coops with 1,750 growers

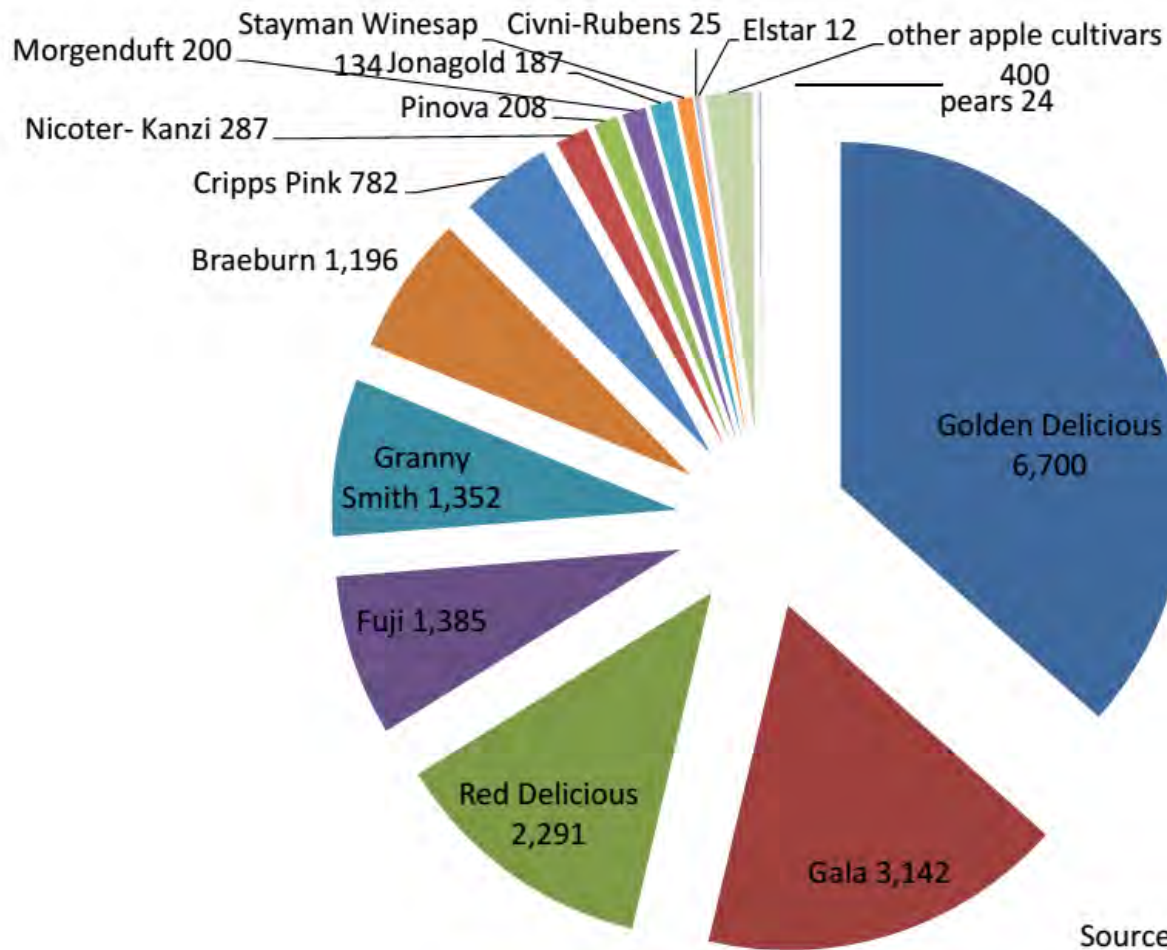


94% Auctioning (6%)

- IPM ~ 92 %
- Organic ~ 6 %
- Conventional ~2 % (estimation)
- IPM production in South Tyrol
 - 50% of the Italian production
 - 10% of the total EU production
- Organic production in South Tyrol
 - 40% of the organic EU production



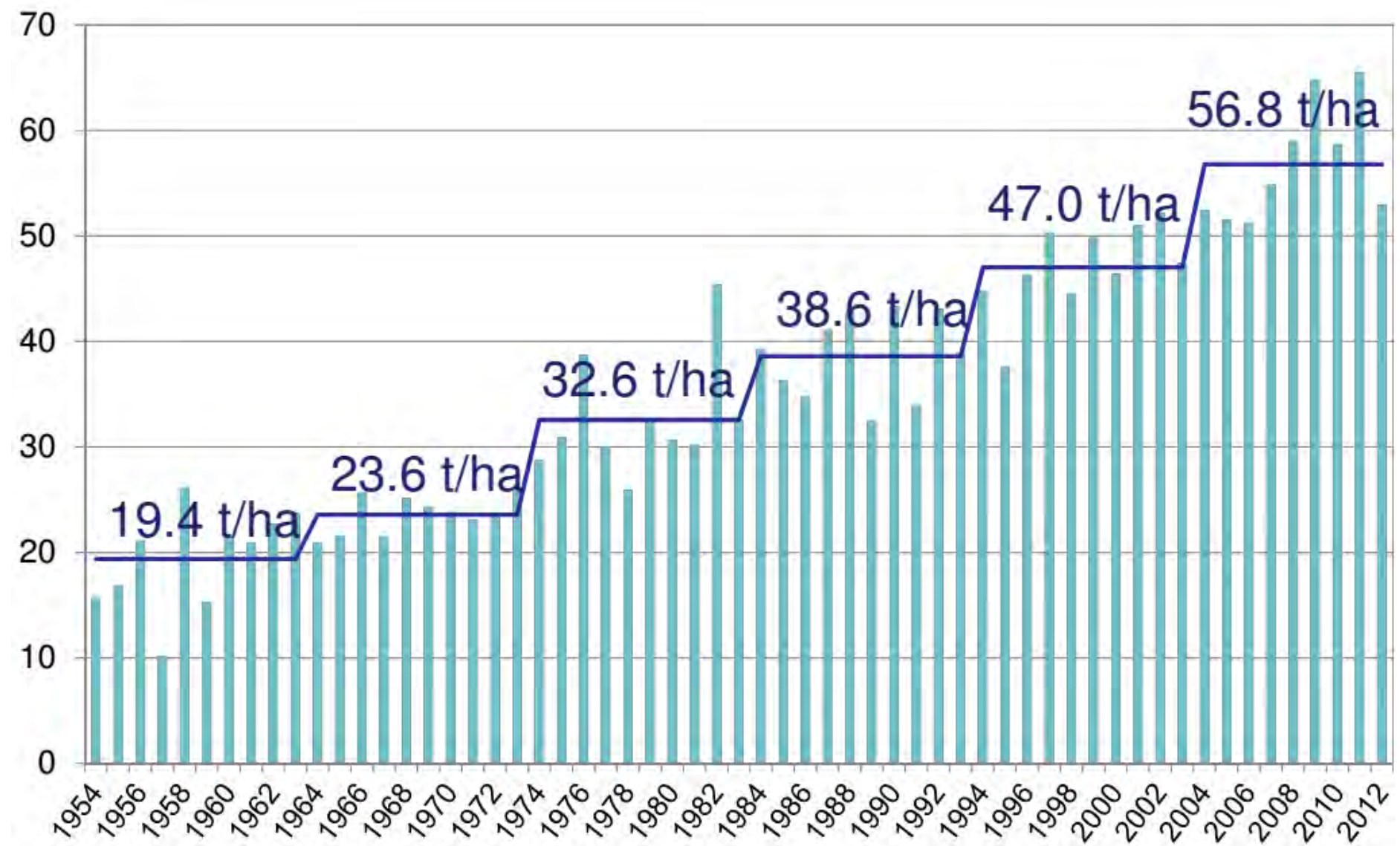
Cultivated area (hectare) & Varieties in 2013



Total: 18,325.8 ha

Source: „Agrar- und Forstbericht 2013“

Business management: yield/ha



Business management: Working hours per 1 hectare apple growing area



Maintenance measure	hours
Harvest	337
Hand thinning	85
Pruning	80
Transport to packing house	33
Spraying	30
Tying and formation	15
Mulching	11
Herbicide application	6
Dispenser application	5
Pest control	5
Irrigation	5
Fertigation	4
others	27
Total	643



The South Tyrolean Extension service for fruit & winegrowing



- Private extension service
- Consulting for apple-, grapevine-, apricot & cherry producers
- Consulting for integrated & organic production
- More than 50 years of experience

Services: Individual & group Consulting

- Planning of new orchards
- In-field inspection
- Telephone consulting
- Group meetings combined with field inspections in more than 100 towns
- Organization of conferences, workshops, seminars & study trips
- Written information...
- Web services...



Visit of The



mi piace di più!

Consortium



Melinda is an organization of producers whose vital structure is made up of member farmers.

- ☐ 6500 h orchards & 4000 families
- ☐ Production 400000 tones in 2014
- ☐ First brand in Italy-1989, third most noun brand in Italy & first in mountain
- ☐ 75% product consumed in Italy 25% are exporting more then 33 countries.
- ☐ 70% G. delicious, 10% Red delicious, 8% Reinette, 5% gala & 6% is Fuji.
- ☐ Harvesting- only gala & Fuji are harvesting in 2 times
- ☐ Capacity of storage is equal to production.
- ☐ Employee –1150, 850 women, 7 packing Dep.
- ☐ 60000 packages/day- 300 tones
- ☐ Total investment 60 Million Euro, income/year around 260 Million Euro 50-55 sent/ kg to farmers.

✓ **Certification**

- All Farmers concerns 100% have been awarded Global –Gap Certificate and all of them respect the rules.





Visit to SFT Consortium



- Established in 2011
- Capacity 30000 Tones
- Members 500 farmers
- Production Area 400 hectare
- Total investment 30 Millions Euro
- ✓ **Yield of apple in the area/ hectare:**
- Gala 30 - 40 Tones/h
- G. Delicious & Red delicious 50 – 60 Tones/h







Visit to TABARELLI VIVAI Company of Certified Sapling Production in VERONA



- Cultivated land only nurseries 65 hectares among this 10h stoolbeds produce 2 million rootstocks/year.
- Main rootstocks use for apple M9 around 90%
- Mother stock – two private MSNs of the Co.
- Certification system is monitoring & under control of local Government,
- recent released Varieties are under process of certification.
- MSN of rootstocks & stoolbeds are certifying at the beginning before planting.
- Rooting in stoolbeds is 92% depend on the weather hot & humid season is the best.
- Certified saplings production 500,000/year







Video of stoolbeds Management

Thank you



First Mission Report of Marketing Strategies and Capacity building



Submitted to

HPS Project
Kabul, Afghanistan

Prepared By

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December 2014

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Executive Summary

Support to the Development of Perennial Horticulture Private Sector (HPS) is a European Union Supported project and jointly implemented by Afghanistan National Horticulture Development Organization (ANHDO) and Relief International (RI) in Afghanistan. The project has 4 Strategic Objectives (SO) and this mission is part of SO3, providing guidance to market driven value chain development for Afghan fresh (grapes), dried (raisin) and nuts (almond) products.

a) Grapes and Raisin

An estimated 350,000 farmers are producing grapes, planted approximately 60,000 ha land, and total production was 610,570MT during 2013-14. Usually 50-60% harvested grapes are sold as fresh and rest 40-50% processed as raisin. It is estimated that 70,000MT of raisins were produced in 2013.

Green raisins are dried in shaded, ventilated houses (Kishmish Khanas), while red, black and yellow raisins are sun dried (yellow raisin first sulfur applying and then put under sun) on rooftops and on the ground. Application of potassium carbonate prior to drying dramatically reduce drying period. After the drying process, raisins are swept up from the ground and bagged. The final product contains 12 to 13 percent moisture. Standard grape to raisin conversion ratio is 7 kg of fresh grapes that harvest early stage and gives 1.5 kg raisin and ripe one gives 3 kg of raisin.

Immature grapes, improper drying methods, poor quality of fresh grapes, improper harvesting techniques of fresh grapes make the raisin sub-standards quality, poor packaging, poor storing and transportation system also could not attract high end buyer or export. Absence of refrigerated carrier, improper packaging and freight forwarding system also restrict export business of both grapes and raisins. It also increases wastages to 30-40% of grapes at different stages of handling.

The three largest producers in 2012 were China (15%), the United States (10%), and Italy (9%). China's share of global grape production is increasing on a yearly basis, up nearly a percentage point from 2011. In 2012, Afghanistan's grape production was estimated to be nearly 600,000MT or 1% of global production.

Almond

Afghanistan is the eighth largest producer of Almond and 4% of global production (2 million MT in 2012). Almonds are generally transported in bulk bags to major trading hubs, as well as during export. According to Afghan Statistics - CSO, in 2012 1,125MT of shelled almond were exported, 287MT of soft-shelled almond were exported in-shell, and 560MT of hard-shelled almond were exported in-shell. The total value of all almond exports was US\$11.6m.

b) Post-harvest activities

Post-harvest activities (sorting, cleaning, grading, packaging, storage and transportation) still offer large areas for improvement. The majority of storage facilities are sub-standard. Sorting, grading, cleaning and packaging remain rudimentary. Packaging does not meet food-grade international standards. The lack of sorting/grading requires re-sorting and repackaging for retail at destination or transit markets. Transportation essentially takes place by truck. There are only a handful of refrigerated trucks in the country.

c) Current Marketing Status in Fresh, Dried Fruits and Nuts Product Value Chains in Afghanistan

Both fresh and dry fruits are following common marketing chain involving middlemen at the local level, traders at the provincial or regional centers who then sell to wholesalers, and other traders and wholesalers in other regional and foreign wholesale markets.

d) Identified Constraints in the market chain:

Afghanistan is a land locked country; geographically it is a barrier to transport to foreign destination. Some other problems are given below (not limited).

- Lack of trustworthy relationship within the VC actors restrict long time business and reduces export and local market as well.
- Lack of post harvest management skills, facilities access to appropriate technologies which leads to unsold products (fresh grapes) and decreases their income.
- Inadequate and inappropriate packaging materials, systems could not attract buyers and retain shelf life longer both in fresh and dry fruits export.
- Inadequate refrigerated transportation facilities and lack of storage hamper fresh fruit business that increases wastages and reduce income.

e) Marketing Strategy for each of the key products including a breakdown in domestic, regional and international markets as well as a short/medium/long term analysis

- **Short Term Strategy for domestic market**

- i. Strengthen local level market service (quality assured traders) provision in the market chain
 - Capacity building of Local Market Service Providers (Quality Assured Local Traders) through processors and large traders
 - Establish partnership with private companies to improve post harvest management technologies in practice
- ii. Strengthen associations and capacity building of them institutionally and technically is required.
 - Capacity building on quality compliance issues, certification system would also be considered.
 - Linkage with the producer's local level traders (LSP), producer groups and their capacity would be facilitated by the association.
- iii. Facilitate group sales and purchase to ensure next level market
- iv. Contract farming arrangement with processors and institutional markets- Product and location specific contract farming system should be established to ensure continuous, consequent and planned production.
- v. Improvements of Packaging system and appropriate post harvest management – Sorting, grading, packaging, handling and overall post harvest management should be improved.

- **Medium Term Strategy – Regional and International**

- i. Create Afghan Brand - Appropriate advocacy and awareness initiatives has to be undertaken in-consultation with MAIL, EPAA, ACCI, Associations, certification agencies, traders and exporters for creation of a country level branding.
- ii. Capacity building of the selected processors
 - Linkage with producer groups, traders and smooth procurement through contract farming
 - Capacity building of the post harvest management and product development
 - Establishment of showcase of hygiene in the processing factories
 - Capacity building on quality compliances and certifications
 - Facilitate standards of transportation and storage
- iii. Establishment of Standards and certification system – HACCP, GlobalGAP, ISO, Traceability etc. Accessing regional and international markets require complying international standards.
- iv. Proper Handling and Transportation
 - Maintaining cool chain is necessary for fresh fruits in every steps of the transportation, finding business effective routes also necessary.
- v. Business delegation to the target markets and trade fair participation
 - Rapid market assessment
 - Explore new markets domestic, regional, international
 - Competitor's analysis and find competitive advantages
 - MoU with importers, associations, and others

- **Long Time Strategy**

- Create Afghan brand
- Advocacy of Export friendly rules, regulations and policies with target export countries
- Strengthen Export processing zone
- Quality Assurance scheme - Adoption of International Quality Standards and Control System, e.g. Global GAP, Traceability, HACCP, etc.
- Development of Contract Farming system
- Streamline with certified sampling, certified orchard, good processing and traceability
- Installation of standard storage facilities and maintain cool chain

f) Development of Capacity Building material & tools used for focused training activities on Agro-product marketing for producers, processors, traders, wholesalers and exporters;

Comprehensive secondary literature studies, key stakeholder's interview and need assessment were carried out during the mission and capacity building tools (training materials, value chain analysis and strategies for market development) were developed.

g) Developed Questionnaire to assess the Import Policy of main regional and international countries importing Afghan goods:

A numbers of questionnaire and tools has been developed in the view of market expansion and import policies of the import countries as below:

- Questionnaire for Importers
- Questionnaire for Exporters
- Questionnaires for Government officers in Importing countries

h) Marketing initiatives

i. for the domestic market

- Capacity building of the producer groups (institutional and technical), e.g. group management, group culture, group building and growth
- Capacity building of the producer groups on proper harvesting, post harvest and packaging and group activities (sales, marketing)
- Capacity building of the local traders (LSP) on quality issues, service provision and market linkages
- Facilitate and market linkage with large traders, wholesalers with local traders and producers groups with appropriate follow-up
- Facilitate on proper packaging and transportation (refrigerated and cool chain) of fruits in traders level
- Strengthening Associations – technical, intuitional and service delivery
- Contract farming arrangement with processors and institutional markets

ii. List of Midterm Initiatives

- Capacity building (strengthen) of the associations of office management, service delivery, and organizational development
- Capacity building of the associations on sales, marketing and market chain (VC) including export market
- Capacity building on post harvest management and packaging of exporters , wholesalers and association members
- Capacity building of the exporters on export readiness
- Facilitate to create contract farming system with producer groups, processors, exporters, or large traders
- Facilitate to participate in trade fairs, delegation, market assessment and linkage to importing countries
- Facilitate to improve cool chain especially in refrigerated transportation to target destination (ports)
- Capacity building on market assessment and entrance into new markets (regionally)
- Facilitate to create own and Afghan brand
- Strengthen quality certification systems and authorization of international standards (recognition of international standards)
- Establishment of showcase of hygiene in the processing factories
- Facilitate standards of transportation and storage

iii. List of Potential Long Time Marketing Initiatives

- Capacity building of the certification agencies on prompt and modern certification system
- Advocacy of export friendly rules, regulations and policies
- Create one Afghan brand through Afghan foreign missions
- Export processing zone - Strengthen Quality Assurance scheme
- Streamline with certified sampling, certified orchard, good processing and traceability
- Create common platform and establishment of e-commerce type interactive web-site

i) Bangladesh Market

Bangladesh is a growing market and large number of population depends on imported fruits from India and China. Afghan products have huge scope to Bangladesh provided freight of the products cost effective.

1. Introduction

Support to the Development of Perennial Horticulture Private Sector (HPS) is a European Union Supported project and jointly implemented by Afghanistan National Horticulture Development Organization (ANHDO) and Relief International (RI) in Afghanistan.

The project has 4 strategic objectives (SO), as part of its (HPS) specific objectives – SO3, with the overall objective “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” Afghan fresh, dried fruits and nut products still provide only a small portion of the local and regional consumers due to the low level of production in Afghanistan. The HPS aims to provide the necessary supports to develop and maintain a concrete market share in a rapidly growing and increasingly sophisticated market.

HPS aims to coordinate with a number of market stakeholders (producers and traders) and implement pilot actions for marketing initiatives in domestic market with traceability, improved quality & packaging and potentially brand name/s. Further marketing initiatives will also take place aiming regional markets (India, Pakistan, central Asia, Russia, UAE) as well as international high value markets (EU and USA) mainly by private sector entrepreneurs. As such this is the first mission of international marketing consultant that would help and guide HPS to develop marketing strategy and mentor the relevant stakeholders and provide them with the technical expertise and inputs required on marketing initiatives.

2. Work Methodologies:

2.1 Work Process

Participatory capacity building strategies were followed to develop marketing strategies that provide them technical expertise and inputs required on marketing initiatives. The activities include secondary review, key stakeholders interview, capacity building training and overall marketing strategic guideline. Brief sectoral assessments were conducted in grapes, raisin and almond on the basis of secondary literature study in the view of value chain based market development.

Following activities and actions were performed during the first mission during November – December 2014 in Afghanistan.

Table 1: First Mission Work Process	
Core Activities	Descriptions
Project understandings	<ul style="list-style-type: none">• Understanding of HPS• Understanding of SO3• Understanding of the role and responsibilities during first mission
Secondary review	<ul style="list-style-type: none">• Secondary literature study and find the sectoral opportunities, constraints and solution• Reviewed the abundant existing relevant literature and perform a basic Survey presenting the current marketing status in fresh fruits (grapes), dried fruits (raisin) and nuts (almond) product value chains in Afghanistan
Meeting key stakeholders	<ul style="list-style-type: none">• Meet with key stakeholders (MAIL, EPAA, ACCI, producers, traders, private entrepreneurs, traders Association, traders, processors, packaging suppliers, exporters etc.) and develop an understanding of the current marketing status and capacities in Afghanistan
Field Visits	<ul style="list-style-type: none">• Field visits to understand producers perspective, marketing dynamics, local traders views, post harvest management and marketing issues and meeting with the producer groups• Assessed the current domestic marketing levels & trends in Afghanistan (Kabul & other urban areas) and familiarize with the current national marketing status.

Table 1: First Mission Work Process	
Core Activities	Descriptions
	<ul style="list-style-type: none"> Visit wholesale market in Kabul
ToT	<ul style="list-style-type: none"> Developed and conducted capacity building trainings on Agro-product marketing for MAIL, producers, processors, traders, wholesalers and exporters
Value Chain Analysis	<ul style="list-style-type: none"> Grapes, Raisin and Almonds VC analysis Identify key constraints in each value chain and propose potential ways to overcome them
Market Assessment tools development	<ul style="list-style-type: none"> Develop a Questionnaire to be used as a tool to obtain information and analyze the existing Import Policy of main regional and international markets (Russia, Iran etc.). Propose and mentor the implementation of focused SO3 Study Tours to these countries to obtain the data. Analyze and produce the existing Import Policies for such countries including recommendations for improvement in the related value chains aiming to enhance Afghan exports to them.
Develop Marketing strategies / initiatives	<ul style="list-style-type: none"> Developed a Strategy for pilot marketing initiatives for each of the value chains and key products including a breakdown in domestic, regional and international markets as well as a short/medium/long term analysis.
Develop Marketing Initiatives	<ul style="list-style-type: none"> Identify specific short term marketing initiatives and interventions for the domestic market for improved packaging and propose a list of potential brand name/s.
	<ul style="list-style-type: none"> Identify potential medium term marketing initiatives for the regional market accordingly. Identify potential long term marketing initiatives for the international high value markets.
Market Feasibility study in Bangladesh	<ul style="list-style-type: none"> Short market survey Interview with importers, wholesalers, freight forwarders Air freight charter agencies Customs and relevant government agencies

2.2 Secondary Literature Review

Reviewed the abundant existing relevant secondary literature and understand current marketing status in fresh fruits (grape), dried fruits (raisin) and nuts (almond) product value chains in Afghanistan.

2.3 Stakeholders Assessment (Meet with key stakeholders)

Meet with key stakeholders (producers, traders, private entrepreneurs) and develop an understanding of the current marketing status and capacities in Afghanistan. Following stakeholders were visited during first visit to Afghanistan:

Table 2: Types of Stakeholders Met		
Sl. #	Types of Stakeholders	# of persons
	<ul style="list-style-type: none"> MAIL / Horticulture Department 	2
	<ul style="list-style-type: none"> Kabul Dry Fruit Market 	8
	<ul style="list-style-type: none"> Kabul Dry and Fresh Fruit Market 	7
	<ul style="list-style-type: none"> Kabul Fresh fruit market 	10
	<ul style="list-style-type: none"> Traders Association (Kabul Dried Fruit Association) 	5
	<ul style="list-style-type: none"> Producers Groups (3 groups, 1 Raisin, 1 Grapes, 1 Prune) 	15
	<ul style="list-style-type: none"> EPAA (Marketing Manager, Khalid Tayeb) 	1
	<ul style="list-style-type: none"> Processors (2) 	2
	<ul style="list-style-type: none"> Custom Dept 	1
	<ul style="list-style-type: none"> Packaging Companies (Plastic Crates , Bahir Packaging) 	1

Deliverables -1 : A basic Survey presenting the current marketing status in key fresh, dried fruits and nuts product value chains in Afghanistan

3. Brief on Selected Fruits Value Chain

3.1 Grapes and Raisin sector

3.1.1 Scenario of Grapes and Raisin

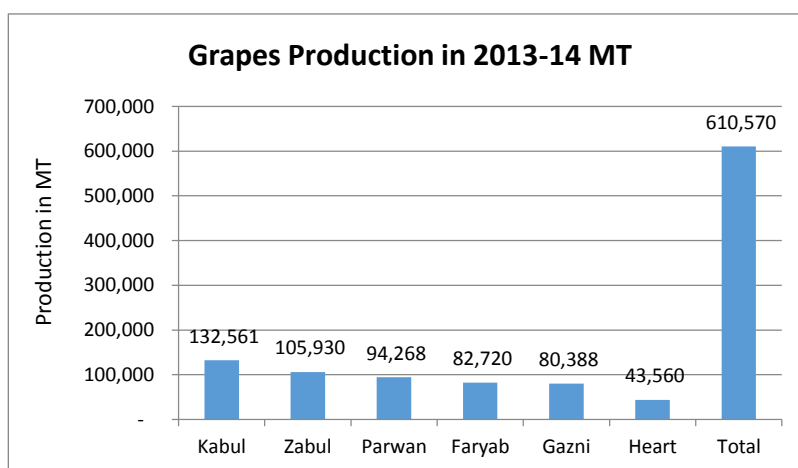
Grape is a traditional high value cash-crop in Afghanistan and is the largest fresh fruit commodity by production. An estimated 350,000 farmers in Afghanistan produce grapes, planted over approximately 60,000 ha, and total production in 2013-14 was total production of nearly 610570MT.

Different research and study findings show that farmers dried an average of 40-50% of their grape harvest into raisins in 2012-2013 after selling (50-60% fresh grape) the first grade of grapes. Therefore, an estimated 70,000MT of raisins were produced in 2013-14.

Total grape production has been reported by the Central Statistics Organization of Afghanistan as totaling 590,000 MT in 2012/13 and estimated at 610,570 MT in 2013/14. Using the standard grape to raisin conversion ratio of 450 kilograms (kg) of grapes to produce 110 kg of raisins, an estimated 274800 MT of grapes will be used for raisin production during MY 2014/15, yielding about 70,000 MT of raisins. The drying process in Afghanistan is carried out two ways: sun drying and shade drying. Green raisins are dried in shaded, ventilated houses (Kishmish Khanas), while red, black and yellow raisins are sun dried on rooftops and the ground. After the drying process, raisins are swept up from the ground and bagged. The final product has a moisture content about to 13 percent¹. (if give reference to the source of information will strengthen the report)

Absence of modern cultivation practices and processing still hamper the development of the sector, as fresh grape exports cannot be maximized due to its shorter shelf life (4-5 days once picked). Moreover, Afghan raisins are well received in neighboring countries, but sub-standard food safety measures limit exports sent to developed countries such as the EU-28 and North America.

The traditional earth-trellised vineyard system, whereby farmers grow the crop on mud walls, is the main grape production system in Afghanistan. The establishment of the vines on mud trellises takes four years, after which production will be largely the same. This production system is used because it is cheap and it is believed to protect the grapes from the heat and wind. Mostly, however, it is used because farmers are uneducated regarding modern methods. Grape vines require 5 years to reach full production potential, after which they produce for more than 30 years.



Graph 1: Grapes Production in Afghanistan during 2013-14

¹ Afghanistan Horticulture Sector Review, Altai Consulting for World Bank , June 2014

Table 3: Major Fruit Production and Area in Kabul, Parwan and Kapisa project area							
Year	Province	Almond		Pomegranate		Grape	
		Area (Ha)	Pdt (MT)	Area (Ha)	Pdt (MT)	Area (Ha)	Pdt (MT)
1390	Kabul	95	428	121	847	13361	106888
	Kapisa	190	855	400	2800	250	200
	Parwan	280	1260	100	700	9500	76000
1391	Kabul	99	455	121	892	13390	128075
	Kapisa	190	873	400	2948	258	2468
	Parwan	280	1287	100	737	9522	91078
1392	Kabul	99	296	121	847	13390	132561
	Kapisa	190	568	400	3000	258	2554
	Parwan	280	837	100	650	9522	94268

Table 4: **Major Fruit Production Area All over Afghanistan**

Year	Province	Almond		Apple		Pomegranate		Grape	
		Area (Ha)	Pdt (MT)	Area (Ha)	Pdt (MT)	Area (Ha)	Pdt (MT)	Area (Ha)	Pdt (MT)
1390	All	13469	60611	8863	62041	8413	58891	61558	492464
1391	All	13490	62000	9148	70000	8413	61995	61690	590065
1392	All	14114	42215	10341	78591.6	8450	63291.9	62118	610568

Table 5: **Areas of Fruit Cultivation (ha) in Afghanistan**

Fruits	2013-14	2012-13	2011-12
Grape	62,118	61,690	61,558
Almond	14,114	13,490	13,469
Walnut	23,17	2,317	2,317
Apple	10,341	9,148	8,863
Apricot	9,005	8,350	8,320
Fig	2,056	2,056	2,056
Total Fruit	158,913	164,867	166,538

Table 6: **Fruit Clusters in Afghanistan**

Name Fruits	Clusters of production
Peaches	Kandahar, Parwan, Heart, Kabul, Takhar
Almond	Zabul, Samangan, Badakhshan, Takhar, Gazni
Pomegranate	Kandahar, Balk, Samangan, Heart, Kapisa
Apple	Wardak, Kabul, Logar, Kandahar, Gazni
Grape	Kabul, Zabul, Parwan, Faryab, Gazni

Table 7: **Grapes harvest Season in Afghanistan**

Harvest season of grapes in Afghanistan												
Lean Period					Peak Period							
Afghanistan	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

Table 8: **Grapes harvest Season in India**

Harvest season of grapes in India												
Lean Period					Peak Period							
States	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Maharashtra												
Karnataka												
Andhra Pradesh												
Tamil Nadu												
Punjab												
Haryana												

Source: Indian Horticulture Database, <http://apeda.gov.in/agriexchange/market%20profile/one/grapes.aspx>

3.1.2 Raisin Processing Industry:

Most factories operating today use processing equipment that is more than 40 years old and antiquated packaging techniques. Currently, raisin-processing factories only process red raisins for commercial export to regional markets. Raisins exported to Pakistan or the United Arab Emirates (U.A.E.), or Russia are not going through commercial processing in Afghanistan but are instead processed in Pakistan or the U.A.E. for exporting to third countries. In Afghanistan, generally a farmer will sell 30-40% of their harvest as fresh produce and dry another 30-40% in a drying hut known as kishmish khana. Kishmish are raisins produced in a kishmish khana. The remaining 20-40% is of lower quality or damaged, and is reserved for aftabi production. Although as aforementioned, on average 50% of grapes were dried into raisins in 2012-2013 due to a decrease in fresh grape exports to Pakistan and India.

As per stakeholders interview there is one modern raisin-processing factory in Afghanistan, which has modern raisin processing equipment. Processing includes washing the raisins twice, passing them through a scanner where waste (stems and foreign matter) is removed. After being sorted by hand, they pass through an X-ray machine before being sprayed with paraffin for being packed in boxes for export. This type of processing produces raisins that are exported to Russia, the Middle East and the European Union

One of the major constraints facing the Afghan raisin industry is the drying process as it predominately occurs in conditions that produce raisins not suitable for export to countries with high food safety standards. Green raisins are produced in Kishmish Khana, a mudroom built from mud bricks and wood sticks. The grapes are placed in the Kishmish Khana for one month to shade dry. Green raisins are rarely processed further and are mostly exported without processing to Pakistan and India. Red raisins are produced from grapes that are left over after fresh grapes are exported or shade dried.

Red raisins, which have a greater export market value, are produced after fresh grapes and shade dried raisins. Afghan farmers prefer to sell fresh grapes and shade dried raisins first because they are easily sold on the domestic market. Aftabi raisins are dried in minimal space without a protective mat or sheet and are often mixed with dust to reduce the drying period. These drying techniques result in poor quality raisins that cannot compete on the global market. These types of raisins often need double washing to make them competitive in countries with high food safety standards. The quality of Kishmish (green raisins) can be improved if the grapes are washed before shade drying and having proper ventilation. The quantity of green raisins can be increased by reducing the drying period and using chemical solutions.

Raisin producers are growing Kishmeshi variety of grapes for raisin production and it is a dominant grape variety for raisin production in Shamali plain. The average yield of Kishmeshi grape is 3.873MT per Jerib. 90% of Shondukhani grape variety mainly uses for table purpose and it is not important grape variety for making raisin in Shamali plain. Taifi and Hussaini are the most popular grape varieties for table purpose.

Grape growers are not able to establish trellis for their vines because of more costs, lack of technical experience on trellis establishment and no access to equipments and tools.

It was found that at farm level the losses of fresh grape and raisin are 32 % and 17% respectively due to improper harvesting and drying methods. Therefore, support to grape growers regarding harvesting tools, post harvest management, raisin drying methods and packages are recommended.

Approximately 1.5 kg raisin is produced from 7kg fresh grapes harvested in early Sunbula (September) and the recovery is double (3kg) if harvested in late Mezan (October). Based on these results, mature grapes are recommended for raisin production.

The green raisin is usually drying in the Kishmesh khana. Kishmesh Khana is a simple mud-brick structure. Kishmesh needs about one month to dry in the Kishmesh Khana. Application of potassium carbonate prior to drying dramatically reduce drying period.

Immature grapes (early harvesting of grapes), improper drying methods (drying on bare land), poor quality of fresh grapes, improper harvesting techniques of fresh grapes make the raisin sub-standards quality, Poor packaging, storing and transportation system did not attract high end buyer or export. Absence of refrigerated carrier, improper packaging and freight forwarding system also restrict export business of both grapes and raisins. It also increases wastages to 30-40% of grapes at different stages of handling.

In major grape exporting countries, it is common for grapes to be taken to a pack house for final sorting, grading and packing after the initial field sorting. This is an embryonic industry in Afghanistan

In the pack house, grapes being graded according to the main market variables e.g. Cultivar, sugar level (Brix level), color and color variation, berry size and size variation, bunch shape, and mass. Pakistani and Indian markets prefer top grade Shindul Khani: yellow berries, to be: 1.8-2.4 cm, bunch 25-30 cm, sugar 25%; and for Kishmishi: yellow berries, to be: 1.1-1.4cm, bunch 20-24cm, sugar 25%. The grader will clip the bunch of grapes with scissors to remove grapes which do not conform to these specifications (i.e. misshapen, diseased, undersized). They are then passed to the packer². (reference that info got from)

Post-processing for raisins in Afghanistan is rare. If a customer requires some sort of cleaning or sorting, the trader will employ temporary laborers to sieve and hand sort the raisins on the roof of his store. He may use a fan to assist in the sieving process. The grapes are rarely washed with water by traders.

Industrial cleaning, sorting and packaging are only carried out for a limited amount of raisins. The majority of raisins which are cleaned are aftabi, as kishmish from the kishmish khana are much cleaner. Raisins are generally not cleaned for the major markets in Pakistan, Dubai and India as the raisins are double-washed at these destinations.

In the factories grapes are winnowed, destalked, washed and sprayed with liquid paraffin or seed oil to prevent clumping. After the mechanical processing they are often re-dried for a few hours in the sun to remove residual moisture from the washing, then hand sorted and boxed for export.

The old machinery does not often meet the standards of more sophisticated markets. Receiving EU certification for Afghan raisins raises some clear challenges. Turkey is often quoted as a primary source by European importers because of the high quality of its machinery and its focus on quality control. In Turkey, raisins for export are often sorted by laser that is able to inspect quality and detect traces of metal.

Table 9: Raisin Specification for Export

Raisin Specification³		
Specifications	Tolerance	Methods
Moisture	16-18%	Moisture meter
Stems	1 per 120 pounds	Visual
Capstems	15 per pound	Visual
Defects	Grade B or Better	As per standards by buyer
Size	60% maximum pass through holes 22/64 diameter 10% maximum pass through 20/64 diameter	% by weight
Berry count range	800-1200 / pound	Visual
Aflatoxin	No	
Yeast	≤10,000 cfu/g	
Mold	≤10,000 cfu/g	
TPC	≤20000 cfu/g	

² Afghanistan Horticulture Sector Review, Altai Consulting for World Bank , June 2014

³ Sun-Maid Standard Size California Natural Seedless Raisins

3.1.3 Packaging and handling

3.1.3.1 Grapes

In Afghanistan, grape packaging and handling is rudimentary. The primary concern for producers or wholesalers is to pack as many grapes into the container as possible rather than protecting the fruit.

At the farm, grapes are picked and often placed directly in a cardboard or wooden box, typically 7 kg and 14 kg respectively. A few bunches of better quality grapes are put at the top of the box, in attempt to show the box is of good overall quality, and then the box is loaded on the truck and sent to the market and then typically exported to Pakistan. The wooden box is traditional, but the branded cardboard box is becoming increasingly popular. Grapes are also sometimes placed into a plastic bag of around 7 kg and transferred to the market or side of the road for domestic sales. Grapes can be piled into a heap in the middle of the farm, so people bring their own containers to take away the volume they want.

Typically the cardboard or wooden boxes are overfilled so the grapes are crushed during transport. This is a prime condition for botrytis cinerea to form and rot the grapes.

In countries where grapes are exported to discerning Western markets, packaging and handling is much more regulated than in Afghanistan. After grading in the pack house, the grapes are weighed. Often 2% extra by weight is added to counteract transpiration during transportation. The packer will place the grapes in the box, add any absorbent and sulfur sheets required (to protect against postharvest fungus), close the box and label it, before it is passed on to logistics. As far as we are aware, there are not currently any grape packaging processes up to this standard in Afghanistan.

Once the product exits the pack house and arrives at the final retail destination, the grapes must be rapidly chilled (to combat botrytis cinerea as much as possible) and then kept under chilled conditions in both transportation and storage. In June 2006 RAMP installed 21 cold stores in 10 provinces. RAMP estimated that 30% of fresh fruit in Afghanistan is lost due to lack of cold storage on the receiving end. The current status of these cold storage facilities is unknown, but they are thought to be largely unused or even not operational.

3.1.3.2 Raisins

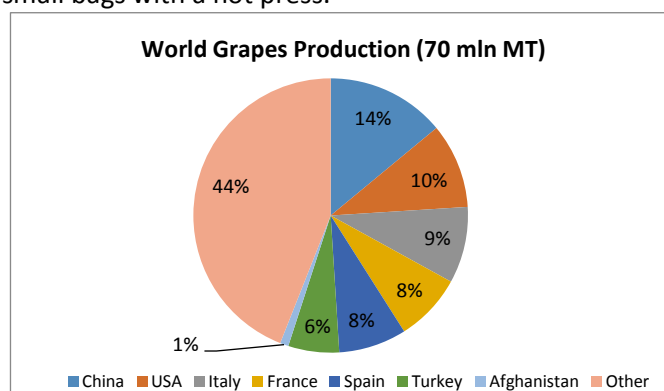
Raisins processed by kishmishpaki (raisin processing factory) are most often brought into the factory in sacks, and delivered back to the trader in 12 kg cardboard boxes. The cardboard boxes vary according to customer requirements in terms of strength, labeling and color of printing. Russian export boxes are typically single color printing and weak corrugated card, while Middle Eastern and European boxes are stronger and often laminated corrugated cardboard which allows full color printing. Depending on the customer, the raisins can first be packed in plastic wrapping.

Raisins destined for wholesale are transported in sacks, and often displayed in large bins for the shopkeepers to purchase in whatever quantity/container they desire. One trader in Kandahar was packing his sieve and fan cleaned raisins in 250 g plastic bags, before packing these into 10 kg boxes ready for export to Pakistan, India, and sometimes to Dubai. The trader pays approximately \$0.03 per 250 g bag, and \$2 for the 10 kg cardboard box. The trader seals the small bags with a hot press.

3.1.4 Global Scenario

The three largest producers in 2012 were China (15%), the United States (10%), and Italy (9%). China's share of global grape production is increasing on a yearly basis, up nearly a percentage point from 2011. In 2012, Afghanistan's grape production was estimated to be nearly 600,000MT or 1% of global production.

Global trade is approximately 5% of global



Graph 2: World Grapes Production

production, estimated to be more than 3.5mln MT. Most of the largest producing countries produce grapes for domestic purposes. Italy exports approximately 8% of total production, followed by the United States (6%), and China (1%). The total trade value of fresh grapes is estimated to be over \$6.5 billion. Furthermore, global raisin production is estimated to be more than 1.1m MT, with global exports of more than 800,000MT. The total trade value of raisins is \$1.9 billion. The total trade value of grapes and grape products such as juice is nearing \$10 billion.

Table 10: Afghanistan Export Statistics: 080620, Grapes, Dried (Marketing Year: October/September)						
Partner Country	Unit	MY 2010/11	MY 2011/12	MY 2012/13	7 months Oct-Apr 2012/13	7 months Oct-Apr 2013/14
Russia	MT	14,309	10,050	8,568	6,815	6,703
India	MT	5,457	7,999	7,484	6,331	9,431
Pakistan*	MT	3,700	2,500	3,000	2,000	2,700
EU-27	MT	4,413	3,167	1,342	877	1,678
USA	MT	268	122	508	388	66
Belarus	MT	1,701	957	737	440	324
Kazakhstan	MT	616	860	343	130	869
Australia	MT	18	20	111	20	283
Ukraine	MT	582	285	390	390	140
Other	MT	330	432	194	88	197
		31,394	26,392	22,677	17,479	22,391

Table 11: Fruits exports from Afghanistan

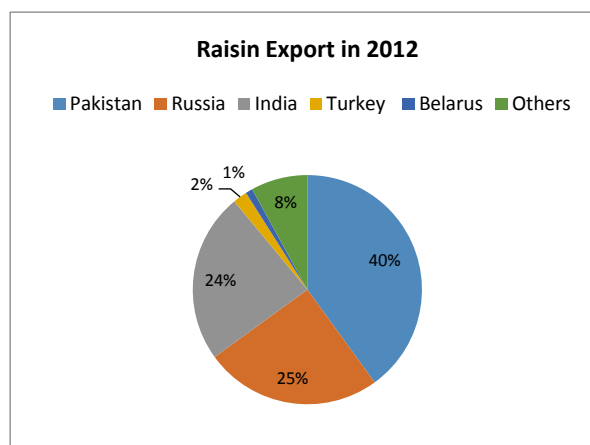
Export in 2013	Official Value		Altai Calculation⁴		Destination
	Volume MT	Value US\$ Million	Volume MT	Value US\$ Million	
Raisin	21142	17.9	35000	140	Pakistan India Russia
Almonds	2949	8	50000	75	India Pakistan Iraq
Pomegranates	8921	4.3	20000	59.6	India Pakistan
Grapes	24710	9.0	25000	15	Pakistan

Source: Altai Study 2014, (Paywand, Comtrade)

3.1.5 Trading systems:

It was found that all the raisin traders purchased the raisins from raisin producers and middlemen and sale to the wholesale market, wholesalers sold in the auction market to the retailers at domestic level. Exporters collected raisin, or grapes from middlemen (traders) pack it and sale to the importers. The average price of red raisin is US\$670-750/MT, and green raisin price is 5-6 times ranges between US\$3500-4300/MT at local level.

The United States, European Union and other destinations with strict standards enforcement are complicated export destinations for Afghan raisins because of poor post harvest management, improper packaging, poor quality and lack of adherence to international food safety standards by processors. However, the implementation of international Codex standards for raisins has increased the ability to market to such places. MY 2012/13, 508 MT were imported to the U.S.; however, in the first three quarters of MY 2013/14 Afghanistan exported only 66 MT. Europe continues to be a growth market, and this market year,



Graph 3: Raisin Export in 2012

⁴ Horticulture Sector Review, Altai Consulting, World Bank 2014

Afghanistan has seen Chile, the Czech Republic and Slovakia increase their imports of Afghan raisins. Kazakhstan is a major market for Afghan raisins, importing 869 MT in the first seven months of MY2013/14. Ukraine imported 390 MT in the same period. Australia has already seen imports of Afghan raisins increase dramatically this market year – from 20.7 MT from October 2012 to April 2013 up to 283 MT in the period from October 2013 to Apr 2014. MY 2014/15 raisin exports at 30,800 MT, a substantial increase from last year based on the expansion of new markets for Afghan raisins in Europe, Australia, Chile and Kazakhstan. Russia and India continue to be top export markets because of regional proximity and because the reputation of high quality raisins.

Another study (Altai 2014) reported that the estimated 70,000MT of raisins produced in 2012, official customs figures state that approximately 21,000MT of raisins were exported, for a total value of \$18m. It was also found that (traders interview) 70% of total trade of dry fruits, including raisins, is transported illegally across the Pakistani border. ComTrade states that Pakistan imported 8,500MT of raisins from Afghanistan in 2012. As such, a fair estimate of total trade volume of raisins is approximately 35,000MT in 2012.

There are no reliable data sources for raisin exports to Pakistan. However, based on estimates from the Afghan Raisin, Fruit and Vegetable Export Promotion Administration (ARF&VEPA) and MAIL's Directorate of Statistics and Market Information, raisins exports to Pakistan can range from 2,000 to 4,000 MT per marketing year. Data from the Central Statistical Organization of the Government of the Islamic Republic of Afghanistan supports exports in that range but is not broken down by month. Illegal exports to Pakistan, which skirt taxes, are a major issue affecting the raisin industry.

Different raisin varieties have different export destinations. Green raisins have a strong market in India and Pakistan, while red raisins are exported to Russia and Eastern Europe. Seedless black raisins from the Sanchark district of Sar-e-pul Province have a strong demand in the United States and Europe.

The grape and raisin marketing chain across Afghanistan is similar to other fresh fruits. Farmers typically sell most of their produce fresh to local traders, collectors or wholesalers. The wholesalers in turn often sell on to another regional wholesaler who is better positioned for larger volume export or domestic retail. For raisin exports, the regional wholesaler will generally send batches of raisins to the cleaning factory.

For larger grape producing areas, most farmers sell their fresh grape production on the vine. A farmer decides how much of his crop he wants to sell fresh, based on his estimate of market demand. The rest he will process as raisins. For the part destined to be sold fresh, he will typically contact a trader (or they will contact him) to negotiate a price for the fresh harvest. The down payment is approximately 30%.

When harvesting time comes, the trader (or often, an 'expert' employed by the trader, with a team of laborers) comes in to harvest and then package the grapes. 30% of the payment is made during harvest and the final 40% at the end. In the early morning, the trader will bring a truck near to the village, and the grapes are brought by the different picking teams to fill the truck. Grapes have about one week to get from the vineyard to the store, meaning the farmer has to sell his crop swiftly.

The system also works against quality, from the growing process (fruit thinning) to harvesting. Everything is focused on quantity and speed, depressing the value of the crop. Little attention is paid to quality, packaging and handling of the grapes. This problem is particularly pressing for export of fresh grapes. At no point in the value chain is there an incentive for quality. This translates into price expectations all the way to the end, where Pakistani and Indian buyers expect low quality/high quantity and pay accordingly.

In typical markets such as in Kabul and Kandahar, two kinds of traders are active: large traders who are exporting internationally to India and Pakistan (typically two or three 12MT trucks of grapes a day in season); and smaller traders who are selling domestically to shopkeepers, regional traders, and the large traders. The main market for Afghan grapes is Pakistan, with several trading modes:

- Direct export to Pakistan: It is common to see Afghan traders with valid permits and Pakistani business partners occupying a stall in the Quetta, Lahore, Peshawar, or Karachi fruit markets. They work on a commission basis, typically 6%.
- Bilateral: this is when larger Afghan traders sell to Pakistani traders, in return for contra-trading of other products (i.e. mangoes). There is a certain degree of trust and equal standing in the relationship.
- Unilateral: more common with smaller traders with no power in the market. Because of market links, and sometimes because of time pressure, the trader has to sell the whole batch to a Pakistani trader or commission agent with no reciprocal trading. There may be a forward contract by the commission agent or trader to take all the harvest.

It is common for the Pakistani commission agent or trader to hide the true price of their transactions further down the marketing chain, increasing their commission, and thus denying the Afghan trader their true percentage. Often the agent or trader repacks into different qualities as he knows he can increase his revenue through sorting. However, the Afghan farmer or trader is not given this information and the initial purchasing deal is done for mixed quality grapes only – no premium is offered for sorting by quality in Afghanistan.

Afghan traders appear to have a justifiably low reputation in quality. Some Pakistani traders reported finding grass, rocks, and even illicit commodities in with the grapes.

With raisins, farmers have more bargaining power than with grapes. Easily they can do packaged, transported and stored, so farmers can wait for a good price. This results in problems for large-scale exporters as they often find themselves paying relative premiums on large orders when producers refuse to lower their price. Often with raisin procurement, compared with fresh grapes, there is another layer in the marketing chain: independent collectors who visit all the farms to collect small quantities and then sell to a trader. There are examples of forward contracting for raisins, but this is rare.

After purchasing, the traders separate the raisins by quality, based on shape, size and color. Generally very little processing is completed beyond basic sorting. Cleaning of the grapes is often done with a fan, getting rid of only a limited amount dust and dirt.

Export

Grapes are Afghanistan's most important fresh fruit export, with a total value of over \$9m in 2012. In terms of volume, Afghanistan exported 25,000MT of fresh grapes in 2012. It is likely that fresh grape exports are actually higher, given that traders in Pakistan suggest some fresh products do cross the border illegally. However, traders were unable to give any credible estimates and therefore it is very difficult to estimate total illegal trade.

Pakistan is the largest importer of Afghan fresh grapes, commanding nearly 99% of the market. Yet, much of the fresh grapes are then re-exported to India and several other markets.

It is noted that fresh grape exports plummeted from 2011 to 2012 by nearly 25%. Official customs data states that fresh grape exports were over 31,000 MT in 2011. The sharp drop is explained by a drastic reduction of exports to Pakistan. Research suggests that the closure of the Torkham Border repeatedly from November 2012 until late January 2013 for political and security reasons is likely the cause. It is, however, highly likely that grape exports will rebound to 2011 levels and perhaps beyond given that main transportation routes into Pakistan are operating as usual.

Transport

Exports to Quetta: Only Afghan trucks are allowed to carry grapes (Pakistani trucks are not allowed to reload in Kandahar), but the trucks must unload at Chaman town in Pakistan and be transferred to a Pakistani vehicle.

Exports to Peshawar: Afghan trucks can drive into Peshawar with a road pass. A road pass is required (around \$600) but transporters with such a license are readily available. Technically, the Pakistani government requires all Afghan products destined for international export (i.e. through Karachi port) to travel through the Torkham border.

Drivers are offered a bonus if they can get their grapes from the farm gate to the Pakistani market in Quetta or Peshawar (and through Afghan customs, checkpoints, vehicle changes at Chaman, and Pakistani customs) before nightfall. If the grapes stay on the road overnight they lose the bonus.

Sun-dried raisins <ul style="list-style-type: none"> • Three main kinds: Currants, Sultana and Aftabi • Mainly used in baking industry 	
Indian market <ul style="list-style-type: none"> • Major dried fruits market (\$1Billion, +20% growth) • Excellent reputation of Afghan products • Accessible quality requirements 	Opportunities for Sultanas <ul style="list-style-type: none"> • Marketing optimization • Branding
Russian market <ul style="list-style-type: none"> • Imports 50 Mil tons • Almost only destination for Afghan exports today • Increasing yet lower quality requirements than EU 	Increase volumes of Aftabi <ul style="list-style-type: none"> • Marketing optimization • Quality improvement
EU markets <ul style="list-style-type: none"> • UK and Germany: 30% of global imports (160,000 tons) • Black raisins (flame) from Chile and Australia • Sultana market saturated by Turkey 	Market for Qaisar/green raisins <ul style="list-style-type: none"> • High focus on quality • Difficult market to enter
Afghan long green raisins are highly appreciated in India, Bangladesh and show high potential on western niche market	
Green raisins <ul style="list-style-type: none"> • Three main producers: Iran, Afghanistan, China (Xinjiang) • Afghanistan mostly exports to India • Luxury product 	
Indian and Bangladesh market <ul style="list-style-type: none"> • Established business • Good reputation of Afghan products • Accessible quality requirement 	Marketing optimization <ul style="list-style-type: none"> • Branding
Western ethnic food markets <ul style="list-style-type: none"> • Growing market • Market dominated by China • Highest quality / traceability requirement 	Premium quality positioning <ul style="list-style-type: none"> • Focus on cleanliness • Extensive branding

Food safety and Certification

Implementation of food safety control and certification of products and production plants are necessary for food industry development and export of food products

<ul style="list-style-type: none"> • Limited activities in food safety control in Afghanistan • Necessity to enforce food safety regulation for horticulture fresh products and local food processing industry 	<ul style="list-style-type: none"> • Operate Food safety control in Afghanistan • Training of Afghan private companies
<ul style="list-style-type: none"> • Certification is necessary for export to international markets • Some products cannot transit through neighboring countries due to lack of certification capacity in Afghanistan 	<ul style="list-style-type: none"> • Certification agencies in Iran and Pakistan can certify in Afghanistan upon request, and are interested in establishing offices in Afghanistan
<ul style="list-style-type: none"> • No laboratories accredited in Afghanistan 	<ul style="list-style-type: none"> • Calibration can be done from neighboring countries - Very costly • Implementation of food safety control and certification of products and production plans are necessary

An illustrative sample of Grapes and Raisin Value Chain

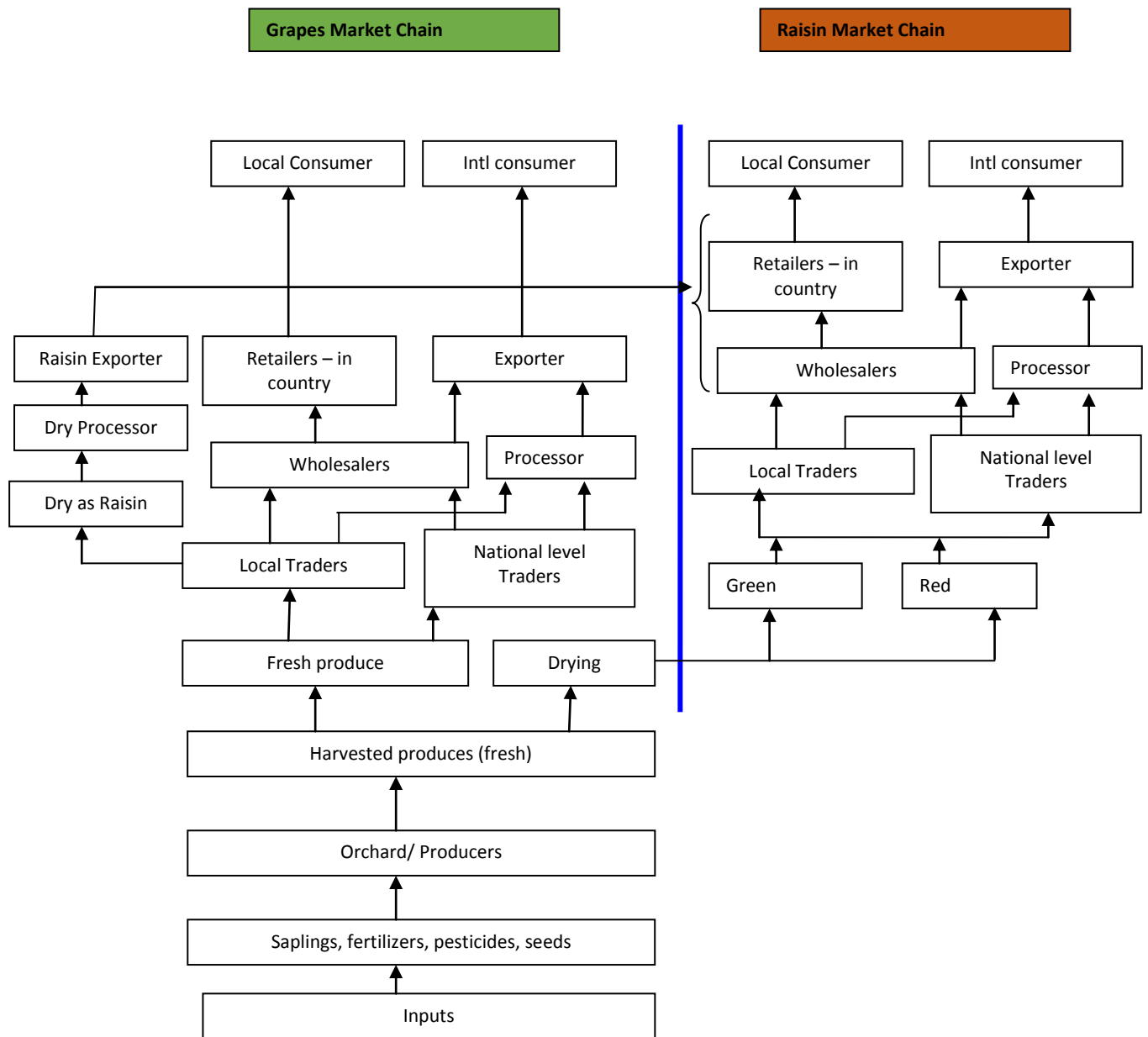


Figure 1: Market Chain of Grapes and Raisin

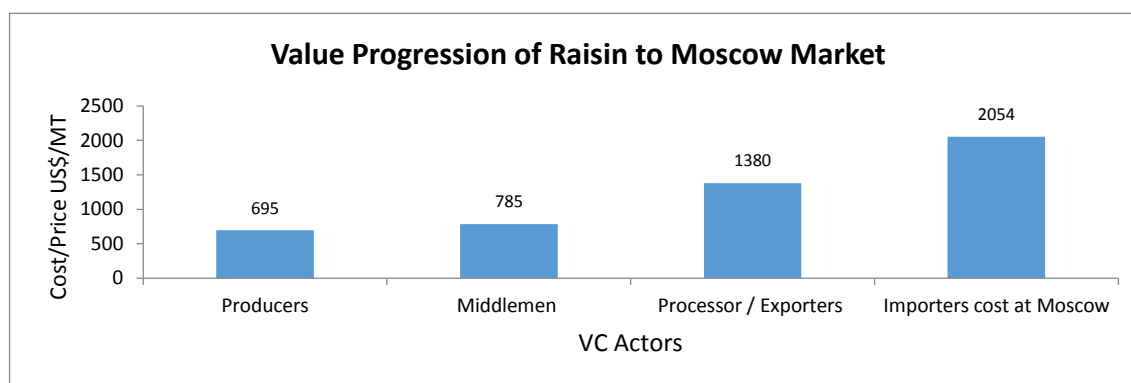
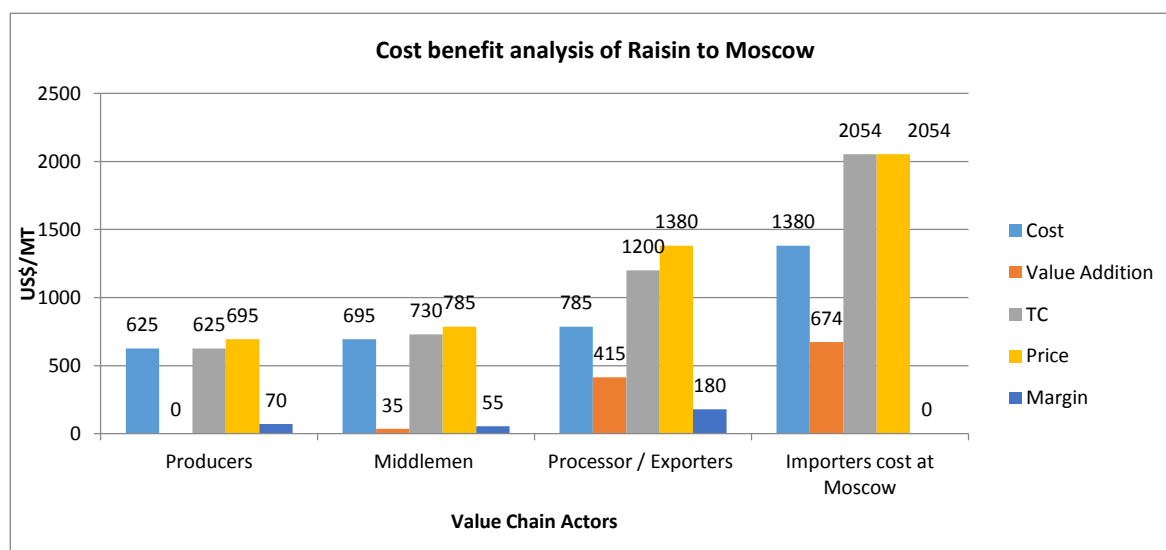
Case study: Cost Benefit Analysis Raisin Export to Moscow

	US\$/MT
Cost for producers	695
Middlemen cost	785
Raw materials cost at processors level	785
Processing, packaging, and documentation, and transport to Hiratan (port) cost	298
Wastages and processing loss (15% of total)	117
Profit for exporter (lump sum) (15-20%)	180
Subtotal	1380
Transportation Hiratan to Moscow	250
Tax at Moscow	244
Storage cost	180
Sub Total	674
Importers cost	2054

Source: Field Survey 2014

	US\$/MT				
	Cost	Value Addition	Total Cost	Price	Margin
Cost for producers	625	0	625	695	70
Middlemen cost	695	35	730	785	55
Exporters cost	785	415	1200	1380	180
Importers cost at Moscow	1380	674	2054	2054	0

Source: Field Survey 2014



Details of Costing

Cost at processors level

Bellow table shows all the cost/expense from the Kabul factories to the Hiratan border:

S/N	Activity/items	Expense/ton (\$)
1	Labors	55
2	Processing company expense	30
3	Waxing (Oil)	30
4	Special plastic to cover the raisin	10
5	Carton	100
6	transportation (Kabul-Russia)	45
7	Kabul Custom	15
8	Hiratan Custom (Load and Unload) expense	12.5
Total		297.5

Source: Field Survey 2014

Procurement Cost:

Bellow table show the price and losses of one metric ton which buy the mentioned company:

S/N	Procurement cost	Expense/ton (\$)
1	Procurement of raw materials (1 MT) Red raisin)	785
2	15 % Losses	117
Total		902

Source: Field Survey

Expenses from Hiratan border to Russian markets:

Bellow table show all expense of 1 MT res raisin from Hiratan border to Moscow:

S/N	Activity	Expense/ton (\$)
1	Transportation cost (Hiratan - Moscow)	250
2	18 % tax/ton in Moscow	244
3	Storage cost in Moscow	180
Total		674

Source: Field Survey 2014

Grape produced in Parwan and sold in a retail store in Kabul. Since the majority of fresh grapes are sold and consumed domestically and the kishmishi is one of the most common grapes, the figure below represents the best illustration of a grape value chain. The farm-gate price for 1MT of kishmishi grapes is \$350. Transportation costs from Parwan to Kabul are approximately \$7/MT. Smaller wholesalers typically purchase the grapes from the larger wholesalers and sell to retailers at a margin of \$20/MT. The final average retail price for 1MT of kishmishi is \$450.

	Cost of Grapes (US\$/MT)	Value Addition and margin	Value of the Grapes
Farmgate price at Parwan	350		350
Transportation to Kabul	350	7	357
Wholesale Margin	357	15	372
Transportation in Kabul	372	2	374
Smaller WS margin	374	20	394
Retailer margin	394	56	450
Consumer price			450

Source: Horticulture Sector Review, Altai Consulting, World Bank 2014

For export premium shindul khani raisins produced in Zabul and shipped for sale in Delhi via Kandahar. Typically, the Afghan exporters absorb all costs up until the Wagah Border. The customs duties are included in the transportation costs listed below, and typically cost \$50 per MT. On the Indian side of the border, the Indian importer assumes all risk until it reaches the wholesale market in Delhi. The Indian

importer will not usually pay the Afghan exporter upfront, but rather will pay 60% of the shipment price once the raisins arrive in Delhi. Once the Indian trader sells the shipment, the Afghan trader receives the rest of the payment. Typically, the Indian importer will make a 6% margin on importing Afghan dry fruits, after all expenses have been paid (office, salaries, rent, etc.). The wholesale price for Afghan green raisins can vary from \$3,500 – \$20,000/MT depending on the quality and whether it is the high or low season. The example below illustrates a high quality shindul khani in-season for \$6,000/MT.

Raisin	Raisin to India (US\$/MT)	Value Addition and margin	Total Price
Purchase price Zabul	4000		4000
Afghan Middlemen Margin	4000	240	4240
Transport to kandhar	4240	25	4265
Afghan regional WS	4265	450	4715
Transport to Wagah Port (incl duties)	4715	400	5115
Transportation Wagha to Delhi	5115	510	5625
Indian WS margin	5625	350	5975
WS market Price	5975		5975

Source: Horticulture Sector Review, Altai Consulting, World Bank 2014

3.2 Almonds

3.2.1 Scenario of Almond in Afghanistan

Almonds are produced in large quantity in Afghanistan. Afghan almonds are highly valued in international markets, but still have significant room for development, particularly through implementation of proper, basic processing methods. Despite large volumes produced, Afghan almond orchards are largely under-producing due to poor practices.

Almond is second most important export produce by value, almonds generate in excess of \$75m in exports to India, Pakistan and Iraq. The volume of shelled almonds exported has recently exceeded the volume of in-shell almonds. Shelling is done manually, at very low cost for traders.

- India Almond: Basic duty RS65/kg plus 2+1% education duty altogether 66.95/kg
- India Import: 2012 Aug/Sept 1007 and during 2013 import 2615MT
- Under the Indo Afghan Preferential Trade Agreement, a tariff concession of 50 percent is applied on the basic import duty for these goods if imported from Afghanistan

Year		Almond	
		Area (Ha)	Pdt (MT)
1390	2011-12	13469	60611
1391	2012-13	13490	62000
1392	2013-14	14114	42215

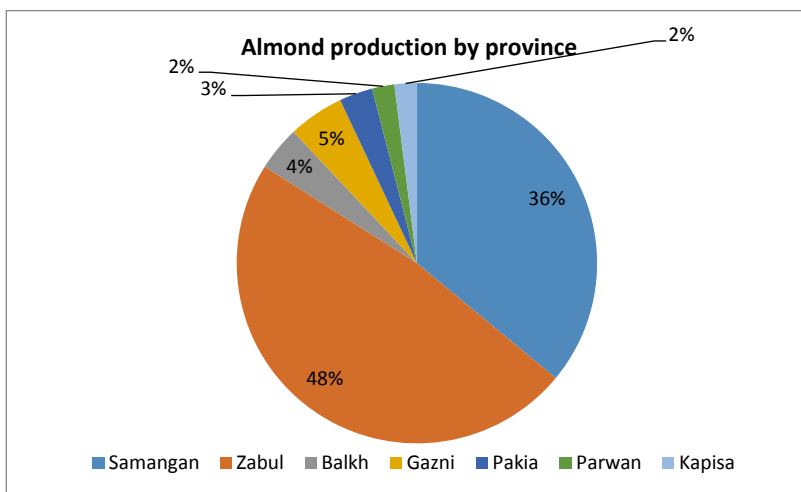
Source: Afghanistan Statistical Year book 2013-14

Top 5 province (MT)	2013-14
Zabul	16301
Samangan	6161
Baghlan	3811
Urozgan	2991
Gazni	1795
Total	42215

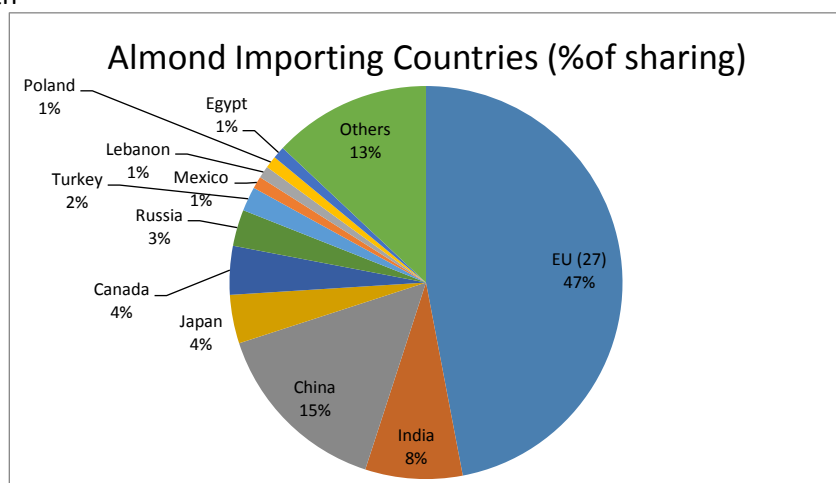
The production of almonds is concentrated domestically in the South– Western and Northern Region, which account for 48% and 36% respectively with main producing provinces Kandahar and Samangan.

In 2012, 2million MT of in-shell almonds was produced globally. The top 10 producing countries accounted for over 85% of all production, with the U.S. leading the group at 720,000mt, just over 37% of global production. Afghanistan itself was the eighth largest producer, with 4% of global production, leaving behind other producing countries such as Greece, Australia and Chile.

A very large quantity has been exported to Pakistan with much lower average export price of 0.3 USD/kg. These are the two main markets for Afghan almonds. They have been occasionally also shipped to Germany, where they were sold with the best average



Graph 4: Afghan Almond Production by Provinces in 2011-14



Graph 5: World Almond Imports in 2012

price of 5.8 USD/kg. The analysis of several factors to this point such as domestic supply, global supply, demand and trade flows indicates that Afghanistan can gain a more important exporting role that fits its rank as a top ten producer

Table 14: Almond export cost calculation to EU/US	US\$/Kg
Average producer price Kandahar	1.4-2.5
Transport cost	0.5
Import tariff	0
Profit	15%
Total	2.2 – 3.5 (EU Market)
CIF USA	3.5-49 (US Market)

China is a very large market with constantly increasing consumer demand for almonds. Domestic consumption is expected to be able to absorb a 15% increase in imports in the season 2010-2011

3.2.2 Global market perspective:

Afghanistan is one of the top ten producing countries in the world however not well recognized in the international scenario because of low export values. Major players, such as the United States account for much larger production and exports quantities having therefore a significant impact on the world market price, closely linked to supply and demand. Their export strategies are well directed towards lucrative markets in terms of demographics consumption and growth such as EU-27, China and India.

3.2.3 Exports Perspective:

Several export price calculations showed that almonds can be price-competitive in existing and new export destinations. A study observed that the Indian market of Afghan almonds holding a very low share, a very competitive price and the potential of significant export growth. Other SAARC member countries, far east and the European market appears to be another lucrative market, where domestic almonds can be price competitive, and scope access to market. In the case of the European market Afghan businesses must do their homework to meet the non tariff barriers in the form of market access requirement such as quality issues, packaging, tracking, pesticide residue lever and others. The Chinese market is another unexplored opportunity which should be strategically investigated in order to be successfully accessed.

3.2.4 Entrepreneur's perspective:

There is room for personal endeavors of expanding from traditional export markets to other export opportunities in the region or international markets. Important factors to be taken in consideration before deciding to enter new markets are 1) the non tariff barriers and possible market requirement for exports, 2) global or regional trends of supply and demand that might influence positively or negatively the season price 3) other marketing issues in order to better meet the end customer demand or consumer behaviors in different markets from the traditional ones and 4) proper packaging and post harvest management.

Due to the wide geographic range of production, almonds may be traded through any of the country's major cities. However, the majority are traded through Pakistan and India via Kabul or Kandahar markets. Smaller amounts are exported to Iran through Herat, and to the north through Mazar-e-Sharif.

3.2.5 Value Chain

The almond value chain largely shares its infrastructure with other Afghan horticultural products, particularly other nuts, dried fruits, and spices. De-hulling, shelling, and packaging links may be specific to the trade in nuts, while production, transportation, and to a large degree retail and export are conducted by individuals or organizations involved in a range of horticultural products, particularly dried fruits and other nuts.

3.2.6 Processing

After transport to wholesalers, almonds are sorted by size and quality. The detail with which this operation occurs differs depending on the market. In the extent of the process is a sieve with variously sized holes, used to sort larger from smaller almonds. By comparison, with larger traders in Kabul, almonds are first sorted by size, before they are shelled by hand. Damaged almonds are removed, before the shelled almonds are again sorted by hand for quality. This sorting process is generally done in the homes of individuals, often by women.

Sweet and bitter almonds may be mixed, either at the farm level or by traders. A mixed shipment has a much lower commercial viability than un-mixed, and harms the reputation for future sales. Many markets require the percentage of bitter almonds to be low for full realization of market potential, for example, export to Europe requires that no more than 5% bitter almonds be present. However, farmers or traders who engage in this practice fear being left with large amounts of unsold bitter almonds, which are more difficult to market under current conditions.

Shelling reduces the shelf life of almonds unless they are properly packaged. Necessary packaging materials and machinery for preservation are in most cases unavailable. Although an extended shelf life would allow traders more flexibility in seeking the best market conditions, Afghan almond traders are usually able to sell their produce quickly after it is acquired, and so have little concern for extending the shelf life of the product.

While almond shelling is currently done largely by hand, machine shelling could improve quality control and increase output, provided the correct shelling equipment for Afghan varieties is procured and proper packaging equipment can be put into use.

3.2.7 Packaging and handling

Almonds are generally transported in bulk bags to major trading hubs, as well as during export. Bags are imported from Pakistan, purchased for \$1.20 each contains 50 kg or as per demand of the importers, and include a jute sac, cloth bag as well as an inner plastic liner. Traders in Kabul will package almonds in 500 g plastic bags, both for domestic retail and export. This packaging is done by hand.

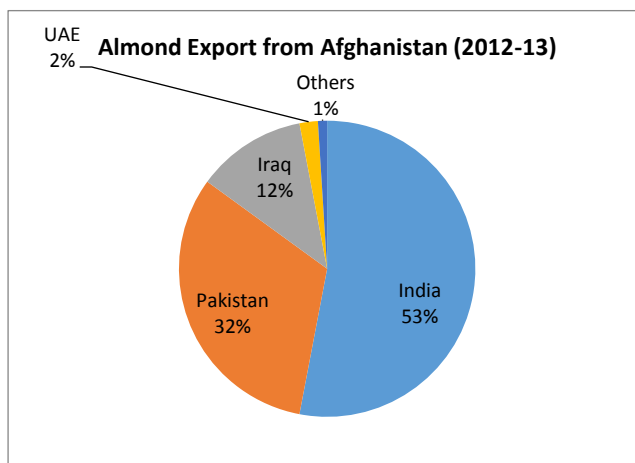
Proper packaging can drastically increase shelf life for shelled almonds. However, Afghan traders lack the equipment to package using these methods, and have little financial motivation to invest in these machines. However, packaging may increase in importance as production expands and stricter markets farther overseas become common partners.

3.2.8 Marketing

Farmers generally sell their entire produce to a single wholesaler or local traders, often in advance of the harvest itself. The largest wholesalers work in both the domestic and export markets. Wholesaler margins vary depending on quality of the product and current supplies, with an average of 5%.

Among many varieties of Almond in the market, they are primarily differentiated into two categories: hard-shelled and soft-shelled. Soft shelled almonds, which are produced in smaller quantities compared to hard shell, can easily be removed from the shell by hand.

According to Afghan Statistics -CSO, in 2012 1,125MT of shelled almond were exported, 287MT of soft-shelled almond were exported in-shell, and



Graph 6: Almond Export from Afghanistan during 2012-13

560MT of hard-shelled almond were exported in-shell. Assuming an average of 260g kernel weight for every 1kg of in-shell almond, a total of 8.35% of all almonds produced in Afghanistan would have been exported. The total value of all almond exports was \$11.6m, with shelled almonds producing both the highest overall value and the greatest value per metric ton. . However, official numbers are considerably lower than actual exports, as record keeping is poor and illegal exports through Pakistan are common. Interviews with traders and market associations throughout the country, and particularly in Kabul, indicate that between 60% almond production is exported.

Nine countries are officially recorded as having imported Afghan almonds in the 2012-13 periods. These included Australia, Canada, India, Iran, Iraq, Pakistan, Turkey, the U.A.E., and the U.K. India, Pakistan, and Iraq imported the majority of this, with a combined 96.9% of all official Afghan almond exports, while India alone imported more than half of all exported Afghan almonds. Shelled almonds were the eighth largest agricultural export by value in 2011, while in-shell almonds were sixteenth. However, taken together, almonds in total comprise the third largest Afghan agricultural export by value.

3.2.9 Value Added at each step of the Value-Chain

The Afghan almond market is quite diverse, with numerous varieties possessing widely differing characteristics, markets, and values. The Afghan domestic market is strong, and Afghan almond traders have well-developed links into the markets of several neighboring countries

Farmers bear transport costs to either regional or major trading hubs, depending on their own distance from district centers and access to transportation. Transportation costs can vary greatly depending on the area, with more rural routes relatively expensive when compared to trade routes between major cities

Wholesalers who purchase almonds in major trading hubs will re-package in bulk using reusable plastic bags with a cloth liner purchased for \$1.20 each from Pakistan.

Table 15 : Almond Export cost analysis through Pakistan	Cost	Margin and Value Addition	Price
Farmgate price (Uruzgan)	1394		1394
Transportation (Chora- Kand)	1394	159	1553
Shelling (4:1MT)	1553	224	1777
Packaging	1777	13	1790
Kandahar WS	1790	186	1976
Transport (Kandahar – Pakistan)	1976	350	2326
Pakistan WS	2326	511	2837
Retails Price Pak	2837		

3.2.10 Marketing

- Identify markets for bitter almonds, and disseminate information on the market to producers. Encouraging farmers not to mix bitter and sweet almonds will increase the value and reputation of Afghan sweet almonds, and make bitter almonds easier to procure for end users. Work with actors such as AAIDO who have already made efforts in this area

4 Post-harvest activities

Post-harvest activities (sorting, cleaning, grading, packaging, storage, and transportation) still offer large areas for improvement. The majority of storage facilities in Afghanistan remain sub-standard. Sorting, grading, cleaning and packaging remain rudimentary, but few processors and produce raisin and almonds. Some of packaging does not meet food-grade standards. The lack of sorting/grading requires re-sorting and repackaging for retail at destination or transit markets. Transportation essentially takes place by truck, although a small amount of produce is exported by cargo plane. There are only a handful of refrigerated trucks in the country. There are ample opportunity to develop the fresh fruit and vegetable air shipment capacities to India, other SAARC countries and international destinations.

Processing

Processing of fruits products is still limited. The main processing activity is fruit drying (70,000MT of raisin), still performed mostly with traditional methods. Competitiveness against other countries, container procurement (refrigerated), and food safety remain barriers to further development.

5 Airfreight

Shipping fresh fruits and vegetables by air more expensive than overland shipping, but it has the potential to reduce spoilage/wastages and so increase the value of shipments, as well as opening new markets to Afghan produce. Use of refrigerated containers, truck would be used for transportation to long distance. While a limited amount of fresh produce is currently shipped by air, there are several steps that could make airfreight more viable in the long term.

Currently, airfreight space is limited, there is potential to eventually export up to one quarter of Afghan fresh produce by air. Increasing capacity specifically for fresh produces products could be facilitated through a pilot program wherein cargo space is created specifically for fresh fruits likely through excess capacity of Ariana, the national airline. A single plane making in-season trips between four regional Afghan airports and on to Delhi could allow access to approximately 1,000MT per week, with each airport accepting 20 trucks of produce per week. Pilot program would quickly prove its value, allowing further expansion.

Ensuring adequate supply will be necessary for airfreight to be cost-effective (the case will be similar with refrigerated trucking and cold storage). Encouraging the currently-active producer's unions to take a role in organizing marketing and shipping will be an important step in creating the steady supply needed to ensure success.

Other carrier like Emirates, Air India, and others would also be the potential for carrying fresh fruits to international destinations.

6 Market Information

Reliable and updated market information is not available at this moment. Although various sources of are exist for prices of commodities and market data. As per secondary reports it has been found that the best source of information currently available is the USG funded Paywand Knowledge Management Facility which is now under the control of MAIL ASMIS. Paywand is an online repository of information compiled from secondary sources and the data is only made available once it is verified to be accurate. Paywand has prices of commodities at the wholesale and retail level, trade flows, market and trade assessments, value chain assessments on specific high value commodities, and a repository of studies completed on various agricultural related topics in Afghanistan over the past decade. However, since the system was transitioned to MAIL in July 2012, the Ministry has been slow to update information and it requires being updated by product and up-to-date.

Roshan's Malomat is a national agricultural price data system providing farmers access to wholesale prices of 41 commodities in 14 markets in Afghanistan and 1 in Peshawar, Pakistan. Users access the information by using a mobile phone, either through an SMS or Interactive Voice Response (IVR) technology. The

primary objective of the initiative is to ‘provide agricultural incentives and economic alternatives’ in the hope to build rural communities by providing Afghan farmers and traders with the latest pricing information. Malomat is available in English, Dari, and Pashto by SMS.

The e-Afghan Agriculture online repository is funded by USDA and implemented by UC-Davis. Through past projects implemented in Afghanistan, UC Davis recognized the need to create an online site that provides credible and relevant information to a variety of actors (USDA, USAID, ADTs, PRTs, NGOs, etc.) assisting farmers in Afghanistan. More than 50 organizations have contributed to the online repository by submitting, among others, studies, data, and maps that have been grouped by: Provincial information, technical information (fruits, nuts, etc.), and non-technical information (cultural and logistical information). Moreover, e-Afghan Ag provides a Q&A service from the field where users are invited to submit questions, as well as offline browsing on mobile devices by providing a remote solution application.

ACCI, EPAA, and Afghanistan Raisins, Fruit and Vegetables Export Promotion Administration (ARF&VEPA) are also providing export related information but such information requires to refresh as per needs of the exporters e.g. country specific information, tax tariff, export requirements, buyers/importers contact information, product pricing etc.

7 Regulatory scenario:

The India Afghanistan Free Trade Agreement is known as IAPTA (India Afghanistan Preferential Trading Agreement) already exists in favor of exporters. The objectives of this Agreement are to promote through the expansion of trade the harmonious development of the economic relations and to provide fair conditions of competition for trade between India and Afghanistan. Additionally EPAA has MoU with Indian Importers Association (Delhi) to promote afghan products to India.

The Afghanistan-Pakistan Transit Trade Agreement (APTTA), which was signed in July 2010 and has experienced sporadic enforcement since, seems to be gaining more standard adherence. The APTTA allows for Afghan goods to transit through Pakistan, an important component in Afghanistan’s ability to export to India. At the same time, Afghanistan has increased its utilization of Iran’s Chabahar Port, which allows Afghan goods to bypass Pakistan en route to India. To further encourage trade with India, the India-Afghanistan Preferential Trade Agreement gives Afghanistan preferential treatment on a number of tariffs, including a 50 percent margin of preference for dried fruits such as raisins and apricots and a 100 percent margin of preference for dried figs and dried mulberries.

ACCI and ARFVPA have been working for long time in fresh and dried fruits marketing. ACCI and ARFVPA link traders to international markets and provide phytosanitary and quality control certificates.

Traders received the phyto- sanitary certificate from ACCI or DAIL, it is work up to boarder, and actually it is certificate of origin, no other quality analysis.

Afghan raisins currently do not meet the quality or phytosanitary standards of Europe and Western markets, because of traditional drying practices, old and unsanitary processing equipment/machineries. Current grape production, harvesting, drying process, sorting, grading, packaging, transport and storing methods (preservation) in Afghanistan results in raisin products that do not meet the requirement for high quality of international market. Testing facilities for certifying raisins against international grades and standards are unavailable for Afghan exports to meet international markets. The most prominent constraints in raisin production are traditional grape production system, lack of both knowledge and inputs producing low yield, lack of capacity and facilities for on farm raisin drying, out dated raisin processing factories, poor packaging, lack of cold store, no standard quality control laboratory, lack of raisin producer associations and poor marketing internationally. Mostly Afghan fresh and dried grapes are reprocessed and repacked after export and is re-exported by the name of them of other countries, not Afghanistan to the international markets.

The export process remains complicated and vague, with three different ministries playing a role in the process. However, the adoption of the global Codex standard for raisins has enabled Afghanistan to increase exports to destinations with strict standard enforcement.

When raisins consignments are ready for shipment exporters must include the following documentation for export:

- Phytosanitary Certificate from the Ministry of Agriculture, Irrigation and Livestock
- Form A (Export Tax Exemption Form) issued by Ministry of Finance
- Transit Form (Transit Permit) issued by Ministry of Commerce and Industry
- Raisin Quality Certificate (meeting Codex Standard 67-1981) issued by Afghan Raisin, Fruits & Vegetable Export Promotion Administration (ARF&VEPA) under the Ministry of Commerce and Industry.

Money is paid at several points along the marketing chain:

- The Ministry of Health and Export Promotion Council of Afghanistan trading license must be renewed each year at a cost of around \$70.
- The MAIL Phytosanitary Certificate is required, around \$3 per shipment. Moreover, importing nations may have additional certification requirements and charges.
- Market tax: in both Kandahar and Kabul, the municipality charges approximately \$0.04 per box of grapes imported and exported. However, the figure actually taken is around \$0.10 per box.
- There are numerous checkpoints on the routes from Kabul or Kandahar to the border, where money is often illegally taken. Traders state a typical consignment will cost a minimum of \$4 in bribes along domestic routes alone.
- The Pakistani Government import tax is 30,000 – 40,000 Pakistani Rupees (\$280 - \$380) per truck. Many traders said the tax was equal to the cost of the grapes.
- GI RoA export tax regulations often change, but are currently estimated at around 0.5%.
- Sales tax of 2.5%, and a 20% tax on trading profits, both payable to the Ministry of Finance.
- The depreciation of the Afghani in 2013 has caused Afghan traders significant losses.

In sum, many Afghan grape traders interviewed reported they had financial difficulties in 2013, with some saying they had made a loss at the end of the fruit season.

- SAFTA Agreement – *“Strengthen intra-SAARC economic cooperation to maximize the realization of the region’s potential for trade.”*
- Governed by WTO principles
 - Reciprocity, special and differential treatment
 - Awareness of the needs of least developed members (Revenue Compensation Mechanism)
- Focus on elimination of tariff and non-tariff barriers
- Two institutions to oversee implementation
 - SAFTA Ministerial Council (highest decision-making body)
 - Committee of Experts (senior economic official from each member-state)

ACCI issues three kind recognizable and reliable certificate of origin:

- Certificate of Origin, Form A: this form is recognized by Germany; Greece, Ireland, Italy, Luxembourg, Netherlands, Bulgaria, Sweden, Swaziland, USA, European Union, Belgium, Denmark, France, Australia, Canada, Austria, Finland, Japan, New Zealand and Norway. Some of the countries consider free custom duty for Afghan goods;
- Certificate of Origin, SAFTA: this certificate is recognized by SAARC member states. India has considered free custom duty for 480 kinds of Afghan goods in according SAFTA Agreement. Pakistan also has considered free custom duty for 233 kinds of Afghan goods as well.

- Certificate of Origin, Granted by China: China has considered free custom duty for 4721 kinds of less developed countries' goods such Afghanistan. This kind of goods should be exported to China in correspondence the Certificate of Origin.

Export documents

1. Bill of lading
 2. Certificate of origin and Form A
 3. Clean inspection report of findings
 4. Commercial invoice
 5. Quality Control Certificate
 6. Customs export declaration
 7. Customs transit document - MOCI
 8. NOC/ Transit permit
 9. Packing list - specify characteristics of a commodity
 10. Insurance certificate
 11. Terminal handling receipts
- Phytosanitary Certificate from the Ministry of Agriculture, Irrigation and Livestock
 - Form A (Export Tax Exemption Form) issued by Ministry of Finance
 - Transit Form (Transit Permit) issued by Ministry of Commerce and Industry
 - Raisin Quality Certificate (meeting Codex Standard 67-1981) issued by Afghan Raisin, Fruits & Vegetable Export Promotion Administration (ARF&VEPA) under the Ministry of Commerce and Industry.
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 - The MAIL Phytosanitary Certificate is required, around \$3 per shipment. Moreover, importing nations may have additional certification requirements and charges.
 - Market tax: in both Kandahar and Kabul, the municipality charges approximately \$0.04 per box of grapes imported and exported. However, the figure actually taken is around \$0.10 per box.
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 - The depreciation of the Afghani in 2013 has caused Afghan traders significant losses.

8 Current Marketing Status in Key Fresh, Dried Fruits and Nuts Product Value Chains in Afghanistan

Analysis of Market Channels

Both fresh and dry fruits are following common marketing chain involving middlemen at the local level, traders at the provincial or regional centers who then sell to wholesalers, and other traders and wholesalers in other regional and foreign wholesale markets. It is noted that middlemen, traders and wholesalers are more distinguished here as functions rather than as individual persons: it is also happened that the same person occupies all three roles.

Market Actors

- **Inputs supplier**

Nursery owners traditionally supplying sapling, now a days, certified sapling are established and available in the market by NGAs. It has created improved trees, varieties and easily can be traceable by the certification tag or labeling. It would create a good traceability certification, having GlobalGAP or many compliances issues for fruit exports. Retailers of seeds and fertilizers usually provide inputs to the producers. As such, these distributors can act as intermediaries in the marketing chain.

- **Producers**

Produce fruits in the orchards by own or as lease basis. Producer is doing orchard management, harvesting and selling to the traders locally.

- **Middlemen:**

There are middlemen (usually called commission agent) and traders operating at the local level, directly in contact with producers, and working on their own or on behalf of larger traders and wholesalers or processors and exporters. They either purchase the produce at the farm-gate during the time of harvest or contract farmers in to purchase their harvest in advance, in order to secure a sufficient volume of activity early on.

All the traders or processors pay the money for middleman because of the services that the middlemen do for the trader's special for the buying of the raw materials. Most of the middlemen don't have any official contracts with the buyers or middlemen may represent of producers and processors whom purchases goods from the manufacturer or producers and sells them to a retailer or export it to the external markets. The middlemen's who purchase goods for the traders or processors usually have close relationship with farmers or originality that will be from the producing areas

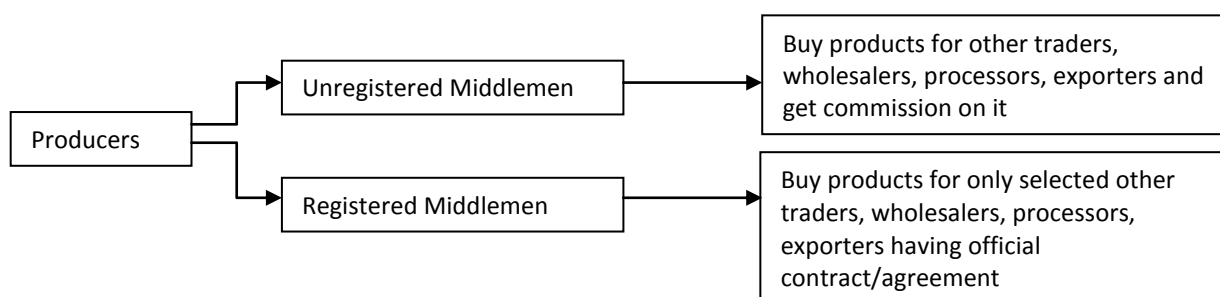


Figure 2: Market system in Fruits trading

- **Traders**

Usually there are 2 categories of traders – local traders, regional traders, often acting as also middlemen having direct relationship with producers. They sell the produce to local wholesalers, to other traders and wholesalers on different regional markets, or export the product.

- **Wholesalers**

Sitting is a regional or provincial markets linked with middlemen, small traders locally or regionally. Wholesale markets are a transit place, rarely a storage place, as space available to wholesalers in the individual shops is scarce. Usually they sold to the processors, local retailers and other traders also.

- **Processors**

Usually processors doing limited scale of processing e.g. washing, grading, sorting, and packaging. Most of the processors processing traditionally use old machineries and most of cases by hand/manually. Only one company has modern facilities for processing. Usually they export regional and international buyers.

- **Exporters/ Importers**

Traders who have connections on foreign markets and an understanding of their dynamics engage in cross-border trading. Although there are commission agent appointed by the importer from Pakistan or India.

Identified Constraints in the market chain:

The trading businesses usually have problems and constraints. Some common issues comprises of distance between the exporting and importing countries, market competition, target market, consumers' demands, production capacity of exporting countries and capacity of exporters and the importers and associated service providing agencies.

Common Constraints

- Lack of trustworthy relationship within the VC actors restrict long time business and reduces export and local market as well
- Lack of transparency in the market systems between traders and farmers/producers limits win-win benefits
- Producers do not have adequate market information which makes them unable to find markets without middlemen.
- Associations are not strong enough to negotiate with own clients making them dependent on local traders/ middlemen
- Poor orchard management practices and limited extension services & incidences of pests & diseases leading to low yields and lower incomes for producers.
- Absence of cold storage facilities to store fruits
- Payment system by bank not strong as export/import issues
- Inadequate quality-monitoring services from the government agencies
- Weak quality certification agencies results exporters could not enter into international market
- Lack of trust between importers and exporters
- Communication gap between exporters and importers
- Frequent supply of substandard quality of the products due to regular interruptions by the middlemen
- Long transportation time to carry fresh produces and only few ports are available for exports
- Unseen cost in the value chain

Specific constraints

Table 16: Value Chain based constraints	
Type	Probable Value Chain Constraint
Technological / Product Development	<ul style="list-style-type: none"> • Lack of post harvest management skills, facilities access to appropriate technologies which leads to unsold products (fresh grapes) and decreases their income • Lack of appropriate modern production and harvesting techniques which results lower yield and less price of the products • lack of technical skills of MSME's to produce to international buyer specifications reduces their income and market access • inadequate and inappropriate packaging materials, systems could not attract buyers and retain shelf life longer both in fresh and dry fruits export

Market Access	<ul style="list-style-type: none"> • lack of market information, linkages to large buyers decreases sales potential of MSME's • lack of information on product standards reduces MSME's ability to produce to buyer specifications, • Lack of proper packaging increases wastages and product cost of the produces • high rejection rates/wastages result in loss of income for MSME producers and buyers • high transportation costs increases the price of MSME production • lack of knowledge on market assessment, competitors analysis
Organization and Management	<ul style="list-style-type: none"> • MSMEs are not formally organized, lack of leadership to move forward • inability of producers to organize for economies of scale limits their opportunities to access higher value markets • MSMEs lack skills to develop business plans
Regulatory (Policy)	<ul style="list-style-type: none"> • Lack of laboratory facilities to certify international buyer requirements • Absence of certification agencies e.g. GlobalGAP, HACCP
Finance	<ul style="list-style-type: none"> • Limited access to finance sometimes none, • unable to pre-finance improved inputs, orchard management,
Input Supply	<ul style="list-style-type: none"> • high prices and substandard quality of inputs restricts use by small-scale producers,
Infrastructure	<ul style="list-style-type: none"> • poor infrastructure (roads, electricity, refrigeration facilities, telephones, etc.) increases the price of final products and makes competing with imports more difficult

Value Chain Constraints and its Probable Solution

Table 17: Value Chain based Constraints and Solutions

Type	Value Chain Constraint /Opportunity	Illustrative Solution
Technological / Product Development	<ul style="list-style-type: none"> • Lack of post harvest management skills, facilities access to appropriate technologies which leads to unsold products (fresh grapes) and decreases their income • Lack of appropriate modern production and harvesting techniques which results lower yield and less price of the products • lack of technical skills of MSME's to produce to international buyer specifications reduces their income and market access • opportunity for equipment manufacturers to offer leasing of tools/machinery to MSME's and thereby improve product quality 	<ul style="list-style-type: none"> • Training on appropriate post harvest methods • Access (provide) to appropriate tools and machinery to the producers • provision of equipment supply/leasing services for MSMEs • training of MSMEs in technical skills to produce to international buyer specification products • capacity building of the VC actors as per their actions and responsibilities in the VC
Market Access	<ul style="list-style-type: none"> • lack of information, linkages to large buyers decreases sales potential of MSME's • lack of information on product standards reduces MSME's ability to produce to buyer specifications, • Lack of proper packaging increases wastages and product cost of the produces • high rejection rates/wastages result in loss of income for MSME producers and buyers • high transportation costs increases the price of MSME production 	<ul style="list-style-type: none"> • access to large-scale buyers for MSMEs • provision of information to MSMEs on buyer specifications and standards • access to new marketing channels for MSMEs • access to affordable product transportation services for MSMEs • Access to form collective efforts on marketing
Organization and Management	<ul style="list-style-type: none"> • MSMEs are not formally organized • inability of producers to organize for economies of scale limits their opportunities to access higher value markets, • MSMEs lack skills to develop business plans • high rejection rates/wastages result in loss of income for MSME producers and buyers 	<ul style="list-style-type: none"> • provision of group organization services for producers • training in business planning / management for MSMEs • training in quality management for MSMEs • Institutionally strengthen associations
Regulatory (Policy)	<ul style="list-style-type: none"> • lack of government contracting procedures that favor MSMEs reduces their opportunity to engage in 	<ul style="list-style-type: none"> provision of lobbying services to: <ul style="list-style-type: none"> • reduce import taxes on inputs

Type	Value Chain Constraint /Opportunity	Illustrative Solution
	<ul style="list-style-type: none"> public sector bids import taxes on inputs increases producer costs, 	<ul style="list-style-type: none"> promote MSME start-ups/ small business development promote government use/ procurement of MSME products
Finance	<ul style="list-style-type: none"> farmers are unable to pre-finance improved inputs, modern orchard management opportunity for exporters to access commercial funding and increase their purchases from small-scale producers 	<ul style="list-style-type: none"> access to input credit for producers provision of working capital loans for exporters access to working capital loans for MSMEs
Input Supply	<ul style="list-style-type: none"> high prices of inputs restricts use by small-scale producers, use of poor quality raw materials by MSMEs results in inferior products unable to meet market demands, MSME's in remote rural areas lack access to inputs which reduces their productivity 	<ul style="list-style-type: none"> provision of affordable inputs for small-scale producers access to good quality raw materials for MSMEs access to inputs for MSMEs in remote rural areas
Infrastructure	<ul style="list-style-type: none"> poor roads (or electricity, refrigeration facilities, telephones, etc.) increases the price of final products and makes competing with imports more difficult 	<ul style="list-style-type: none"> provision of lobbying services to improve the availability and quality of rural roads access to cooling facilities for MSMEs

Deliverable 2: A Marketing Strategy for each of the key products including a breakdown in domestic, regional and international markets as well as a short/medium/long term analysis

9 Marketing Strategy for each of the key products including a breakdown in domestic, regional and international markets as well as a short/ medium/ long term analysis

Strategies for Market Development

9.1 Short Term Strategy for domestic market

To develop the each of the value chain, stronger networks and relationships between producers, trader's processors, exporters and wholesalers are needed. For producers to strengthen themselves it is important to improve the relationship among themselves. Improved management is needed together with basic training on modern business skills, modern orchard management, appropriate harvesting, post harvest and marketing techniques. This could strengthen producers, their groups and make it possible for them to reach new markets. Closer relationships with traders, wholesalers or other institutions could strengthen profit margins for producers. The availability of long term relationships among chain actors could in a short run improve profit, for a medium perspective of time stronger relationships could improve and create markets in terms of new clients, branding and improved finance both for producers and groups. For a longer term period ambition could be regional and international markets.

Prime consideration of the Afghan products:

- Appropriate harvesting technique should be ensured
- Post harvest management should be improved
- Proper packaging should be adopted and practiced (materials, information, and durability)
- Modern hygiene sanitation to be ensured during the processing areas(utensils, manpower's)
- Maintain proper cool chain each of the products (both fresh and dry)
- Proper transportation to be ensured
- Air transportation preferred for international market
- Always buyer comes first

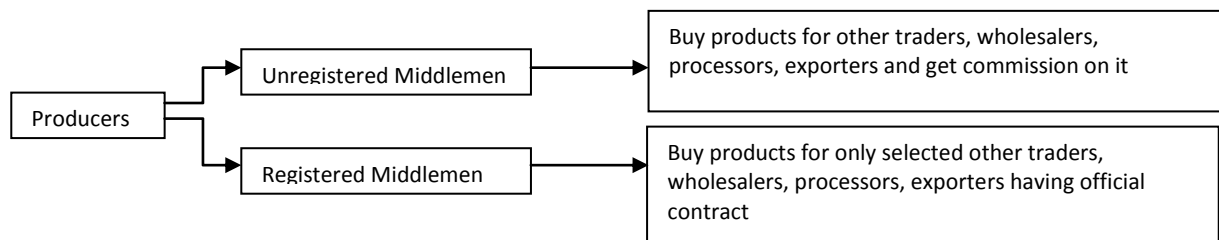
9.1.1 Strengthen local level market service provision in the market chain

- Capacity building of Local Market Service Providers through processors and large traders
- Establish partnership with private companies in improve post harvest management technologies in practice

Linkage with the quality assurance local traders (local market service providers - LSP) would be most crucial and important for enhancing capacity of the producer's skills and enter into the market. Identification of LSP and their capacity building, linkage with their next level of buyer and producer's is essential. As per different study and market assessment it was found that middleman/commission agent/supplier have significant role in the market, they have link with large traders, processors and producers. They are playing key role pre-harvest, during harvest, post harvest and sales of the produces. They have key leverage to play catalytic role in both sides e.g. market information, technology dissemination, product selling and buying.

Producers are facing numbers of problem on inadequate knowledge on modern orchard management, appropriate harvesting, postharvest management, lack of product quality issues, lack of market information, and they rely on mid level traders (suppliers) to sale product. Most of the necessary information they receive, comes through them as an embedded service. But many research finding suggests that the vital information that producers get from local level traders are almost always incomplete and insufficient and sometimes even faulty and misleading. It is not because their unwillingness to provide right information because they are, too, not well informed and trained and sometimes do not

realize the mutual benefit of providing information to the producers – the fact that increased trust and good relationship with producers will bring more business.



However, middlemen/traders can also play a vital role in providing necessary information to the producers. Alongwith product specific information (e.g. how to identify good products, why their product is good) they can also provide necessary information on orchard management, appropriate harvesting, post harvest management, quality compliances packaging and other necessary information through training the local level traders.

Therefore linkage with traders, producers, processors, wholesalers, exporters should be given priority that enhance income and make win-win business. To do this LSPs capacity building is necessary alongwith producers.

Whenever LSP capacitate and linked with producers, larger buyers, processors, exporters and outputs market by the private sector enterprises that will create win-win environment for their own benefit, then the process will continue for a longer period of time. Once functional linkage has established among value chain actors they will continue to run their own business. This functional linkage would be conducted by the facilitation of the large traders, processors, and by the exporters association. It will continue like given below diagram.

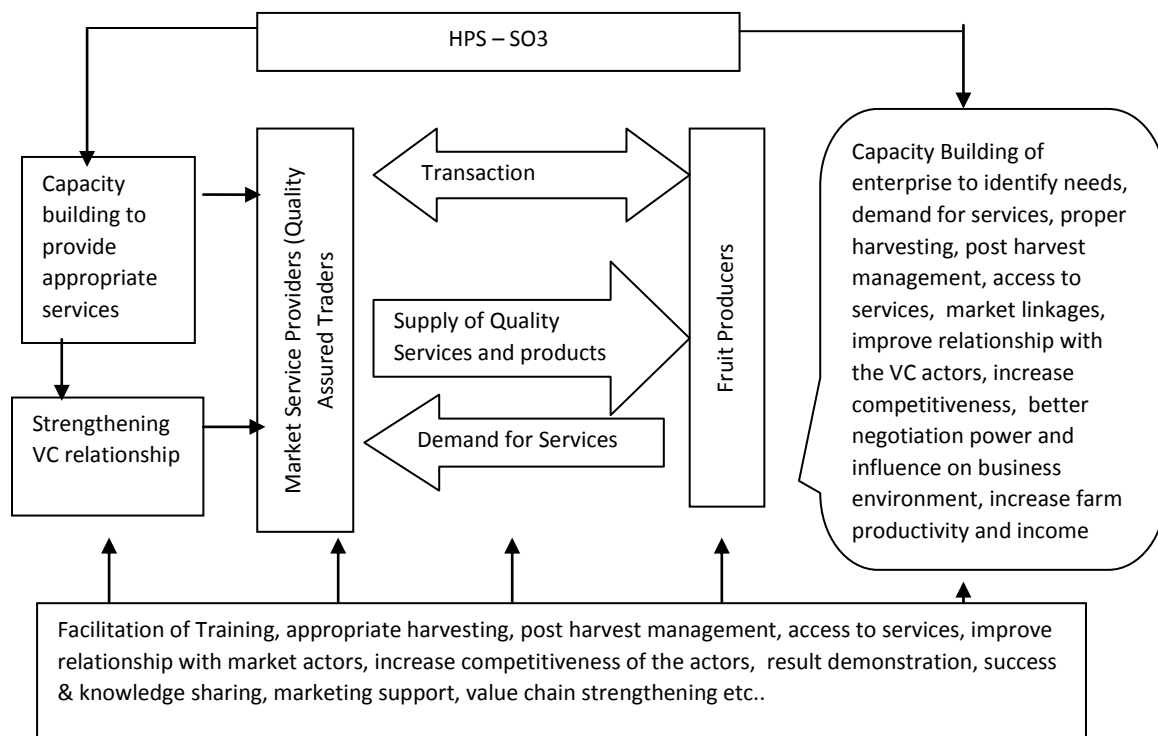


Figure 3: Service provider's capacity building model

Process: Build private sector partnership for this intervention. Through 4-5 large processors form a group or by alone having MoU for strengthening service sector in each of the value chain and facilitate to build service provision in the market.

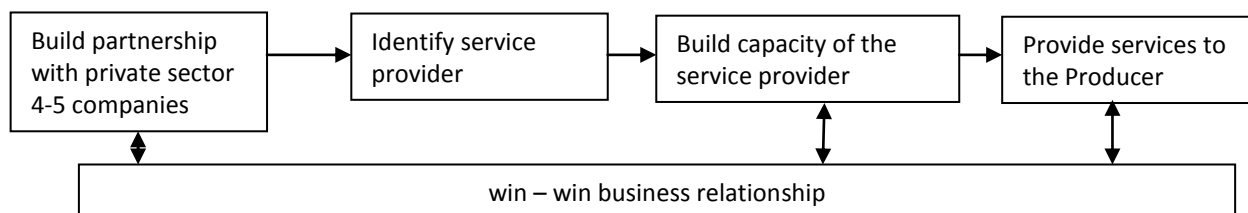


Figure 4: Capacity Building Process

9.1.2 Strengthening Trader's Association

Exporters or traders association would play key role to make their supply chain more strengthen, by the capacity building of associations institutionally, and technically. Associations would have trained members on access to new market, market assessment, efficient procurement system, and workers skill development on processing, post harvest management as per their needs and demands. Capacity building on quality compliance issues, certification system would also be considered. Linkage with the producer's local level traders (LSP) and their capacity would be facilitated by the association.

- Institutional capacity building
- Skill development on Post harvest management and product development
- Capacity building of proper packaging
- Capacity building on hygiene and sanitation
- Capacity building on appropriate processing
- Capacity building on market assessment
- Capacity building on access to new buyer and markets
- Capacity building on quality compliances
- Capacity building on appropriate procurement system

Table 18: Strengthen Associations with time line	Immediate	Medium	Long
○ Institutional capacity building	Y	Y	
○ Skill development on Post harvest management and product development			
○ Capacity building of proper packaging		Y	Y
○ Capacity building on hygiene and sanitation			
○ Capacity building on appropriate processing			
○ Capacity building on market assessment			
○ Capacity building on access to new buyer and markets			
○ Capacity building on quality compliances			
○ Capacity building on appropriate procurement system			

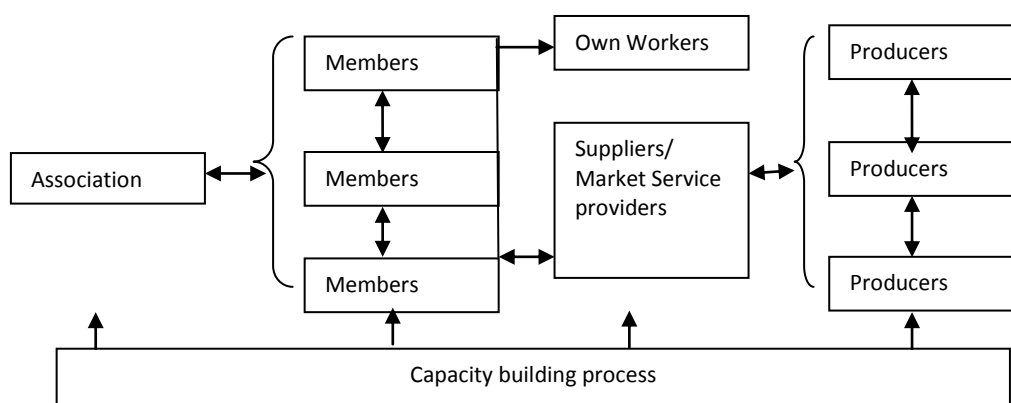


Figure 5: Institutional Capacity Building Process Module

Note: Capacity building of suppliers/market service provider similar to above strategy one strategy

9.1.3 Facilitate group sales to ensure next level market and higher price

Producer group will be facilitated for the group sales, group marketing to attract large buyer, and pre harvest they may build linkage with processors and exporters. Group leaders will take key role and HPS will be facilitated to do this.

9.1.4 Contract farming arrangement with processors and institutional markets

It is importance of producers groups with stronger relationships and networking is important. The supply chain which most likely could be improved in the short run is the domestic channel, medium regional market and long run for other international markets.

Product specific and location specific contract farming system should be established to ensure continuous, consequent and planned production within the product zones. Exporters can reduce the cost of production, cost of transactions and strengthen the supply chain for smooth supply of products with desired quality.

Example: Contract Farming by Supermarkets

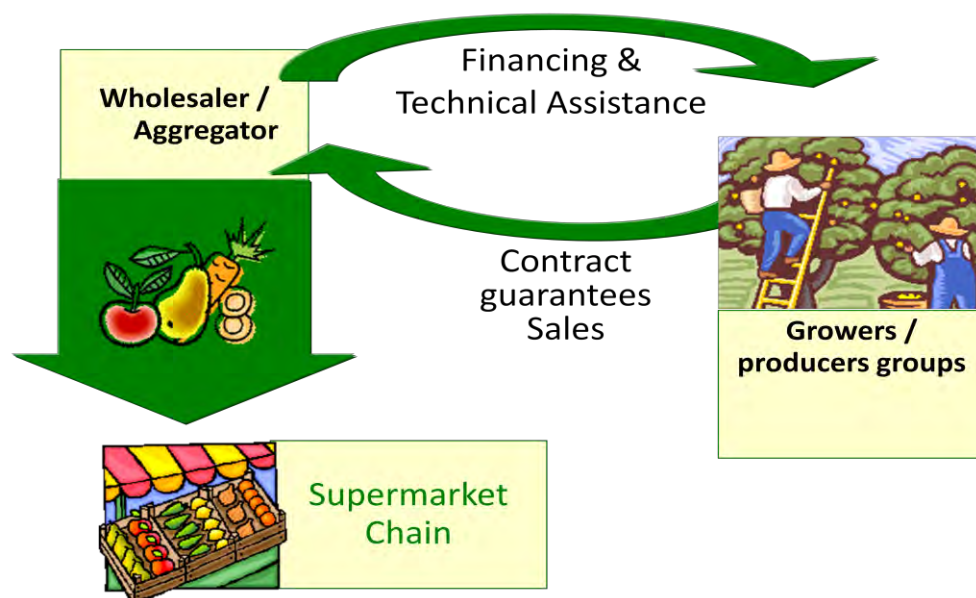


Figure 6: Sample contract farming sketch

9.1.5 Establishment of Market linkages

- Strengthening value chain actors relationship through win-win business
- Improve harvest and post harvest techniques through large traders, processors or exporters
- Linkage with local level service providers
- Involve private sector partners in facilitation process
- Based on seasonality and market demand planned for harvest and production
- Linkage for storage facilities
- Develop well functioning markets through transparent information, fair prices, sound infrastructure and reduced speculation
- Encourage co-operative (group) approaches to marketing for producers

- Promoting an enabling environment by improving access to credit and removing inappropriate government policies that create major challenges for a variety of stakeholders
- Increasing the commercial orientation of smallholder producers by bringing producers together and reducing market barriers. As they become more commercial, smallholders will produce more marketable produces and raise their incomes

Methodology:

- Assessment of producers
 - Capacity to produce and sale
 - Quality of the produces
 - Technology being using
 - Product quality and specification
 - Production planning
 - Post harvest management
 - Strength and opportunities (SWOT)
 - Willingness to grow as per buyers perspective
 - Communication mechanism

Table 19: Strategies for Market Linkage		
Assessment of traders, processors, market actors	Assessment of Service provision	Assessment of business enabling environment
<ul style="list-style-type: none"> • Type, location, other general information • Business volume and growth • Ranges of product with specification • Supply chain / value chain • Procurement system and selling style • Association member or not, types • Technology • Identification of potential traders, processors for market linkage • Willingness to work for producers 	<ul style="list-style-type: none"> • Availability • Skills, knowledge, attitude and qualification • Willingness • Growth (demand, supply) • Types of service provision • Service mechanism • Customer service • others 	<ul style="list-style-type: none"> • Assessment of constraints and opportunities in both sides • Assessment of cross border trade barriers and advantages • Assessment of different routes and means of transportation • Tax, tariff, and regulations • Mapping the markets and its channels • Participation in trade fairs with key stakeholders • Find solution for both sides as win – win business relationship • Find service providers • Intervention design and implementation module

Process for market linkage

- Share views individually – one-one meeting, counseling, match making meeting and group
- Arrange exchange meetings – exchange information
- Arrange workshops with the key value chain actors, service providers
- Capacity building to solve constraints in both sides – e.g. group selling, bulk buying, post harvest management, transportation, packaging, business planning, business management, entrepreneurship development
- Capacity building to find new markets, product development, and client service
- Success and lessons sharing
- Linkage with large buyers
- Create service provision (service market)
 - Pool of service providers locally (facilitator)
 - Skill development and capacity building of service providers
 - Linkage with traders and producers
 - Involve government services to the producers
- Piloting the intervention and replication
- M&E and Learning – feedback and improvements

9.1.6 Improvements of Packaging system and appropriate post harvest management

Sorting, grading, packaging and handling remains rudimentary in fruits sector in Afghanistan. The primary concern for producers or wholesalers is to pack as much of the product as possible into boxes or bags rather than to protect the fruit from damage and keep the fruits fresh and attractive. Each box, package, cartoon should contains relevant accurate information, quality grades, weight, brands and as per buyers requirements. Cartoon and crates should be used from the time harvesting till to the consumers. In every steps cartoon, package me be different as per requirement and types of the consumer. Considering target consumer pack may different. The produce would be placed into different packages depending on the produce and on destination

Based on the market and consumers (buyers) choice packaging should be improved, complying international standards and specification. If it is consumer pack it should be food graded and having following information on the pack.

- Name and address of the company (phone #)
- Products
- Origin
- Variety
- Date of packing
- Weight
- Name of the consignee and consignor
- Batch #
- Lot #
- Brand name
- others
- Product packaging must be:
 - Ventilated
 - Protects against contamination and physical damage
 - Strong
 - Insulated
 - Labelled
 - Non toxic
- Product packaging must not cause of food contamination
- Packages must be consider the requirement of the produce and meet the int'l standards

9.2 Medium Term Strategy – Regional and International

9.2.1 Create own Afghan brand

As afghan fruits has uniqueness it should have own brand name and used by all exporters whenever they export to others. Creation of countrywide one name would be better. Appropriate advocacy and awareness initiatives has to be undertaken in-consultation with MAIL, EPAA, ACCI, Associations, certification agencies, traders and exporters for creation of a country level branding.

9.2.2 Capacity building of the selected processors

- Linkage with producer groups, traders and smooth procurement
- Capacity building of the post harvest management and product development
- Establishment of showcase of hygiene in the processing factories
- Capacity building on market assessment and entrance into new markets (regionally)
- Capacity building on quality compliances and certifications
- Find new markets regionally targeted to super markets and large buyer
- Strengthen opportunities of regional markets
- Market assessment, opportunity identification
- Business delegation
- Visits and participate in trade fairs
- Meeting with CCI, traders associations
- Assessment of regulatory issues

9.2.3 Replication of short term strategies in new locations, places

Replicate success factors to other areas, other products and VCs

9.2.4 Standards and certification and branding requirements – HACCP, GlobalGAP ISO etc

Accessing regional and international markets require adherence to minimum standards. HPS could support developing a system for tracking and disseminating market requirements in terms of international standards and certification requirements.

- Business delegation to the target markets
 - Rapid market assessment
 - Explore new markets domestic, regional, international
 - Competitor's analysis and find competitive advantages
 - Trade Fair Participation
 - Exchange Meeting through – CCI, Importers Association, web-sites etc

Export Documents (Common)

- Bill of lading
- Certificate of origin and Form A – from ACCI
- Clean inspection report of findings
- Commercial invoice
- Quality Control Certificate
- Sanitary phytosanitary certificate - MAIL
- Customs export declaration
- Customs transit document – MOCI
- NOC/ Transit permit
- Packing list - specify characteristics of a commodity
- Form A (Export Tax Exemption Form) issued by Ministry of Finance
- Raisin Quality Certificate (meeting Codex Standard 67-1981) issued by Afghan Raisin, Fruits & Vegetable Export Promotion Administration (ARF&VEPA) under the Ministry of Commerce and Industry.
- Insurance certificate
- Terminal handling receipt

Participation in a Trade Fair

- Planning a visit to an exhibition
- Collecting the fact and set objectives
- Planning your trade fair appearance
- Choose right persons to be visiting
- Prepare all information's ready
- Exhibitor registration and stand setting
- Opportunities for visitors at exhibitions
- Set mirror on market assessment and open up new market
- promote an in-depth exchange of information
- Ensure your visibility – stand, brochure, catalogue, product display, information center, feedback, interactions, one-to-one counseling, meetings etc
- Find market dynamics and regulations
- Trade fair is a part of marketing mix,
- Networking at exhibitions
- Develop a database with feedback plan
- Travel and accommodation

Requirement for Bangladesh:

- Trade license
- Certificate of Origin
- Radioactive Certificate
- Phytosanitary certificate
- Commercial Invoice
- Packing List
- Importers VAT Registration Certificate
- Importers Tax Identification Number (TIN)
- 2% Sticker of Business Identification Number (BIN)
- Import Registration Certificate (IRC)

Regional Market

- India
- Bangladesh
- Pakistan
- Iran
- UZB
- Other

9.2.5 Proper Handling and Transportation

Maintaining cool chain is necessary for fresh fruits in every steps of the transportation, finding business effective routes also necessary.

Afghan fresh fruit is not pre-cooled which results in a 4-5 day shelf life for the fruit. With this in mind, outside of neighboring countries air transportation is the only means to better ensure delivery on time before the fruit expires.

Assessment of different routes, their cost effectiveness in terms of business viability and long time relationship is required. Low cost it does not mean that would be effective, think freshness quality and attractiveness of the products. As for example transportation through road to Delhi it takes 7-10 days time from Kabul, considering wastages, transportation duration fresh produces lost its shelf life and buyer (importer) in India lost interest to make the business though air freight is costly but it can go within a day kept produces fresh buyer might get good price in their markets.

Case Study:

International transportation to markets in Pakistan such as Peshawar and Lahore via the Torkham border can take 1 to 3 days depending on the queue at the border crossing. Technically, only the Torkham and Spin Boldak borders can be used for all Afghan goods destined for international destinations. However, borders can close without warning depending on the security and political situation. The Torkham border was closed repeatedly for anything between a few hours to several days from November 2012 to late January 2013, significantly impacting trade (negative). Afghan truck drivers are allowed to transport goods via Pakistan to a third destination. However, this method is not economically viable as the Afghan transporters are forbidden to load a new shipment in India, for example, for transit back to Afghanistan. This effectively doubles the cost of the shipment. Therefore, Afghan traders still prefer to use Pakistani trucks and drivers once the consignment crosses into Pakistan. The same rule applies to Pakistani trucks operating in Afghanistan. This drastically increases delivery time, another example of why fresh fruit is not economically viable to ship long distances. To overcome this challenge, traders offer transporters a bonus if they can get their fresh fruit shipment to the Pakistani markets before night fall on the first day.

The cost of transportation from Jalalabad to Peshawar, including taxes and duties, is approximately \$200 per MT. This covers the \$23 per MT permit charge payable to the Afghanistan Chamber of Commerce and Industries, \$70 per MT to Pakistani customs agents, \$5 per MT in illegal bribes, and fuel, depreciation, labor, and the margin of the transportation company. Transportation from Kabul or Kandahar to the Wagah border on the Indian side is balloons up to approximately \$400 per MT, (including 5% missing or damaged products). From the Wagah border to the Delhi markets is around \$16 per MT.

Source: Horticulture Sector Review, Altai Consulting, World Bank 2014

For example, air transportation to Delhi costs \$600 per MT with a maximum allowance of 30 MT per day. A 30 MT consignment costs would be \$18,000. It seems difficult to manage by one importer or exporter, in that case make a group in both side and do the business. HPS, MAIL, EPAA, ACCI, exporters association, and importers make a key facilitation role to form a group.

Road transportation costs vary greatly depending on the distances traveled, and road situation it varies from \$15 - \$50/100km/MT to cross international borders. A typical truck carries 15 MT making the average cost \$225 for every 100km.

From this case study it seems for long time business relationship and keeping Afghan brand on top to the consumer (regionally, internationally) air transportation would be better.

For this issues group production, group procurement and group export would be the solution.

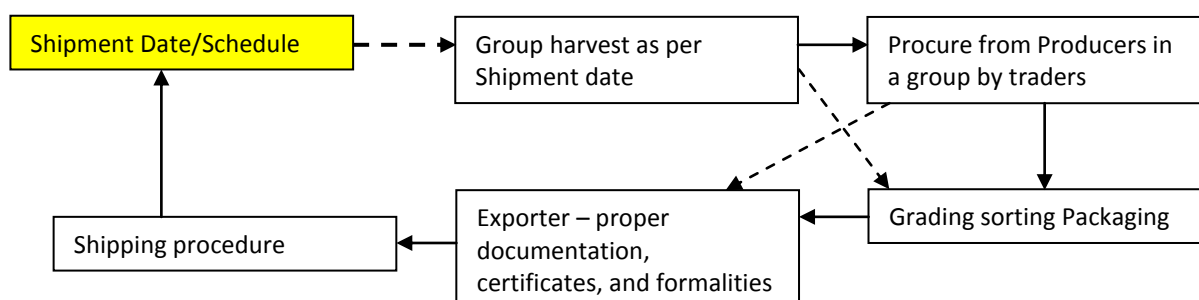


Figure 7: Group transportation model

9.2.6 Find cost effective routes (best routes):

Assessment of different routes, their cost effectiveness in terms of business viability and long time relationship is required. Low cost it does not mean that would be effective, think freshness quality and attractiveness of the products. As for example transportation through road to Delhi it takes 7-10 days time from Kabul, considering wastages, transportation duration fresh produces lost its shelf life and buyer (importer) in India lost interest to make the business but air freight costly but it can go within a day kept produces fresh buyer might get good price in their markets.

9.2.7 Synchronization of Market information – Medium

On time and right market information is required for any business especially for export and fruits markets varies frequently, so the synchronization and integration of the market information is required for fruit exports.

HPS and take a lead or make synergy with some of information providers to make the effort effective and flows to the producers, traders, exporters as regularly. There would be interactive websites or find a platform in this issues.

Following are the existing sources of market information available in Afghanistan

- MAIL ASMIS –
- Roshan's Malomat is a national agricultural price data system providing farmers access to wholesale prices of 41 commodities in 14 markets in Afghanistan and 1 in Peshawar, Pakistan
- The World Food Program (WFP), via its VAM project, collects prices of 13 commodities weekly in 8 markets across Afghanistan.
- Monthly price bulletins used to be created by the EU funded FAAHM program in collaboration with MAIL
- The e-Afghan Agriculture online repository is funded by USDA and implemented by UC-Davis.

9.2.8 Business delegation to the target markets and trade fair participation

Out of all the marketing instruments available trade fairs offer by far the widest range of functions. This is where exhibitors can conduct business, cultivate their image, look for business partners or examine the market. The same applies to visitors. Trade fairs are the ideal place for surveying the market, comparing prices and sales terms, trying out products, discussing their applications and doing business. However, in order to visit or exhibit or participation in a successful trade fair it is essential to prepare optimally and to choose the "right" event, the best option for meeting the set objectives. Trade fairs should not only be seen as an efficient communications and sales channel. They also influence product and pricing strategies, policies, packaging, product variations, supply chain, distribution, technology, customer behaviors, market linkage, and information. This will include:

- Rapid market assessment
- Explore new markets domestic, regional, international
- Competitor's analysis and find competitive advantages
- Different markets visits
- Exchange Meeting through – CCI, Importers Association, web-sites etc
- MoU with importers, associations, and others

Develop promotional materials, tools and means

- Develop a web site
- Develop product catalogue

9.3 Long Time Strategy

9.3.1 Advocacy of Export friendly rules, regulations and policies

- **Advocacy and Linkage with MAIL, EPAA, others**

Regular and periodic review of the agreements: Afghanistan has several business agreements like SAPTA/SAFTA, IPA, within the SAARC countries, and bilateral agreements between India and Pakistan. All of these agreements should be periodically reviewed. Any business agreement should have provision for proper and comprehensive market research for promoting the sustainability of the entrepreneurs.

Export friendly policy: The export friendly policy needs to be designed and implemented. Every Afghan mission embassies may have commercial unit they can work for linkage, meetings, market information and many others.

Bi-lateral and Tripartite agreement: As Afghanistan is a land locked country, tripartite agreement would help open up opportunity for export with neighboring countries like Pakistan, India, Iran, and other central Asians.

9.3.2 Create own Afghan brand

As Afghan fruits has uniqueness it should have own brand name and used by all exporters whenever they export to others. Creation of countrywide one name would be better. Appropriate advocacy and awareness initiatives has to be undertaken in-consultation with MAIL, EPAA, ACCI, Associations, certification agencies, traders and exporters for creation of a country level branding.

Branding on Afghan product as common effort - Creation of Afghan brand is necessary by the participation of all traders, processors, exporters and relevant government (MAIL, EPAA, MOCI, ACCI, exporters association, certification agencies)

9.3.3 Strengthen Export processing zone:

- Export-processing zone should be strengthened to facilitate grading, packaging, storage and merchandising at production site. Establishing export-processing zones for different products in land ports, where road communication is better, and exporters get preference setting up factories and processing plants. Facilities like bank, transportation, international standards inspection and quality control authority, environmental control, and other related services at the site also need to be established.

9.3.4 Quality Assurance scheme

- **Global GAP Certification:**
- **Traceability of the product:** it is necessary to keep all records of operation in every steps of value chain, to channelize the product flow and certification of different compliances e.g. GlobalGAP for EU market.
- **Adoption of International Quality Standards and Control System** - International standard compliances (e.g. GlobalGAP) are becoming important issue and countries are imposing various standards for imported goods. International standard quality management should be ensured for every exportable product. MAIL or any other authority can be modernized in line with product and need based standards. Therefore, the facilities for maintaining global quality standards have to be developed at the local market in Afghanistan also. Exporters, processors and entire values chain needs to be capacitate in this issues. Certification facilities need to be set up in the nearby export processing zones for easy and friendly access for the producers and exporters.

9.3.5 Strengthen Quality Certification Agencies

- Establishment or capacity building of laboratories by the relevant government agencies, regulatory bodies needs to strengthen further as per international standards e.g. HACCP, GlobalGAP, biological test, analytical test, etc.
- Capacity building of the relevant Human resources on various certification system

- International standard compliances (e.g. GLOBALGAP) are becoming important issue and countries are imposing various standards for imported goods. International standard quality management should be ensured for every exportable product. MAIL or other relevant authority can be modernized in line with product and need based standards. Therefore, the facilities for maintaining global quality standards have to be developed at the local market in Afghanistan also. Exporters, processors and entire values chain needs to be capacitate in this issues. Certification facilities need to be set up in the nearby export processing zones for easy and friendly access for the producers and exporters.
- Capacity building on quality compliances and certifications – HACCP, GlobalGAP, ISO etc
- Building capacities for trustworthy GlobalGAP accreditation, certification, and monitoring of fruit quality
- **Branding on Afghan product as common effort** - Creation of Afghan brand is necessary by the participation of all traders, processors, exporters and relevant government (MAIL, EPAA, MOCI, ACCI, exporters association, certification agencies)

9.3.6 Improvement of port facilities:

The standard export process requires improved infrastructural facilities. Afghanistan needs to improve the port facilities like adequate loading and unloading facilities, easy or one stop services for export documentation and other formalities. The arrangement of temporary warehouse, cold storage, and packaging system also need to be improved.

9.3.7 Establishment of showcase of hygiene in the factories

Every factory should be maintaining cleanliness, hygiene sanitation as per international standards both for domestic and international market. It includes machineries, workers, buildings, and other facilities also.

9.3.8 Development of Contract Farming system

As discussed earlier

9.3.9 Streamline with certified sampling, certified orchard, good processing and traceability

- Find new markets internationally (EU, USA) targeted to super markets, processors, importers and large buyer
 - Market assessment, opportunity identification
 - Product development as per international standards and compliances
 - Business delegation to the target markets and countries
 - Visits and participate in trade fairs
 - Meeting with CCI, traders associations
 - Assessment of regulatory issues
 - Cost and benefit analysis

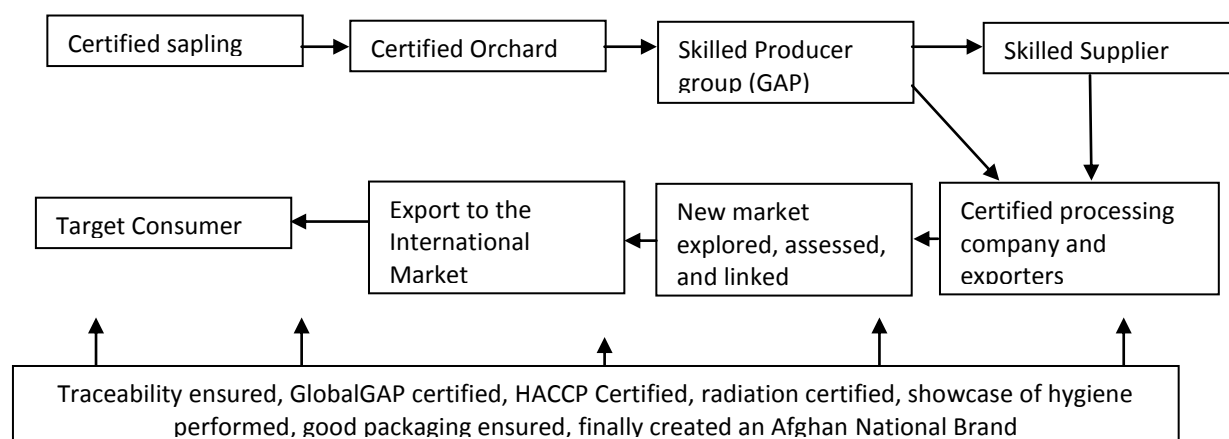


Figure 8: Long time fruit sector development traceability module

Deliverable -3: A set of Capacity Building material & tools used for focused training activities on Agro-product marketing for producers, processors, traders, wholesalers and exporters;

10 Capacity Building material & tools used for focused training activities on Agro-product marketing for producers, processors, traders, wholesalers and exporters;

A comprehensive secondary were conducted throughout the mission and sample stakeholders interview and need assessment were conducted for the development of the capacity building tools. On the basis of the stakeholders needs a two days long ToT were conducted ANDHO office.

ToT on Agro-Product Marketing:

A two days long ToT on “Basics of Agro-Product Marketing” was conducted on 25-26 November 2014 at HPS meeting room. 25 participants were attended from different portions of the market chain such as fruit producers (fresh + dry grapes, almond, prune, raisin) representative of producer groups, processors, traders of fresh and dried fruits, representatives from MAIL, DAIL, ANNGO, fruit exporters association, dry fruit cooperatives representatives, local development agencies. It was a very basic level of training to aware and made pool focal persons in the respective VC and marketing.

The training was covered mostly concept of sales and marketing, practices in fruits marketing, fruit market chain in Afghanistan and abroad, product and product quality management (post harvest issues, packaging, transportations), market assessment tools and tactics, SWOT competitors analysis, supply chain management, market linkage, export procedure, value chain and value chain relationship (role of VC actors), facilitation process and few others. Participants were proactive and enthusiastic to learn therefore it was lively and participatory event as adult learning process. Questions answers, group exercise, role play on sales and marketing, cross cutting issues between VC actors, practical examples, and pictorials were made the training lively. Participants also exercised to identify VC constraints, solution in each of the steps and during group exercise. Understand market chain/supply chain, relationship were also exercised during the training. Participants gained expectation of dry and fresh fruit traders from producers, that what standards and what requirements they want from producer’s end to export good quality, standardized and meets the international standards product to Asia, Europe, and American markets.

All of the participants understand that trustworthy relationship is necessary to make the business profitable and win-win relationship does matters. Participants were learned about export policy and support from EPAA, MAIL, ACCI, MOCI and other relevant agencies first time ever their life. It has encouraged export more in future.

At the end participants were committed to share gained knowledge, to their fellows and others for the development of the horticulture sector more functional toward getting good market.

There were 2 working group were formed to facilitate the lessons learning, functioning markets such as improvement of production including postharvest management for good quality of product headed by MAIL, another one flow of market information and buyers linkage/requirement by the association.

Finally, training completion certificates were distributed to the participants.

A PowerPoint presentation is given in Annexure II

A Value Chain based market assessment tools given in Annexure III

Deliverable 4: Develop a Questionnaire to assess the Import Policy of main regional and international countries importing Afghan goods;

11 Develop a Questionnaire to assess the Import Policy of main regional and international countries importing Afghan goods:

A numbers of questionnaire and tools has been developed in the view of market expansion and import policies of the import countries as below:

- Questionnaire for Importers
- Questionnaire for Exporters
- Questionnaires for Government officers in Importing countries

Sample questionnaires are given in Annexure IV

Deliverable – 5: A list of specific marketing initiatives for the domestic market, including a list of potential partners

12 A list of specific marketing initiatives for the domestic market, including a list of potential partners

12.1 Marketing initiatives for the domestic market

- Compile database on area of production, local production, processing, and identification of market channels
- Develop list of regional markets and large traders, wholesalers, processors, and transportation systems
- Formation of producer groups in target project locations (clusters of the target fruits)
- Value chain analysis each of the target fruits and markets to identify constraints, probable solutions, and intervention design
- Develop a list and profile of trade associations (traders, exporters, producers and others), both in national and international
- Develop a list and profile of exporters and processors
- Rapport building with associations, wholesalers, and large traders
- List of potential traders, processors and retails points and linked with producers groups
- Capacity building of the producer groups (institutional and technical), e.g. group management, group culture, group building and growth
- Capacity building of the producer groups on proper harvesting, post harvest and packaging and group activities (sales, marketing)
- Capacity building of the local traders (LSP) on quality issues, service provision and market linkages
- Facilitate and market linkage with large traders, wholesalers with local traders and producers groups with appropriate follow-up
- Facilitate on proper packaging and transportation (refrigerated and cool chain) of fruits in traders level
- Strengthening Associations – technical, intuitional and service delivery
- Facilitate to establish Contract farming arrangement with processors and institutional markets
- Facilitate group sales to ensure next level market and higher price
- Facilitate group sales to ensure next level market and higher price
- Improvements of Packaging system and appropriate post harvest management
- Strengthen quality certification systems
-

12.2 List of Potential Partners

- Kabul Dry and Fresh Fruit Exporters Association
- Other Associations
- Large processors
- Large wholesalers
- Other fruit Associations

List of Potential Exporters

List of Potential Exporter, Partners and Importers are given in Annexure V

Deliverables – 6: A list of potential medium term marketing initiatives for the regional market, including a list of potential partners

13 A list of potential medium term marketing initiatives for the regional market, including a list of potential partners

13.1 List of Midterm Initiatives

-
- Develop a list and profile of trade associations (traders, exporters, producers and others), both in national and international
- Develop a list and profile of exporters and processors
- Rapport building with associations, wholesalers, and large traders
- Capacity building (strengthen) of the associations of office management, service delivery, and organizational development
- Capacity building of the associations on sales, marketing and market chain (VC) including export market
- Capacity building on post harvest management and packaging of exporters , wholesalers and association members
- Capacity building of the exporters on export readiness
- Facilitate to create contract farming system with producer groups, processors, exporters, or large traders
- Facilitate to participate in trade fairs, delegation, market assessment and linkage to importing countries
- Facilitate to improve cool chain especially in refrigerated transportation to target destination (ports)
- Capacity building on market assessment and entrance into new markets (regionally)
- Facilitate to create own and Afghan brand
- Strengthen quality certification systems and authorization of international standards (recognition of international standards)
- Establishment of showcase of hygiene in the processing factories
- Facilitate standards of transportation and storage
- Facilitate to Develop proportional materials through association
- Establishment of showcase of hygiene in the processing factories
- Capacity building on quality compliances and certifications
- Standards and certification and branding requirements – HACCP, GlobalGAP ISO etc

13.2 List potential Partners

- Exporters Association Member and Association
- Fruit Processors and exporters
- Fresh fruit exporters and whole sellers

List of Potential Exporter, Partners and Importers are given in Annexure V

Deliverable 7: A list of potential long term marketing initiatives for the international high value markets, including a list of potential partners

14 A list of potential long term marketing initiatives for the international high value markets, including a list of potential partners

14.1 List of Potential Long Time Marketing Initiatives

-
- Capacity building of the certification agencies on prompt and modern certification system with international accreditation
- Advocacy of export friendly rules, regulations and policies
- Create one Afghan brand through Afghan foreign missions
- Export processing zone - Strengthen Quality Assurance scheme
- Streamline with certified sampling, certified orchard, good processing and traceability
- Create common platform and establishment of e-commerce type interactive web-site
- Improvement of port facilities
- Development of contract farming system
- Streamline with certified sampling, certified orchard, good processing and traceability

14.2 Potential Partners

- Importers Association of the respective countries
- Chain Super shops
- Retailers Association
- Large importers

List of Potential Exporter, Partners and Importers are given in Annexure V

Deliverable 8: Feasibility on Bangladesh Market and Business Delegation to Bangladesh

15 Brief of feasibility of Afghan Fruit Market in Bangladesh

Demand

Name fruits	Size of the Demand (MT)	Main exporting countries	Usual Season	Remarks
Grapes	16500	India, China, Pakistan, EU, South Africa	Aug-Dec India: Oct – Jan Pakistan: Aug-Oct China: Year round	Previously imported from Afghan but not now
Raisin	1750	India, China, Pakistan	Year round	
Almond	1500	India, China, Pakistan, USA, EU	Year round	

Wholesale price

Name fruits	Wholesale Price per kg	Retailer price per kg	Importers Impression
Grapes	Tk. 125-250	Tk.150- 300 at super market consumer pack Tk400-600	Quality variation too high Willing purchase direct from producers Willing to invite exports in Bangladesh and eager to visit Afghanistan
Raisin	Tk.250 – 800	Tk.250-300 Tk.1200 (consumer pack at super market)	Large size, washed and cleaned Processed factories will have good market and they are interested to process further
Almond	Tk.800 - 1400	Tk.1000-2200	Small pack size Processed factories will have good market and they are interested to process further

Note: US\$1=Taka 78

Documents/Certification required

- Certificate of origin
- Radiation Certificate
- Pesticide residual certificate
- Formalin free certificate (chemical free)
- Commercial Invoice
- Bill of Lading
- Sanitary and Phyto-sanitary certificate

Packaging required

Fruits	Packaging specification
Grapes	Plastic crate (18 kg) Ventilated paper cartoon
Raisin	Red and green both Bulk sac box (50 kg)
Almond	Bulk Large sac box

Main Competitors:

- India, China, Pakistan, Bhutan and USA

Mode of Transportation

Fruits	
Grapes	Refrigerated container (both 40 ft and 20ft) Water ways – china, and other countries Trucks – from India
Almond and Raisin	Trucks and container

Mode of Payment / Transaction

- Letter of Credit (LC)
- Consignments and advance payment is possible
- Bank LC

Regulation

- Around 90 per cent on product cost including - 30 per cent SD, 25 per cent Customs Duty (CD), 15 per cent Value Added Tax (VAT), 5.0 per cent Regulatory Duty (RD), 4.0 per cent Advance Trade VAT, 5.0 per cent Advance Income Tax (AIT) on import of fresh fruits
- Regulatory Duty (RD) (5% (CIFD + Supplementary Duty (SD)))
- Advance Trade VAT (4% CIFD)
- AIT(Advance Income Tax) (5% CIFD)

Possibilities for air freight:

- Importers are reluctant to air freight due to high cost (sometime 4-6 times than water ways)
- Air freight possible by Emirates (need further investigation with Emirates) per trip 20-25MT
- Charter cargo – possible (minimum 45 – 60 MT)

Interested on Afghan Fruit

- Very good quality product (Grapes, Almond, Apple and Pomegranate)
- Keen to import from Afghanistan
- Interested to use water transportation through Pakistan
- Some of them have good relation with Pakistan Importer; they might use such linkage for afghan products
- One of importer interested to make **contract farming**

Challenges

- Transportation – air freight
- Refrigerated truck, containers and use of ports
- Cost of products

List of Potential Importer in Bangladesh given in Annexure V

Deliverable 9: Measuring Indicators

Table 20: Sample Performance Measuring Indicators

Measuring Indicators	Description
Increased fruit sales(domestic and exports (volumes and value)	<ul style="list-style-type: none"> • Total official Domestic volume or % increased from ... MT to ... MT in 20 ... • Total official export volume or % increased from ... MT to ... MT in 20 ... • Total export value or % increased from ... million US\$ to ... million US\$ in 20... • # and area of certified orchard started with certified saplings • % of wastages reduced
Areas under coverage of fruits	<ul style="list-style-type: none"> • # hectare involved in fruit orchard (specify) year by year • # traders, producers involved in the VC strengthening
Access to market	<ul style="list-style-type: none"> • # new markets accessed, domestic, regional, international • # new buyer accessed, domestic, regional, international • # new routes for exports – specify • # of new product adopted by processors, exporters
Institutional strengthening	<ul style="list-style-type: none"> • # of association involved in VC development • # associations strengthened – specify • # adopted new technology, markets, certifications • # increase in members • Increased sales volume by the members (% , volume) • # of processors introduced new machineries in processing line
Enhanced capacities of value chain operators (actors) to comply with international market quality and product safety requirements	<ul style="list-style-type: none"> • % and # of fruits exporters, processors adopt certification scheme • # entrepreneurs received new certificates – specify e.g. HACCP, GlobalGAP etc • # participants trained in . . . certification system • Adopt show case of hygiene, sanitation, and quality parameters • # of laboratories capacitated – specify • # partners staffs capacitated of quality compliances issues • # producers harvested appropriately, adopted quality compliances – grading sorting packaging, and drying • # staffs in laboratory capacitated
Increased employment and income	<ul style="list-style-type: none"> • % increased income • more employees and seasonal laborers
Economic impact (profit)	<ul style="list-style-type: none"> • Increased export volumes and values and extra income & turnover companies (% and amount) • Extra employment generated along the supply chain • # new markets identified and entered into
Social impact (people)	<ul style="list-style-type: none"> • Increased employment in the agricultural sector and along the supply chain (also with services and input providers) • Enhanced knowledge about export to EU and advanced production and processing technologies
Other indirect impact	<ul style="list-style-type: none"> • Increased cooperation between SAARC countries. • The image of Afghanistan has improved through the proposed “Afghanistan Branding”

Sample data collection tools are given in Annexure VI



POST HARVEST MANUAL

Practical examples for:

- *Grape*
- *Raisin*
- *Plum*

Federico Valori

SO3 Post-Harvest & Quality Control Int'l Consultant



DISCLAIMER: This document aims at providing some advices on the most common mistake of the Postharvest Process. This document is prepared based on existing reports, document, scientific books and articles.

This manual should be considered as an aid to HPS staff and its intent for SO3 internal use only. Sources and copyright are reported in the bibliography.



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1. Introduction

The horticulture scenario, in Afghanistan, can be described as: a country with an ancient culture in dried fruit production with high export potentials and good domestic market. Thus, horticulture signifies a potential opportunity for the whole country in terms of industry and agribusinesses development. Horticulture crops in Afghanistan represent a large part of the agricultural production and a good chance of revenue (it represents over 30 % of the national export). The domestic and global demand for horticultural products is increasing, as well as, the request for an higher food security and safety. At the moment, Afghanistan horticultural production cannot satisfy these requirements due to its low quality standards.

In this document specific problems and suitable solutions for the main Afghanistan crops are proposed. In par. 2, a general overview of the basic concepts of Postharvest is given. In par. 7, a broad and exhaustive bibliography is reported for more details.

In this manual, some of the described Postharvest concepts are applied practically to the HPS-SO3 selected crops: grape, raisin, plum and almonds.

2 Postharvest: Basic concepts

In agriculture, Postharvest handling is defines as the stage of crop production immediately following harvest. The first important concept to underline is that: Fruit Quality cannot be improved after harvest, only maintained. Is clear how pre-harvest and harvest are fundamental parts in the definition of the crops quality.

The main goals of Postharvest techniques are:

1. to reduce the perishable of crops and increase the crops shelf life.
2. to harvest the product at its optimum maturity.
3. to maintain the product's internal and external quality throughout packing, storage and distribution.
4. to deliver the fruit to consumers at the time and in a form (e.g. ripe, cut up, etc.) that they will purchase it.
5. to generate market opportunities.
6. to delay, as long as possible, the tissue disintegration/senescence phase
7. to reduce and delay the action of the internal factors that are responsible for product deterioration
8. to avoid the negative effect of external factors

Postharvest techniques are used to reduce the percentage of crops losses, reduce the price for the consumer and thus increases the farmer's income. Postharvest improves overall quality and food safety, and it helps to increase the profits of the growers and marketers.

2.1 Fruit maturity

Maturation is defined as the time between final fruit growth and the beginning of ripening, and senescence (Crisosto, 1994_b). Maturation process is a flow supplied by the plant and defined by typical



flavors and characteristic colors the fruits. Harvesting process interrupts such flow. Harvesting fruits, depending on its type (climateric or non climateric), are “frozen” at the time of picking. The harvesting time, thus influence the storage life and quality of fruits. Fruits picked immature or fruits harvested over mature or full ripe they are easy susceptible to microbial and physiological spoilage and their storage life is considerably reduce. Such fruits persist numerous problems during handling, storage and transportation (Tamil university,2014).

Market and consumers define the minimum commercial requirements acceptance for fruits. This situation create different type of maturity:

- Physiological maturity: it refers to the stage in the development of the fruits when maximum growth and maturation has occurred.
- Commercial maturity: It is the state of fruits that reflects the market requirements.
- Harvest maturity is the time that according to the specific characteristics of the fruits allow to reach the market (and the final consumer) having acceptable flavor, taste and visual characteristics satisfactory and having adequate shelf life.

2.2 Postharvest steps

The main steps of the Postharvest are below briefly explained.

a. Cooling

As well explained in par. 3, temperature is one of the most important factor to maintain crops Postharvest quality. In general, removing field heat as rapidly as possible is highly desirable. The instant a crop is removed from the ground, or separates the product from its parent plant, it begins to deteriorate: harvesting cuts off a crops from its source of water, but it is still alive and will lose water, and therefore start to deteriorate. High temperature - e.g. direct exposure to sunlight- can accelerate the rate of respiration and therefore the rate of quality loss. Proper cooling should be applied to protect crops quality. One of the main problem of Afghanistan is the lack of infrastructures for cooling crops.

It is well known, how the refrigeration capacity is critical to reach the desired short-term storage or shipping pulp temperature rapidly to maintain the highest visual quality, flavor, texture, and nutritional content of fresh produce. Failure to cool at the optimum time may result in an elevated risk of persistent contamination or pathogen multiplication as natural plant barriers and resistance to microbial invasion is reduced.

Proper Postharvest cooling can:

- Suppress enzymatic degradation (softening) and respiratory activity
- Slow or inhibit water loss (wilting)
- Slow or inhibit the growth of decay-producing microorganisms (molds and bacteria)
- Reduce the production of ethylene (a ripening agent) or minimize the commodity's reaction to ethylene

At industrial level there are many different cooling system (Room cooling, forced-air cooling, hydrocooling liquid icing, vacuum cooling, etc). However in Afghanistan such techniques are not yet common used and are not reliable to be introduced in short term. In the current situation only some advices can be provided:

1. Harvest during cool part of the day (early morning).
2. Protect harvested grape from the direct sunlight.
3. Creation of rudimentary cooling facilities with a good aeration system.



4. Create a good aeration system in each step from the field to the packaging premises.

b. Cleaning

Cleaning fruits is of great concern to produce safe products: not only to protect products to Postharvest diseases, but also to protect consumers from food borne diseases (e.g. E. coli, Salmonella, Lysteria, Hepatitis, etc.). Clean water (cold or warm) is the basic techniques.

1. Reduce quantity of water but with high pressure is preferable to a large amount of water with low pressure.
2. Use of a disinfectant in wash water can help to obtain a better final products. Chlorine in the form of a sodium hypochlorite solution or as a dry, powdered calcium hypochlorite can be used in wash water as a disinfectant (Table 1). Ozonation is another technology that can be used to sanitize produce.

Test and trials on raisin washing steps are highly recommended.

Chlorine concentration		
	25 °C	40 °C
Fungi	30-40	10
Bacteria	20	10

Table 1 Minimum Chlorine concentration necessary to kill all pathogens within 1 minute at two temperatures at neutral pH

The most common cleaning methods are:

- Soaking. Soaking is used as a preliminary stage in the cleaning of root vegetables and other foods, which are heavily contaminated. Adhering soil is softened and some is removed, together with stones, sand and abrasive materials, which would damage the machinery, used in the later stages of cleaning (if any). The efficiency of soaking is improved:
 - i. by moving the water relative to the product by means of caged propeller-stirrers built into the tank.
 - ii. by moving the product relative to the water either by means of slow-moving paddles or by feeding the raw material into a horizontal perforated drum which rotates whilst partially submerged in the soak tank.
 - iii. Warm water improves the efficiency of soaking but the rate of spoilage of foods may be increased.
- Spray washing. The efficiency of spray washing depends on: water pressure employed, the volume of water used, the water temperature, the distance of the food from the spray origin, the time of exposure of the food to the sprays and the number of spray jets used.
 - i. A small volume of water, at high pressure, is the most effective general combination. However damage may be caused to ripe soft fruits such as strawberries and to delicate vegetables like asparagus. Spray drum washers and spray belt washers are used.
- Flotation washing. This method depends on a difference in buoyancy between the desired and desired parts of the food to be cleaned. Thus bruised or rotten apples, which sink in water, may be

removed by fluming the fruit into a tank and collecting the overflow of sound fruit. Heavy debris can be removed by fluming dirty produce over a series of adjustable weirs arranged in series.

Postharvest techniques, cooling system or washing procedures, are poorly applied in Afghanistan. With respect to the water potability the situation is critical i.e. water used in raisin process is not analyzed at all and without any tests or information on its safety, is difficult to imagine a reliable washing step (Figure 1). However, in some cases, water comes directly from mountain (spring water) or from very deeply wells (>200m). Of course such condition is not guarantee of potability or safety, but the chances of atrophic contamination are reduced.



Figure 1. Raisin factory - washing tank

c. Packing

Packaging is a power tool to preserve and obtaining maximum storage life and quality of fruits. The main characteristics of good packages are good ventilation and resistance. Ventilation will prevent, or at least delay, spoilage and reduce crops heating. Packages resistance is mandatory to prevent and avoid collapse. In general waxed cartons, wooden crates or rigid plastic containers are preferable to bags or open baskets, since bags and baskets provide no protection to the produce when stacked. Waxed cartons, wooden crates and plastic containers, while more expensive, are cost effective when used for the domestic market. These containers are reusable and can stand up well to the high relative humidity found in the storage environment (Kitinoja and Adel, 2002). Packing materials can act as vapor barriers and can help maintain higher relative humidity within the package. In addition, to protecting packages allow quick handling throughout distribution and marketing and can minimize impacts of rough handling. Produce can be hand-packed to create an attractive pack, often using a fixed count of uniformly sized units. Packaging materials such as trays, cups, wraps, liners and pads may be added to help immobilize the produce (Kitinoja and Adel, 2002). in Afghanistan, only few factories are equipped with mechanic packaging machinery. The normal and most common practice is the hand-made packaging. For the



domestic market the hand-made packages is not a relevant problems. Such approach is not advisable (and for some goods allowed) for goods addressed to be exported in EU or US.

2.3 Postharvest losses

Postharvest losses can be defined as losses of horticultural commodities in quality and quantity after harvesting till consumption.

There are numerous factors affecting Postharvest losses and part of such factors belong to the pre-harvest techniques; e.g. seeds source, rootstock, soil, trimming, pruning, heavy rain, irregular water supply, wrong fertilization - excess or deficiency-,etc. As said, the instant a crop is removed from the ground, or separates the product from its parent plant, it begins to deteriorate. The rate of crops perishable is mostly related to the water content. In fact, crops (fruits and vegetables) contain up to 95 percent of water. When food and water reserves are exhausted, produced dies and decays. Anything that increases the rate at which a product's food and water reserves are used up increases the likelihood of losses. The key processes during the Postharvest are:

- a) Respiration and Temperature,
- b) Transpiration,
- c) Ethylene production,
- d) Contamination,
- e) Transportation.

Some of the causes that enhance the above mentioned processes are:

- Temperature: e.g. chilling injury, freezing injury or high temperature injury,
- Relative atmospheric humidity,
- Altered atmospheric gas concentrations: e.g. Low O₂ or Elevated CO₂,
- Physical injury,
- Pathogens,
- Light,
- Rodents and other animals,
- Contamination.

a. Respiration and Temperature

After the harvest crops are still alive: respiration process, water losses and biochemical reactions are still on going. E.g. during the respiration, crops consume oxygen and produce carbon dioxide (Sugar+ O₂->Energy + CO₂ + Water + Heat). In addition, reduction of water, stored starch and sugar leading to aging of crop and its decay.

The respiration rate depends also on a good air supply; the lack of oxygen can start fermentation instead of respiration. In addition, poor ventilation, and thus the lack of O₂, also leads to the accumulation of carbon dioxide. When the concentration of carbon dioxide increases, it will quickly ruin products and crops.

Recapping, to an higher respiration corresponds a shorter shelf life (Table 2).



Respiration	Respiration Rate	Products
Room Temp.	mg CO ₂ /Kg Hr	
Low	5 - 10	Sugar beet, garlic, onion, watermelon, citrus.
Moderate	10 - 20	Cabbage, carrot, cucumber, mango, tomato, grape.
High	20 – 40	Avocado, cauliflower, lettuce, strawberry.

Table 2 Respiration rate of fruits and vegetables

Temperature is the most important factor influencing the Postharvest life of the given commodity. Temperature determine the rate of many biochemical reactions including respiration. Moreover, temperature is perhaps the single most important factor influencing disease development after harvest. Temperature not only directly influences the rate of pathogen growth, but also the rate of fruit ripening. The development of many Postharvest diseases (see point D, in this paragraph) is closely associated with fruit ripeness, so treatments which delay ripening tend also to delay disease development. Low temperature storage of fruit and vegetables is used extensively to delay ripening and the development of disease, although the temperatures commonly used for storage are not lethal to the pathogen. For this reason, cool-stored produce which is transferred to ambient temperatures for ripening and/or sale may rapidly breakdown with Postharvest disease. Temperatures used to store produce depend largely on the chilling sensitivity of the produce in question. Temperatures used to store produce depend largely on the chilling sensitivity of the produce in question. For example, many temperate fruit and vegetables (e.g. apples, peaches) can be stored at 0°C, whereas many tropical fruits cannot be stored below 10°C without developing symptoms of chilling injury (L. Coates, G.Johnson, 1997).

Respiration and temperature are strongly linked.

Typically, for every increase of 10°C, the respiration increases between 2 and 4 fold, according to the following formula:

$$Q_{10} = \left(\frac{R_2}{R_1} \right)^{\frac{10}{T_2 - T_1}}$$

R1=Respiration at Temperature 1 (T1)

R2=Respiration at Temperature 2 (T2)

The most significant factor is the ratio of the surface area of the fruit or vegetable to its volume. In other word the bigger the crops size the higher is the respiration rate, In addition the stages of development play an important role in the respiration rate. In general young leaves have an higher respiration.



External factors might increase the respiration rate. E.g mechanical damage and product's sanitary condition, Atmosphere composition (O₂, CO₂, ethylene), physical barriers (waxes, plastic films, etc.).

b. Transpiration

In botanic, transpiration is the process by which moisture is carried through plants from roots to small pores on the underside of leaves, where it changes to vapor and is released to the atmosphere. Transpiration is essentially evaporation of water from plant leaves and fruits (USGS). In Postharvest, transpiration, represents the losses of water from leaves, steam, fruits.

The number of factors¹ that determine transpiration rates are following reported divided in:

- 1) Temperature: Transpiration rates go up as the temperature goes up, especially during the growing season, when the air is warmer due to stronger sunlight and warmer air masses.
- 2) Relative humidity: As the relative humidity of the air surrounding the plant rises the transpiration rate falls. It is easier for water to evaporate into dryer air than into more saturated air. Is now clear how, shelf life tests must be conducted with controlled humidity.
- 3) Wind and air movement: Increased movement of the air around a plant will result in a higher transpiration rate.
- 4) Soil-moisture. When moisture is lacking, plants can begin to senesce (premature ageing, which can result in leaf loss) and transpire less water.
- 5) Species and varieties Plants transpire water at different rates.
- 6) Surface integrity and sanitary products conditions.
- 7) Altitude. Higher altitude have as a consequence the reduction of the transpiration. (Afghanistan has this natural advantage clearly visible during the grape harvesting).
- 8) Physical barriers (avoid air contact with the product-reduce transpiration rate).

c. Ethylene production

Ethylene is a naturally occurring plant growth substance, that has numerous effects on the growth, development and storage life of many fruits and vegetables. Harvested fruits may be intentionally or unintentionally exposed to biologically active levels of ethylene. The detrimental effects of ethylene on quality center on altering or accelerating the natural processes of development, ripening and senescence, while the beneficial effects of ethylene on quality center on roughly the same attributes as the detrimental effects, but differ in both degree and direction (Mikal E. Saltveit, 1999). Climacteric and non-climacteric crops are associated to the ethylene production:

Non-climacteric fruits they ripen without ethylene and respiration bursts, on the contrary climacteric fruits are sensitive to ethylene-produce larger quantities of ethylene in association with their ripening (Table 3). Non-climacteric fruit only ripen while still attached to the parent plant. Their eating quality suffers if they are harvested before fully ripe as their sugar and acid content does not increase further. Early harvesting is often carried out for export shipments to minimize loss during transport, but a consequence of this is that the flavor suffers.

As explained in the document "US 20140121110" (par. 7): Climacteric stage is the final physiological process that marks the end of fruit maturation and the beginning of fruit senescence. The climacteric event also leads to other changes in the fruit including pigment changes and sugar release. For those

1 USGS, website



fruits raised as food the climacteric event marks the peak of edible ripeness, with fruits having the best taste and texture for consumption. After the event fruits are more susceptible to fungal invasion and begin to degrade with cell death. Ethylene destroys the green color of plants. Leafy vegetables will be damaged if stored with ripening fruit. Ethylene production is increased when fruits are injured or decaying and this can cause early ripening of climacteric fruit during transport.

Climacteric (Ethylene producing)	Non-climacteric (Non ethylene producing)
Apples, pears, quince	Cherry, blackberry, strawberry
Apricot, nectarine, peach	Eggplant, cucumber, pepper
Mango, avocado, banana	Lemon, orange, mandarin
Tomato, sapodilla	Water melon, honey dew melon
Rock melon, passionfruit	Grape, lychee, loquat

Table 3 Examples of climacteric and non-climacteric products- Kader (1992).

The most commonly known use of ethylene is to trigger ripening in some crops, such as bananas and avocados. The application of ethylene at a controlled rate means that these products can be presented to the customer as “ready to eat”. The concentration of ethylene required for the ripening of different products varies. The concentration applied is within the range of 1 and 100 ppm. The time and temperature of treatment also influences the rate of ripening with fruit being ripened at temperatures between 15°C to 21°C ripening is the major Postharvest use of ethylene it can also be applied pre-harvest to promote Postharvest benefits (Jobling-Sydney Postharvest Laboratory).

d. Disease

Postharvest diseases (Table 4) are often the result of infections of the crops in the field before harvest (pre-harvest phase): fungi, bacteria and virus diseases can cause losses and fruits decay. Product affected by diseases made it unusable if the infection reaches the fruit's core. The loss of quality is when the diseases affected only the fruit surface.

Bad handling or bad harvesting (dirty equipment or lack of training) can enhance the infection rate and through mechanical injuries open the way to infections.



Disease	Pathogen	
	Anamorph	Teleomorph
Temperate Fruit		
Pome Fruit		
Blue mould	<i>Penicillium spp.</i>	
Grey mould	<i>Botrytis cinerea</i>	<i>Botryotinia fuckeliana</i>
Bitter rot	<i>Colletotrichum gloeosporioides</i>	<i>Glomerella cingulata</i>
Alternaria rot	<i>Alternaria spp.</i>	
Mucor rot		<i>Mucor piriformis</i>
Stone Fruit		
Brown rot	<i>Monilia spp.</i>	<i>Monilinia fructicola</i> (syn. <i>Sclerotinia fructicola</i>)
Rhizopus rot		<i>Rhizopus spp.</i> (mostly <i>R. stolonize</i>)
Grey mould	<i>Botrytis cinerea</i>	<i>Botryotinia fuckeliana</i>
Blue mould	<i>Penicillium spp.</i>	
Alternaria rot	<i>Alternaria alternata</i>	
Grapes		
Grey mould	<i>Botrytis cinerea</i>	<i>Botryotinia fuckeliana</i>
Blue mould	<i>Penicillium spp.</i>	
Rhizopus rot		<i>Rhizopus spp.</i>
Berries		
Grey mould	<i>Botrytis cinerea</i>	<i>Botryotinia fuckeliana</i>
Rhizopus rot		<i>Rhizopus spp.</i>
Cladosporium rot	<i>Cladosporium spp.</i>	
Blue mould	<i>Penicillium spp.</i>	
Subtropical Fruit		
Citrus Fruit		
Blue mould	<i>Penicillium italicum</i>	
Green mould	<i>Penicillium digitatum</i>	
Black centre rot	<i>Alternaria citri</i>	
Stem end rot	<i>Phomopsis citri</i>	<i>Diaporthe citri</i>
Brown rot		<i>Phytophthora citrophthora</i> and/or <i>P. parasitica</i>

Table 4 Examples of common Postharvest diseases and pathogens of fruits- L. Coates, G.Johnson, 1997.



Traditional strategies for Postharvest disease control and prevention²

- **Fungicides**

Fungicides are used extensively for Postharvest disease control in fruit and vegetables. Timing of application and type of fungicide used depend primarily on the target pathogen and when infection occurs. For Postharvest pathogens which infect produce before harvest, field application of fungicides is often necessary. This may involve the repeated application of protectant fungicides during the growing season, and/or strategic application of systemic fungicides. In the Postharvest situation, fungicides are often applied to control infections already established in the surface tissues of produce or to protect against infections which may occur during storage and handling. In the case of quiescent field infections present at the time of harvest, fungicides must be able to penetrate to the site of infection to be effective. How successful fungicides are in doing this depends largely on the extent to which infection has developed at the time of fungicide application and how effectively the fungicide penetrates the host tissue. In general, fungicides for the control of wound-invading pathogens should be applied as soon as possible after harvest. If infection is well advanced at the time of Postharvest treatment, control will be difficult to achieve. The usual approach with controlling wound pathogens is to maintain a certain concentration of the fungicide at the injury site which will suppress (though not necessarily kill) pathogen development until the wound has healed. In this sense, most of the 'fungicides' which are used Postharvest are actually fungistatic rather than fungicidal in their action under normal usage. Disinfectants such as sodium hypochlorite can be used to kill pathogen propagules on the surface of fruit, but are unable to control pathogens once they have gained entry to host tissue. Postharvest fungicides can be applied as dips, sprays, fumigants, treated wraps and box liners or in waxes and coatings. Dips and sprays are very commonly used and depending on the compound, can take the form of aqueous solutions, suspensions or emulsions. Fungicides to control Postharvest diseases of citrus and some other fruit are often applied to the fruit in wax on the packing line.

- **Maintenance of host resistance to infection through manipulation of the Postharvest environment**

The ability to control the Postharvest environment provides a good opportunity to delay senescence.

- **Temperature**. The effects of temperature were discussed in point a of this paragraph.
- Modifying the **storage atmosphere** is sometimes used to delay produce senescence. The rate of fruit respiration can be reduced by increasing CO₂ and decreasing O₂ levels in the storage environment. Storage atmosphere can also have a direct effect on pathogen growth, although levels of CO₂, or O₂ required to achieve this are often damaging to the produce if applied for extended periods.
- The **relative humidity** of the storage environment can have a major influence on the development of Postharvest disease. High humidities are often used to minimize water loss of produce. This however can increase disease levels, particularly if free moisture accumulates in storage containers.

2 The techniques here reported are from L. Coates, G. Johnson, 1997

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- **Hygiene practice**

Maintenance of hygiene at all stages during production and Postharvest handling is critical in minimizing sources of inoculum for Postharvest diseases. In par.3 hygienic practices are fully explained.

- **Pre-harvest factors**

A wide range of pre-harvest factors influence the development of Postharvest disease. These include the weather (rainfall, temperature, etc.), production locality, choice of cultivar, cultural practices (pesticide application, fertilization, irrigation, planting density, pruning, mulching, fruit bagging, etc.) and planting material. These factors may have a direct influence on the development of disease by reducing inoculum sources or by discouraging infection. Alternatively, they may affect the physiology of the produce in a way that impacts on disease development after harvest. For example, the application of certain nutrients may improve the 'strength' of the fruit skin so that it is less susceptible to injury after harvest and therefore less prone to invasion by wound pathogens.

- **Prevention of injury**

See point e. of this paragraph.

- **Heat treatments**

Heat treatments applied after harvest can be used to control certain Postharvest diseases. Heat works by either killing the pathogen or by suppressing its rate of development following treatment.

- **Ionising radiation**

Ionising radiation is another physical treatment that can be used after harvest to reduce disease in some commodities. Like heat, commodities must be able to tolerate the doses of ionising radiation required to achieve disease control. Some commodities are surprisingly tolerant. For example, strawberries can tolerate the doses of radiation required to effectively control grey mould caused by *Botritis cinerea*. In other commodities, however, abnormal ripening, tissue softening and off-flavours can result from applying ionising radiation at doses lethal to the target pathogens. Poor consumer acceptability of food irradiation coupled with high treatment costs pose additional limitations to the widespread use of this technology at the present time.

e. Mechanical injury

Fruits and vegetables are very susceptible to mechanical injury. This can occur at any stage of the value chain and can result from poor harvesting practices such as the use of dirty cutting cutters; unsuitable containers used at harvest time or during the marketing process, e.g. containers that can be easily squashed or have splintered wood, sharp edges or poor nailing; over-packing or under-packing of containers; and careless handling of containers. As many Postharvest pathogens gain entry through wounds or infect physiologically-damaged tissue, prevention of injury at all stages during production, harvest and Postharvest handling is critical. Injuries can be either mechanical (e.g. cuts, bruises and abrasions), chemical (e.g. burns), biological (e.g. insect, bird and rodent damage) or physiological (e.g.



chilling injury, heat injury). Injuries can be minimized by careful harvesting and handling of produce, appropriate packaging of produce, controlling insect pests in the field, storing produce at the recommended temperature and applying Postharvest treatments correctly (L. Coates, G. Johnson, 1997).

f. Contaminants

Some fruits and vegetables are also susceptible to contaminants introduced after harvest by use of contaminated field boxes; dirty water used for washing produce before packing; decaying, rejected produce lying around packing houses; and unhealthy produce contaminating healthy produce in the same packages.

g. Transport

Losses directly attributed to transport can be high, particularly in developing countries. Damage occurs as a result of careless handling of packed produce during loading and unloading; vibration (shaking) of the vehicle, especially on bad roads; and poor stowage, with packages often squeezed into the vehicle in order to maximize revenue for the transporters. Overheating leads to decay, and increases the rate of water loss. In transport it can result from using closed vehicles with no ventilation; stacking patterns that block the movement of air; and using vehicles that provide no protection from the sun. Breakdowns of vehicles can be a significant cause of losses in some countries, as perishable produce can be left exposed to the sun for a day or more while repairs are carried out.

2.4 Postharvest losses of food in Afghanistan

In industrialized countries Postharvest losses of food ranged between 5-25% loss after harvest. The percentage is bounded to the crop varieties and process, cooling, cleaning, sorting, storage and packing and can, for some crops, reach 50%.

Food Postharvest losses in Afghanistan are generally higher, for the following reasons (FAO, a, 1989):

- Fruits and vegetable are not sorted after harvest
- Produce are improperly handled during harvest, storage, transport and at the retail point
- Produce stay long periods in inappropriate storage conditions (too hot or cold, not ventilated and exposed to insects, rodents, and dust)
- Food processing techniques often suffer from the following weaknesses and constraints:
- Poor hygiene conditions, leaving foods exposed to dust and insects
- Limited awareness and knowledge about simple food processing techniques
- Low quality of processed foods, making them unsuitable for marketing or unsafe for consumption
- Limited access to food processing equipment and materials, in particular packaging

The Afghanistan Postharvest losses are divided between:



- Process and Packaging (15 %)
- Long range transportation (30-40%)
- Harvesting (10-15%)
- Storage (10%)

Such values are generic and different kind of produce and varieties might sensible changed such values.

3 HACCP Basic Concept

3.1 HACCP

The Hazard Analysis and Critical Control Points (HACCP) system is a logical, scientific approach to controlling hazards in food production. The application of HACCP is based on technical and scientific principles that assure food safety. An ideal application would include all processes from the farm to the table. The principle of HACCP can be applied to all the productions: from food home preparation to processing, shipping and distribution.

HACCP is a systematic approach that, if correctly applied, allows to identify, assess and control (reduce) the risk of biological, chemical and physical hazards. The concept is to develop a system that anticipates and identifies specific point in the production process—known as critical control points (CCPs)—where contaminants (biological, chemical and physical hazards) might be introduced or other food safety concerns can be identified. CCPs is measurable and a specific threshold is defined (i.e. critical limits). When critical limits are exceeded, corrective actions are foreseen and reported in specific procedures. The taken corrective actions must be documented and registered.

HACCP methodology, as well as the whole safety management system, has the aims at:

- Protecting People
- Keeping the Employees and Customers
- Preventing Food Safety Errors

With HACCP, part of the safety management are Good Agricultural Practices (GAPs) and Good Manufacturing Practice (GMPs). All these components represent the integrated Safety and Quality System (Figure 2).

GAP, are specific methods and guidelines which, when applied to agriculture, help growers to minimize potential biological hazards during production and harvesting of crops. GAP is not a certificate, the certification based on GAP procedures is called GlobalGAP (www.globalgap.org/).

GMP, are the practices required in order to conform to guidelines recommended by agencies that control authorization and licensing for manufacture and sale of food, drug products, and active pharmaceutical products (Wikipedia). In other words GMPs define procedures to be used by handlers to allow crops to be processed, packed and sold under sanitary conditions.

HACCP is applied to the entire production system and represents the final stage of an integrated system dedicated to guarantee the food safety. Food safety is the assurance that food will not cause harm to the consumer when it is prepared and/or eaten according to its intended use. HACCP is not a certificate.



Figure 2 Safety and Quality Management Systems

HACCP is presented as a preventative system rather than an inspection system of controlling food safety hazards. In Afghanistan such approach is not fully reliable. In the current situation -in which there is still no law on food production and the quality system is totally absent- a control system based on institutional inspections and analytical control, is mandatory. In the future, of course, is advisable the fully adaptation of the principle of HACCP as preventive system. Prevention of hazards cannot be accomplished by end product inspection, so controlling the production process with HACCP offers the best approach, indeed. The current situation of Afghanistan production present the following main problems:

- Absence of food inspection, including meat inspection
- Lack of infrastructure, such as adequate refrigeration.
- Poor hygiene, including a lack of clean water supplies.

In this document the HACCP schemes are reported for the selected crops.



4 Fresh Fruits: GRAPE

4.1 Grape a General Overview

Fresh grapes represent a good and developed market for Afghanistan. From the value chain analysis the most reliable opportunity is mainly focused on the domestic market compare to the international market. Recapping, the main bottlenecks of grape value chain are: transportation and packaging. All the interventions should be focused on these main aspects: in the first place with the individuation of transportation company with refrigerated trucks. Second to provide suitable boxes for harvest and conservation (e.g. plastic boxes for the harvest and plastic shell for grape transportation and conservation).

Here follow are reported the main characteristics of Grape:

- Table grape is a non-climacteric fruit with a low rate of physiological activity, but are subject to serious water loss.
- Browning stem and gray mold infection (caused by the fungus *Botrytis cinerea*), are the two main factors which reduce table grape Postharvest quality.
- Gentle handling, careful cluster cleaning, fast hauling and cooling, low temperature, and weekly SO₂ application during storage are recommended to reduce the incidence of these two problems (Crisoto, 1994).
- Seasonal activities: Summer (*mid June through mid September*)

4.2 Afghanistan Grape

The available Afghan grape varieties are reported in ANNGO catalog 2015.

From the ANNGO catalog here below the list of available varieties with their main characteristics are reported. In Figure 3 is shown the grape ripening time calendar for grape in Khandahar.

1. Variety name: Fantasy 224

Flowering time: 1st to 3rd week of May

Ripening time: 2nd week of July

Bunch size: long

Berry size: medium

Berry color: pale black

Seed presence: absent

Sugar Content: 20 Brix

Overall: one of the early variety, good for fresh market, not so sweet

2. Variety name: Crimson Seedless 225

Flowering time: 1st to 3rd week of May

Ripening time: 2nd week of August

Bunch size: long

Berry size: big

Berry color: red

Seed presence: absent

Sugar Content: 21 Brix

Overall: late variety, sweet and juicy

3. Variety name: Perlette 226

Flowering time: 1st to 3rd week of May

Ripening time: 1st week of July

Bunch size: small

Berry size: medium



Berry color: green yellow
Seed presence: absent
Sugar Content: 21 Brix
Overall: very early variety, not so sweet

4. Variety name: Flame Seedless 221
Flowering time: 1st to 3rd week of May
Ripening time: 2nd week of July
Bunch size: long
Berry size: medium
Berry color: deep red
Seed presence: absent
Sugar Content: 17 Brix
Overall: early variety, good for fresh consumption

5. Variety name: Emperor 222
Flowering time: 2nd to 3rd week of May
Ripening time: 4th week of July
Bunch size: medium
Berry size: medium
Berry color: red
Seed presence: present
Sugar Content: 21 Brix
Overall: good for fresh consumption

6. Variety name: Black Emerald 223
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of June
Bunch size: long
Berry size: medium
Berry color: black
Seed presence: absent
Sugar Content: 22 Brix
Overall: it is early variety, recommended for fresh consumption

7. Variety name: Cardinal 229
Flowering time: 1st to 3rd week of May
Ripening time: 3rd week of July
Bunch size: medium
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 23 Brix
Overall: N/A

8. Variety name: Exotic 230
Flowering time: 2nd to 3rd week of May
Ripening time: 3rd week of July
Bunch size: long
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 23 Brix
Overall: N/A

9. Variety name: Kandahari 236
Flowering time: 4th week of April
Ripening time: 3rd week of June
Bunch size: small
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 13 Brix
Overall: early variety, it is very sweet and juicy



10.Variety name: Lal Sorkh 736
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of July
Bunch size: small
Berry size: medium
Berry color: red
Seed presence: present
Sugar Content: 23.5 Brix
Overall: best for fresh consumption

11.Variety name: Raucha Sorkh 714
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of June
Bunch size: small
Berry size: small
Berry color: dark red
Seed presence: present
Sugar Content: 16 Brix
Overall: one of the earliest variety, compact bunch, white Raucha is also available

12.Variety name: Red Globe 228
Flowering time: 1st to 3rd week of May
Ripening time: 1st week of August
Bunch size: long
Berry size: big
Berry color: red
Seed presence: present
Sugar Content: 22 Brix
Overall: late mid variety, good for fresh market

13.Variety name: Ribier 232
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of July
Bunch size: long
Berry size: medium
Berry color: black
Seed presence: present
Sugar Content: 18 Brix
Overall: early mid variety, good for fresh market

14.Variety name: Cheshmi Gao 237
Flowering time: 2nd to 3rd week of May
Ripening time: 3rd week of July
Bunch size: small
Berry size: big
Berry color: green yellow
Seed presence: present
Sugar CoGrape ripening time in Kandahar tent: 16 Brix
Overall: mid variety, very sweet, good for fresh market

15.Variety name: Sahibi 240, 874
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of July
Bunch size: medium
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 19/16 Brix
Overall: good for fresh consumption

16.Variety name: Sahibi Spin 891
Flowering time: 2nd to 3rd week of May



Ripening time: 4th week of June
Bunch size: medium
Berry size: medium
Berry color: green yellow
Seed presence: present
Sugar Content: 14 Brix
Overall: export quality, sweet and juicy

17. Variety name: Shir Ahmadi 219
Flowering time: 1st to 3rd week of May
Ripening time: 4th week of July
Bunch size: long
Berry size: medium
Berry color: green yellow
Seed presence: absent
Sugar Content: 18 Brix
Overall: recommended for fresh consumption and drying

18. Variety name: Cardinal 229
Flowering time: 1st to 3rd week of May
Ripening time: 3rd week of July
Bunch size: medium
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 23 Brix
Overall: N/A

19. Variety name: Exotic 230
Flowering time: 2nd to 3rd week of May
Ripening time: 3rd week of July
Bunch size: long
Berry size: medium
Berry color: dark red
Seed presence: present
Sugar Content: 23 Brix
Overall: N/A

Grape ripening time in Kandahar												
Variety	ورایتی	Clone Number	نمبر کلون	July - اسد			August - سنبله			September - قوس		
Perlette	پرلیت	AFG0226										
Flame Seedless	فلیم سیدلس	AFG0221										
Black Emerald	بلک امیرالک	AFG0223										
Fantasy	فانتسی	AFG0224										
Hussaini Qalamak	حسینی قلمک	AFG0725										
Ayta Qalami	آیتہ قلمی	AFG0353										
Hussaini	حسینی	AFG0497										
Keshmeshi Sorikh	کشمشی سرخ	AFG0502										
Ayta	آیتہ	AFG0553										
Ayta	آیتہ	AFG0216										
Raicha Safid	روچه سفید	AFG0300										
Exotic	ایگزوتیک	AFG0230										
Riber	ریبر	AFG0232										
Redglobe	ریڈ گلوب	AFG0228										
Emperor	ایمپیرر	AFG0222										
Emperor	ایمپیرر	AFG0536										

Figure 3 Grape ripening time in Kandahar

4.3 Physiological and Physical Disorders³

Shatter. (Loss of berries from the cap stem) In general, shatter increases in severity with increasing maturity, i.e., the longer the fruit remains on the vine. Berries of seedless cultivars, are usually less well attached to the cap stem than seeded cultivars. Shatter varies considerably from season to season, and there is a large difference among varieties. Gibberellin applied at fruit set weakens berry attachment. Shatter occurs mainly due to rough handling during field packing with additional shatter occurring all the way to the final retail sale. Shatter incidence can be reduced by controlling pack depth and fruit packing density (cubic inches per pound), using cluster bagging, gentle handling and maintaining recommended

3 UC-Davis: <http://postharvest.ucdavis.edu/PFfruits/Grape/>

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temperature

and

relative

humidity

Waterberry. Waterberry is associated with fruit ripening and most often begins to develop shortly after veraison (berry softening). The earliest symptom is the development of small (1-2 mm) dark spots on the cap stems (pedicles) and/or other parts of the cluster framework. These spots become necrotic, slightly sunken, and expand to affect more areas. The affected berries become watery, soft, and flabby when ripe. In California, this disorder has been associated with a high nitrogen status vine, canopy shading, or cool weather during veraison and fruit ripening. Avoid over fertilization with nitrogen. Foliar nutrient sprays of nitrogen should be avoided in waterberry-prone vineyards. Trimming off affected berries during harvest and packing is a common practice, although labor intensive.

Pathological Disorders

Gray Mold (*Botrytis cinerea*). Gray mold is the most destructive of the postharvest diseases of table grapes, primarily because it develops at temperatures as low as 31°F (-0.5°C) and grows from berry to berry. Gray mold first turns berries brown, then loosens the skin of the berry, its white, thread-like hyphal filaments erupt through the berry surface, and finally masses of gray colored spores develop. Wounds near harvest also provide opportunities for infections. No wound is required for infection when wet conditions occur.

Botrytis infection can be reduced by removing desiccated, infected grapes of the previous season from vines, leaf-removal canopy management, preharvest fungicides, trimming visibly infected, split, cracked, or otherwise damaged grapes before packing, prompt cooling and fumigation with sulfur dioxide (100 ppm for one hour) or use of continuous release SO₂ pads.

4.4 Grape value chain

The current situation of the Afghan grape growers, is made by farmers with low or none knowledge and limited techniques. Few investment are made on the vineyards and even lower investments are put in Postharvest technologies. In Afghanistan, three different type of grape (table or raisin) growers are present: accidental, opportunist and commercial.

Accidental growers are farmers that start the grape (or raisin) production without any experience and without any knowledge. This kind of farmers are often part of International project with a limited understanding of the territory.

Opportunistic growers are farmers with good financial reservoir that start grape production (or raisin) according to the economical grape (raisin) positive trends as medium-long term investment.

The accidental and opportunistic behavior are particularly damaging for the raisin productions. The number of specific raisin producer, indeed, are limited and the grape addressed to become raisin is normally the worst one or the unsold. This situation create a large amount of raisin with very poor quality. Poor quality in large quantity determine two main consequences: lower price for low quality raisin and unfair final price for the good raisin quality.

Commercial grape growers are farmers that have understand that, Afghanistan lives is on fore front of international customer base and many quality requirements. Fore front brings understanding and commitment to these specifications.

In the international scenario accidental and opportunistic growers found less and less room due. Such obligation, is linked to the increasing demand of more guarantee on food safety, cosmetic quality, phytosanitary regulations and cold chain, by the final consumer. In order to ensure market access and a future in the horticulture afghan industry, adherence to food safety, phytosanitary regulations and quality specifications can't be limited only to the harvest period.



Educated and knowledgeable employees, appointed specifically for these tasks within exporting company, is of utmost importance to ensure that all requirements and specifications for goods addressed to be exported, are communicated to the growers and adhered to.

One of the most critical aspects of the above reported situation is the fact that the grape production must be an holistic approach to growing, packing, exporting and even importing of fruit is necessary and the different aspects can't be seen in isolation. As a consequence, massive financial and work inputs are required. The farmers faced the situation of a high-risk financial request to applied the "right" technologies and practices or follow the traditional approach and be part of the accidental growers (Grape-Alliance policy. Normandie, Orchard, 6870, South Africa).

4.5 Harvest criteria

Time of harvest is probably the most important and challenging viticultural decision for grape producers due to the difficulty of assessing grape maturity in the vineyard and predicting grape quality: too early and the grapes are too acid. Too late and they may lack acidity or suffer reduced yields from bird damage or rots. The berries must contain the correct balance of flavor and aromatic compounds. The typical maturation levels of sugars should lie between 16% and 24% and acid between 0.6% and 1%. The yield of juice depends primarily on the cultivar's degree of pulpiness. Other factors influence yield such as the stage of ripeness, size of berries, seediness, thoroughness of fermentation and efficiency of crushing, pressing and other operations (Chervin et al., 2012). Grapes meant for table purpose should not be harvested until ready to eat, since they do not ripen after harvest. They should be picked only after they reach the optimum stage of acceptability in appearance, flavor and texture.

Key criterion for harvesting are:

- Color of berries
- Sugar content

4.6 Grape maturity

Grape is a non-climacteric fruit and its berries ripen only on the vine. Hence, ripening standards are practically applicable for harvesting. Maturity of fruits and vegetables is an indication of the development of the crop as a marketable product. Selection of right stage of maturity for harvest is an important aspect, which has considerable influence on storage life and quality and final acceptance by the consumer.

The grape was one of the first fruits to be cultivated by man and during the years grape maturity index have been developed. Grape maturity is associated with three main measure: °Brix, pH, and TA.

- Brix scale. A hydrometer scale for measuring the sugar content of a solution at a given temperature, usually 20°C (68°F). Grape Brix is measured using the refractometer. The refractometer is an optical instrument, hand-held or digital. It measures the deviation of light produced by the sugar or solids dissolved in the liquid. The higher the sugar content, the wider the deviation, measured in Brix degrees (° Bx) in 0.1% graduations. It determines the total content of soluble solids (TSS) or sugar in a fruit juice or solution.

- pH scale is a measure of how acidic or basic a substance is. While the pH scale formally measures the activity of hydrogen ions in a substance or solution, it is typically approximated as the concentration of hydrogen ions. pH is measured with pH-meter.



- Titrateable Acidity is the total amount of all acids in your grape sample that can be titrated with a strong base to an end point of pH 8,1. Titration is a chemical process used in ascertaining the amount of acids in a sample by using a standard counter-active reagent, e.g. an alkali (NaOH 0,1 N) and a pH meter. The point of neutrality or the end-point of titration is reached at pH 8,1.

Grape Maturity index are not unique and can changed with many parameters. PHPD pomology laboratory is running tests in order to define for the existing grape varieties the right and specific maturity index. By now the bibliography give some generic range to determine the grape maturity (reported in par.4,2) In grape description is also reported the optimum Brix content for harvesting for each single varieties.

Table grapes must be sufficiently developed and display satisfactory ripeness.

In order to satisfy this requirement, the fruit must have obtained a refractometric index of at least 16°Brix.

Fruit with a lower refractometric index are accepted provided the sugar/acid ratio is at least equal to:

- (a) 20:1 if the Brix level is greater than or equal to 12.5° and less than 14°Brix,
- (b) 18:1 if the Brix level is greater than or equal to 14° and less than 16°Brix.

4.7 Subjective criteria for estimating grape maturity

As reported in par. 3.2 the scientific methods to determine the optimum harvest time is related to chemical parameters that required specific instruments to be determined. Grape growers in Afghanistan currently are not in the conditions to have access to such instruments. In addition the Postharvest parameters are changing among the same Province. Since this is subjective, it is difficult to have the tools to make proper decisions.

A scorecard was developed to aid with this process using a check list for subjective criteria for assessing grape maturity as follows (Table 5, Dami, 2013).



Attribute	Level of attribute	Points Awarded
Color	Green (lack of color)	0
	Color change; translucent	1
	Fully-matured color	2
	Over-mature color	1
Ease of removal of berries from pedicels	High resistance	0
	Moderate resistance	1
	Little/no resistance	2
Texture upon touch Texture – initial bite	Firm	0
	Soft/elastic	1
	Shriveled; loss of shape	0
	High resistance	0
Ease of skin collapse	Moderate resistance	1
	Low resistance	2
Mechanical features of the pulp	Thin; watery	0
	Viscous	2
	Jelly-like	1
Aroma	None	0
	Recognizable varietal aroma	2
Flavor upon chewing		
Initial character (upon chewing)	Unripe; green; bland	0
	Some varietal character	1
	High varietal character	2
Release from skin	None	0
	Typical varietal character	1
After taste	None	0
	Bitter, astringent	0
	Typical varietal character	1
Maximum total		15

Table 5 Subjective criteria for estimating grape maturity

Harvest Practical advices:

- it is necessary to prune long shoots or strip leaves to allow for better grape coloration and offer pickers easier access to the fruit.
- Harvest the berries on the coolest time of the day (early morning).
- Harvesting of berries must stop once the pulp temperature reaches 28°C.
- If rain wet the cluster thoroughly, it is important to suspend/delay the harvesting operation so as to avoid the fungus infection thereafter.
- Harvesting should be done with the help of sharp knife or clippers specially designed for grapes.
- Harvested produce should be kept under shade or in cool place
- Grapes should be harvested after the berries ripen on the vine and attain their color.
- Harvesting should be done with a suitable harvesting tool.
- Harvested berries should be kept at dry and cool place.
- Grape bunches are graded on the basis of size of berries or color

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- These should be packed in ventilated CFB(Corrugated Fibre Board) boxes and marketed.

4.8 Sorting & Grading

In bibliography is possible to find many parameters for grape classifications. In this manual for all the different crops the **Codex Alimentarius** is adopted.

The Codex Alimentarius (Latin for "Book of Food") is a collection of internationally recognized standards, codes of practice, guidelines and other recommendations relating to foods, food production and food safety. Its texts are developed and maintained by the Codex Alimentarius Commission, a body that was established in early November 1961 by the Food and Agriculture Organization of the United Nations (FAO), was joined by the World Health Organization (WHO) in June 1962, and held its first session in Rome in October 1963. The Commission's main goals are to protect the health of consumers and ensure fair practices in the international food trade. The Codex Alimentarius is recognized by the World Trade Organization as an international reference point for the resolution of disputes concerning food safety and consumer protection (Wikipedia).

4.9 Codex Stan 255-2007

4.9.1 Minimum requirements

In all classes, subject to the special provisions for each class and the tolerances allowed, the bunches and berries must be:

- sound, produce affected by rotting or deterioration such as to make it unfit for consumption is excluded;
- clean, practically free of any visible foreign matter;
- practically free of pests and damage caused by them affecting the general appearance of the produce;
- free of abnormal external moisture, excluding condensation following removal from cold storage;
- free of any foreign smell and/or taste;
- practically free of damage caused by low and/or high temperatures.

In addition, the berries must be:

- whole;
- well formed;
- normally developed.

Pigmentation due to sun is not a defect so long as this only affects the skin of the berries.

The development and condition of the table grapes must be such as to enable them:

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

4.9.2 Classification

Table Grapes are classified in three classes defined below:

Extra” Class

- Table grapes in this class must be of superior quality.



- The bunches be characteristic of the variety in shape, development and colouring, allowing for the district in which they are grown.
- The berries must be firm, firmly attached to the stalk, evenly spaced along the stalk and have their bloom virtually intact.
- They must be free of defects, with the exception of very slight superficial defects, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package.

Class I

Table grapes in this class must be of good quality.

- The bunches must be characteristic of the variety in shape, development and colouring, allowing for the district in which they are grown.
- The berries must be firm, firmly attached to the stalk and, as far as possible, have their bloom intact.
- They may, however, be less evenly spaced along the stalk than in the “Extra” Class.

The following slight defects, however, may be allowed, provided these do not affect the general appearance of the produce, the quality, the keeping quality and presentation in the package:

- a slight defect in shape;
- a slight defect in colouring;
- very slight sun scorch affecting the skin only.

Class II

This class includes table grapes which do not qualify for inclusion in the higher classes, but satisfy the minimum requirements specified in section above.

- The bunches may show slight defects in shape, development and colouring, provided these do not impair the essential characteristics of the variety, allowing for the district in which they are grown.
- The berries must be sufficiently firm and sufficiently attached to the stalk. They may be less evenly spaced along the stalk than in Class I.

The following defects, however, may be allowed, provided the table grapes retain their essential characteristics as regards the quality, the keeping quality and presentation:

- defects in shape;
- defects in colouring;
- slight sun scorch affecting the skin only;
- slight bruising;
- slight skin defects.

4.9.3 Grape Optimum Storage Conditions ⁴

In the next future, hopefully, cold storages will be available in Afghanistan. Here below are reported the optimal condition to preserve table grape.

The table grape storage optimum condition were studied by Crisoto from UC Davis:

Ideally storage room operates at -1° to 0°C and 90 to 95 percent Relative Humidity (RH), with a moderate airflow 20-40 cubic feet per minute (CFM) per ton stored grapes.

⁴ Source: Crisosto, Table Grapes Postharvest Quality Maintenance Guidelines-UC Davis Pomology Department

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Optimum storage temperature of -1.0 to 0.0°C is recommended for mature fruit. Freezing damage may occur in less mature grapes. The highest freezing point for berries is -3.0°C

5 Fresh Fruits: PLUM

5.1 General overview

The Japanese cultivars of plums were introduced in California -*Prunus salicina* are mainly used for fresh consumption and not for drying. Plums are also used for canning, freezing, and jam and jelly making. Another variety suitable for drying is cultivated in Europe- *Prunus domestica*, L.

5.2 Afghanistan Plum

The complete list of available cultivars in Afghanistan is included in the latest ANNGO catalog (2015). In table Table is reported the riping time referred to Kandahar.

5.3 Plum Maturity Indices

The maturity indices mostly used are determined by:

- skin color changes
- fruit firmness
- sugar content

1. Fruits dimension (calculated on 500 pieces), the non-conformity should not exceed 16 fruits.
2. Ratio between stone and flesh higher than 14
3. Brix between 22 and 28
4. Juice pH between 3.8 and 3.8
5. Total acidity higher to 80 meq/L

Measurement of fruit firmness is recommended for cultivars where skin ground color is masked by full red or dark color development before maturation. Flesh firmness, measured with a penetrometer with an 8 mm-tip, can be used to determine a maximum maturity index, which is the stage at which fruit can be harvested without suffering bruising damage during Postharvest handling.

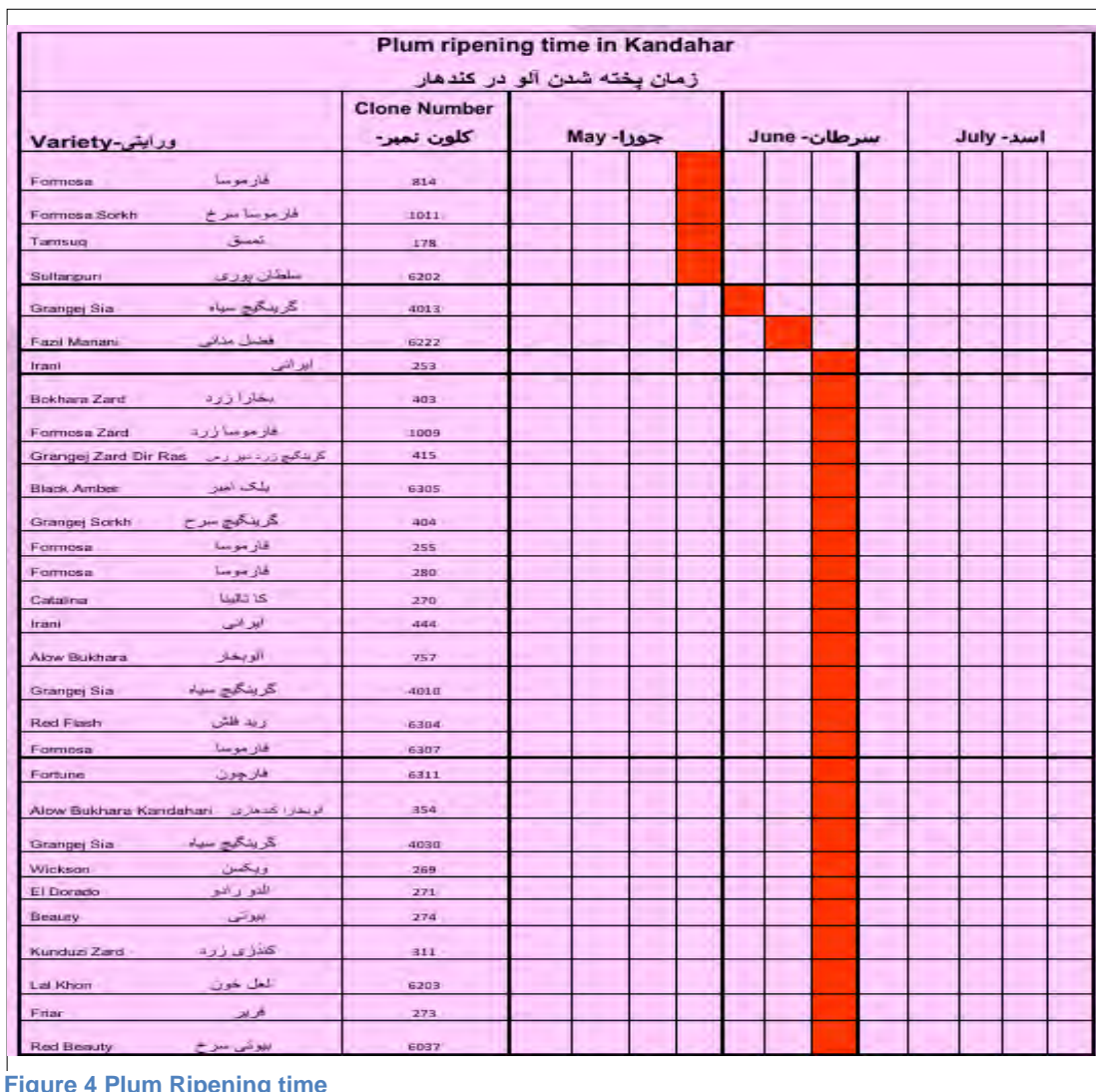


Figure 4 Plum Ripening time

Regards to the quality, plum are considered with good quality if:

- High soluble solids content (SSC)
- Fruit acidity, SSC/acidity ratio, and phenolic content are also important factors in consumer acceptance
- There is no established minimum quality standard based on these factors Plums with 2-3 pounds force flesh firmness are considered "ready to eat"

5.4 Sorting and Grading



The classification of plum is not included in a specific Codex. Is possible to use the more generic CODEX STAN 242-2003 (codex standard for canned stone fruits).

Codex stan 242-2003

- Color

The color of the product, should be normal for the varietal type of the fruit used.

- Texture

Plum should be reasonably fleshy of uniform texture and may be variable in tenderness but should neither be mushy nor excessively firm.

- Uniformity of Size

Plum should be reasonably uniform in size.

- Definition of Defects

- a) Blemishes - means surface discoloration and spots arising from physical, pathological, insect or other agents that definitely contrast with the overall color and which may penetrate into the flesh. Examples include bruises, scab and dark discoloration.
- b) Crushed or broken - considered a defect only in whole or halved canned fruits in liquid media pack; means a unit which has been crushed to the extent that it has lost its normal shape (not due to ripeness) or has been severed into definite parts. Halves partially split from the edge to the pit cavity and whole apricots split along the suture are not considered broken. All portions that collectively equal the size of a full size unit are considered one unit in applying the allowance herein. In the case of plums and cherries blemishes should not seriously affect the appearance of the products.
- c) Peel - considered as a defect
- d) Split any split that seriously affect the appearance of the product.

5.5 Disorders⁵

Brown rot. Caused by *Monilia fructicola* is the most important Postharvest disease of stone fruits. Infection begins during flowering and fruit rot may occur before harvest but often occurs Postharvest. Orchard sanitation to minimize infection sources. pre-harvest fungicide application and prompt cooling after harvest are among the control strategies. Also, Postharvest fungicide treatment may be used.

Gray Mold. Caused by *Botrytis cinerea* can be serious during wet spring weather. It can occur during storage if the fruit has been contaminated through harvest and handling wounds. Avoiding mechanical injuries and good temperature management are effective control measures.

Rhizopus Rot. Caused by *Rhizopus stolonifer* can occur in ripe or near ripe stone fruits kept at 20 to

5 Source: The reported disorders are reported form UC Davis post Harvest Department info sheets.<http://postharvest.ucdavis.edu/>



25°C (68 to 77°F). Cooling the fruits and keeping them below 5°C (41°F) is very effective against this fungus.

5.6 HACCP Plum Scheme

In Table 6 is reported the HACCP scheme for plum drying.

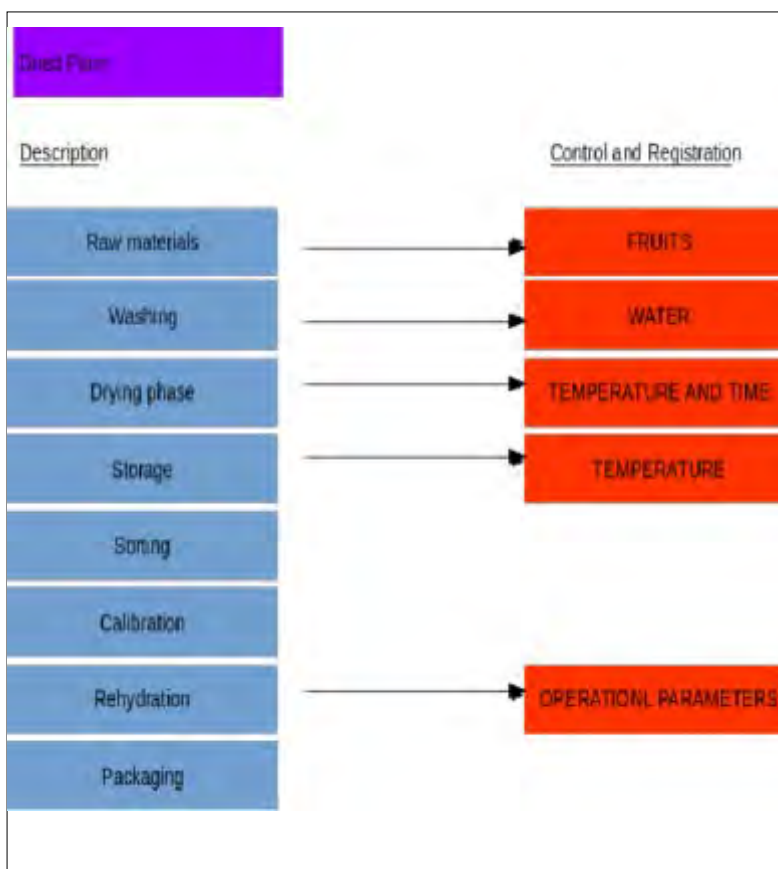


Table 6 HACCP scheme for Drying Plum

- **Raw materials:** characteristics: the optimal physics characteristics of the are: homogeneous maturity, regular calibre (medium-big), flesh consistency, flexible skin. Other chemical characteristics are: Total sugar content, total acidity, pH.
- **Washing:** The washing step has the aim of remove soils and extraneous debris and to reduce the bacterial total content. The manual or mechanic washing step must use potable water or sprig water. It is really important the ratio between water and products (this is a relevant problem in raisin washing).
- **Drying:** The final humidity of the plum should be between 18 and 22 %. There are several existing methods for drying plum however the suggested method is a tunnel with hot air. This situation is optimal for the temperature control and especially the drying time.



- **Calibration:** The calibration should be done manually with a differentiation of 2 or 3 different grades.
- **Storage:** The dried plum should be storage in woos bins well aerated with an optimal temperature of 6 °C.

Plum Harvest Practical advices:

- Harvest plum on the coolest time of the day (early morning).
- Harvesting of berries must stop once the pulp temperature reaches 30°C.
- Harvested produce should be kept under shade or in cool place
- Harvesting should be done with a suitable harvesting tool.

5.7 Plum Optimum Storage Conditions⁶

In the next future, hopefully, cold storages will be available in Afghanistan. Here below are reported the optimal condition to preserve plums.



To maintain the quality of local market plums over a period of cold storage, it is essential that the fruit be placed under cold storage as soon as possible after harvest. Chilling injury in plums is promoted by storage at temperatures between 1 °C and 5 °C . If stored at temperatures higher than 5 °C for long periods, rapid ripening may occur. This will result in soft, overripe fruit. By contrast, if plums are subjected to prolonged low temperature storage (-0.5 °C), chilling injuries such as internal browning may develop, depending on the cultivar (Figure 5).

Research has indicated that the period over which plums can be subjected to low temperature varies dependent on the cultivar, and also the maturity of the fruit at harvest. Generally, it would appear that 10 to 14 days at -0.5 °C is the limit before internal disorder problems develop in all cultivars except those known to store well at single

temperature. The relative humidity in the cold store also influences fruit quality. To prevent shrivelling, humidities should be maintained at between 90 and 95%.

5.8 Alu Bokara

Alu Bokhara plums from Farzha is a traditional and particular product included in the HPS -SO3 project. The value chain of Alu Bokara present the following problems (for more details please see Report #1 May-June 2014).:

1. No functional farmers groups.
2. Problems in processing: problems with peeling and low skilled labors
3. Problems in packaging
4. No Market for Plum and low prices due to middlemen/local traders interruption.

The HACCP approach is compared to the current situation and where possible some advices are provided.

- **Raw materials Harvesting (Figure 6 and Figure 7)**

The basket used to harvest plums are not appropriate. Hygienic condition are poor and Plums are directly in contact with metal surface. Plastic basket should be introduced.



Figure 7 Basket used to harvest Plums



Figure 6 Basket used to harvest Plums

- **Washing (Figure 8)**

Washing step is obviously inadequate. An alternative must be found. Alu Bokara are normally handle in private houses by the women. Normally the houses are not provided with running water. This step is particularly critical and difficult to solve. However might be possible to create small points close to the river where plums should be properly washed and rapidly bring to the peeling work station.

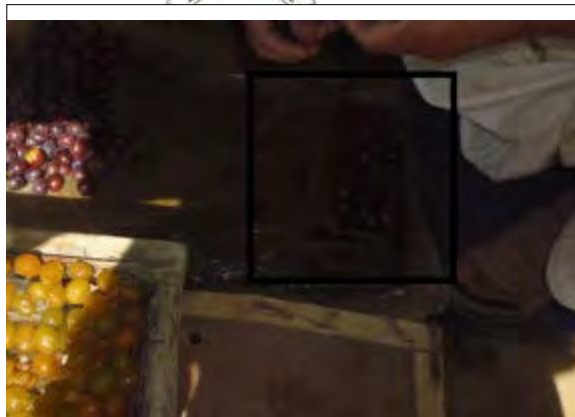


Figure 8 Plum washing

- **Peeling (Figure 9)**

Peeling procedure represent another critical point in the quality of Alu Bokara. The peeling work station is placed directly on the floor, as said far from water and exposed to many contaminations. Such condition is incompatible with the basic hygienic procedures and of course with the required minimum quality standards for international market. Interventions are highly desirable, especially providing specific tools for peeling and increasing the hygienic condition for the workstation. In such situation, any intervention is difficult because we operate at family level and we faced the normal living conditions. If the product should be processed at house level, the whole hygienic condition should be improved and such solution is not reliable. The proposed solution is the decentralize the production and organize producers in groups and create specific workstation where tools (table, peeling tools, etc) are shared among the groups.



Figure 9 Peeling simulated by a man

- **Drying (Figure 10)**

Drying does not represent a big issue in the procedure. Providing new nets will facilitate the



Figure 10 Drying nets

handle of dried plums. Drying nets are not protected and are exposed to many contaminants (e.g. insects, rodents and birds). In addition, nets are not removed or cover during the night and fluctuation in temperature and humidity might altered the quality of the final products.

- **Grading (Figure 11 and Figure 12)**

Grading is made after the drying directly from the nets based on visual differences. A grading made after washing step should be easier and faster. However, the problem in grading is the on the hygienic conditions. Once dried, plums are “ready-to-use” and every single contamination or exposure to bacterial will become part of the final product with terrific consequences on the Alu Bokara quality. This step must be improved with the introduction of clean nets or tarpaulins where temporary store the graded plums.

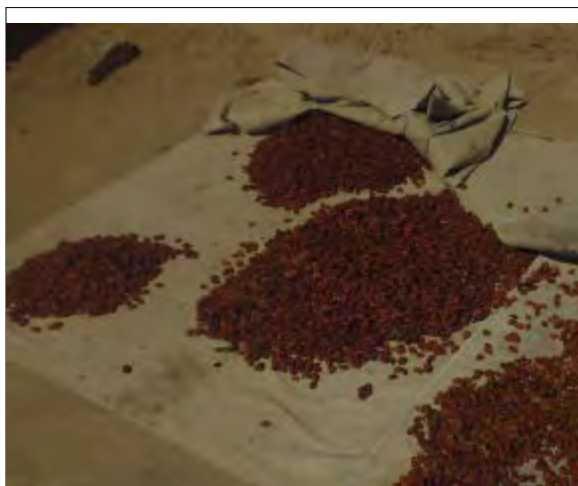


Figure 11 Grading

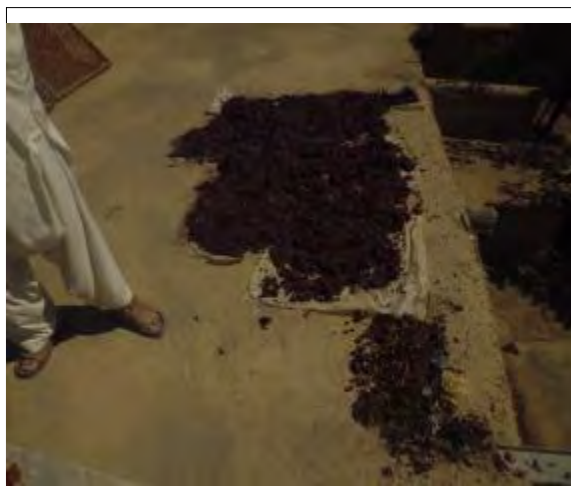


Figure 12 Byproduct- skin used after dried for kebab spices

- **Packaging (Figure 13 and Figure 14)**

Grading foresees three different quality classes. Packagings are not differentiated for the different classes. In addition, the boxes used to pack the plums are totally inadequate. Different boxes must be

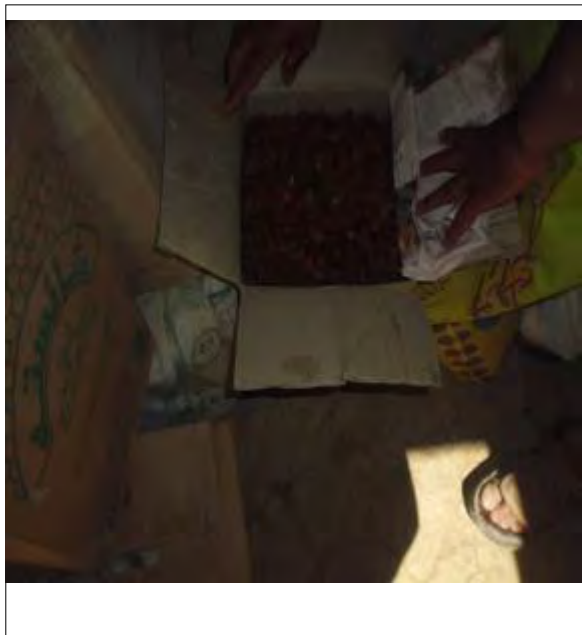


Figure 13 Packaging for first class



Figure 14 Packaging for second class

provided.

- **Storage** :The dried plum should be storage in woos bins well aerated with an optimal temperature of 6 °C.

5.9 Possible interventions:

1. Providing plastic basket for harvesting (on going with SO3 intervention).
2. Providing training directly to women on hygienic procedures (on going with SO3 intervention).
3. Create producers groups and processing center where tools (boxes, grading table, potable water) are shared among the groups.
4. Provide drying nets (on going with SO3 intervention).
5. Protection from contaminations (animal, dust) during the day and protection from temperature and humidity fluctuations during the night.
6. Introduction of tarpaulins (clean and easy to wash) where temporary store the graded plums.
7. Provide different boxes with appropriate labels for each different class.(on going with SO3 intervention).



6 Dried Fruits: RAISIN

6.1 Raisin a General Overview

Afghanistan produces two main types of raisins: Kishmish production is the grape dried in shaded and ventilated houses while red raisins (Aftabi Kishmish) is the type of sun-dried (red, black and yellow) on the ground and roofs. Normally the long seedless kishmish from the Shindoo Khani variety are the most expensive.

About 25% of the total grape production is addressed to raisin production. Farmer's choice raisin or sell fresh grape, is linked to the grape price and grape quality. Security and political situation (i.e. Pakistan border) may increase or reduce such percentage. In addition, areas where transportation is more difficult will dry more grapes simply because of the challenges of getting fresh grapes to market.

In Afghanistan there are a low numbers of vineyards dedicated to the raisin production. Indeed, mostly of the raisin comes from second or third class or from unsold or spoiled grape. Such condition represent one of the biggest raisin production problems: obtain good raisin starting from second class or spoiled grape is impossible.

6.2 Raisin production in Afghanistan

Shadow raisin (Kishmish) is produced in traditional “kishmish khana”, which are simple mud-brick structures. They are easily built, cheap and are well-ventilated. Generally, one linear meter of kishmish khana will hold 450kg of fresh grapes which will ultimately yield about 110kg of green kishmish. Kishmish khana can be quite long but are usually only about 3 meters wide (Safi J. et. al. 2014).

Post forecasts for Afghanistan's marketing year (MY) 2014/15 raisin production at 36,000 metric tons (MT), a 5 percent increase from the previous marketing year. The increase over last year is attributed to better production techniques, provided disease control trainings and new production from vines planted in 2011, coming into production for MY 2014/15 along with good precipitation, adequate water and minimal disease or pest issues (Safi J. et. al. 2014).

Hierarchic list of grapes producing Afghan provinces:

1. Kabul
2. Parwan
3. Kandahar
4. Herat
5. Ghazni
6. Faryab
7. Sar-e-pul

The raisin value chain bottlenecks are here briefly recapped:

- Traceability. For food security and food safety the traceability is mandatory. With raisin the trace of fruits is lost at the beginning of production; this is a critical and major point in which all the certification (e.g. HACCP and thus ISO 22000) will halt, as well as the possibility of interventions: if the production is not fully followed, it's not possible to isolate the problems eventually present in



raisin production (e.g. farmers with very low quality or poor hygienic conditions). The traceability is lost because farmers sold the product to a middle-man and the only interface with the factory is this middle-person.

- Contamination. Primary production is contaminated since the very beginning of the process of raw materials that will immediately compromise the quality of the product and the control of the hygienic procedure. Contaminations are consequence of poor drying techniques and the result is raisin very dirty with an incredible amount of foreign materials

6.3 Raisin Quality

Higher-maturity grape produces higher-quality raisins. The consideration reported for grape in par. 4.6, are still valid also for raisin production as well as the harvest criteria (par. 4.5). As said, generally, high-quality (high-maturity) raisins are plump, meaty, and fine wrinkled, the result of having harvested grapes at a high soluble solids content. Raisins must meet minimum maturity grade standards. As a general rule, grapes should have average soluble solids readings of at least 19 °Brix in order meet minimum incoming grade standards (Christensen L . P. and Peacock W.L).

As quality reference, in this manual the Codex Alimentarius (when available) has been adopted. The raisin standard is CODEX STAN 67-1981.

6.3.1 CODEX STAN 67-1981

Raisin General requirements.

- shall be properly cleaned, whether washed or unwashed;
- shall be stemmed except for the form of cluster raisins;
- shall be cap-stemmed ;
- *may be dipped (unbleached) in an alkaline lye and oil solution as an aid to drying;*
- may be bleached by being subjected to bleach treatment by chemical means and are further processed by drying; *This procedures is now broadly applied in Afghanistan.*
- may have seeds removed mechanically in seed bearing types;
- shall be reduced in moisture to a level that will assure preservation of the product;

Type Groups (see par. 4.2- grape varieties)

- a) Seedless - prepared from grapes that are naturally seedless or almost seedless;
- b) Seed-bearing - prepared from grapes that possess seeds, which may or may not be removed in processing.

Minimum Quality Requirements

Raisins shall be prepared from such materials and under such practices that the finished product shall possess normal color, flavor, and maturity characteristics for the respective type and in addition comply with the following requirements:

- Moisture Content maximum 19%'



- Mineral Impurities - may not be present
- Other Defects - substantially free from stems, extraneous plant material and damage.

Definitions of Defects

(a) **Piece of stem** – Portion of the branch or main stem. Could be Embedded to the berries or loose.

(b) **Cap-stem** – Small woody stem exceeding 3 mm or 1/8 inch in length which attaches the grape to the branch of the bunch and whether or not attached to a raisin.

(In considering allowances for cap-stems on a “percentage by count” basis, cap-stems that are loose are counted as being on a raisin).

(c) **Immature or Undeveloped Raisins** – Refers to raisins that:

1. Are extremely light-weight berries, lacking in sugary tissue indicating incomplete development;
2. Are completely shriveled with practically no flesh, and
3. May be hard.

(d) **Damaged Raisins** – Raisins affected by sunburn, scars, mechanical injury, or other similar means which seriously affect the appearance, edibility, keeping quality, or shipping quality. In “Seedless” type, normal mechanical injury resulting from removal of cap-stems is not considered “damage”.

arrangements(e) **Sugared Raisins** – Raisins with external or internal sugar crystals which are readily apparent and seriously affect the appearance of the raisin. Raisins that are sugar-coated or to which sugar is added intentionally are not considered “sugared raisins”.

(f) **Seeds** – Substantially whole, fully developed seeds which have not been successfully removed during processing of seeded forms.

(g) **Moisture** – Moisture means the percentage by weight of the processed raisins, exclusive of branch and heavy stem material, which is moisture when determined by the Dried Fruit Moisture Tester Method or in accordance with other methods that give equivalent results.

6.3.2 Standard Specification for Iranian Processed Raisins.

In addition to the Codex Alimentarius, some requirements are defined by the consumer and/or distribution. For example, is reported the Standard Specification for Iranian Processed Raisins.

• QUALITY CLASS GRADING

Recommended facilities & processing for production:

ISO 9001 & HACCP / ISO 22000 Approved	Grade AAA	Double or Triple Washed – Laser Sorted – X-Ray Scanned – Handpicked – Optional Selection on Belt
	Grade AA	Double or Triple Washed – Laser Sorted – X-Ray Scanned or Handpicked – Optional Selection on Belt
Grade A		Double Washed – Handpicked or Laser Sorted – Selection on the belt (QC report accompanied)
Grade B		Once or Double Washed – Selection on be



• ORGANOLEPTICAL REQUIREMENTS

Criteria	Statement
Appearance	Composed of berries with the general appearance of the representative type
Color	As per Color table on this specification sheet.
Smell	Typical sultana aroma without any foreign smell or off-odor
Taste	Typical raisins taste without any foreign taste
Consistency	Firm, not sticky, free-flowing

• PHYSICAL PROPERTIES

Physical Properties		TARGET	RTU Grade		Grade A(%) (gr)	Grade B
			AAA	AA(%) (gr)		
Mouldy Berries (g/100g)		0.5	1	1	2	2
Damaged Berries (g/100g)		2	4	4	5	5
Undeveloped Berries (g/100g)		0.3	0.5	0.5	1	1
Sugared Berries (g/100g)	Before March	0.2	1	1	1.5	1.5
	After March	0.2	1.5	1.5	2	2
Stones (mineral Impurities) > 2mm (Piece/MT)		NIL	NIL	2	10	15
Sand & Grit (Piece/MT)		NIL	1	2	2	3
Capstem (Piece/100g) Stalks (Piece/12.5 kg)	Loose	NIL	1	2	3	3
	Embedded	1	2	2	3	3
	4 – 15 mmPer 10-12.5 Carton) Larger than 15 mm (Piece/Box)Per 10kg – 12.5Kg Carton)	1 NIL	1 0	2 1	4 2	6 3
Foreign Matter Such as Plastic, etc. (Piece/MT)		NIL	0	2	5	10
Extraneous Vegetable Material (Piece/MT)		NIL	1	2	5	10
Glass & Hazardous foreign matter		Absent	Absent			

• CHEMICAL PROPERTIES

Chemical Properties	Max.	Max.	Max.	Max.
Moisture	16% 16%	16%	16%	16%
Oil	5Kg per ton	5Kg per ton	5Kg per ton	5Kg per ton
Ochratoxin	10 ppb	10 ppb	10 ppb	10 ppb
Sulphur Dioxide (Only applies to Bleached Types)	2000ppm	2000ppm	2000ppm	2000ppm



• COLOR REFERENCE

Amber	Light
	Amber
	Dark Amber
Brown	Light Brown
	Brown
	Dark Brown
<p>Golden: Golden raisins are reasonably uniform in color and may range from yellow or golden or greenish yellow to light amber wherein the predominating color may be greenish yellow or light amber and that not more than three percent, by weight, of all the raisins may be definitely dark berries.</p> <p>Green: Green raisins are reasonably uniform in color and may range from green or light green to yellow and amber yellow wherein the predominating color may be green or yellowish green that not more than three percent, by weight, of all the raisins may be definitely dark berries.</p>	

• MICROBIOLOGICAL PROPERTIES

Parameters	Target	Method
Total Viable Count	10.000/g CFU	ISO 4833
Yeast & Mould Count	10.000/g CFU	ISO 7954
Coliform	100/g CFU	ISO 4832
E-coli	ABSENT	ISO 4832
Salmonella	ABSENT per 25g	TS 3446

• METAL DETECTION

Goods are metal detected after being packed inside cartons. Minimum required sensitivity:

Parameters	Minimum detection size (Sphere size)
Ferrous	2.5 mm
Non-Ferrous	3 mm
Stainless Steel	3 mm

• FUMIGATION

Container is fumigated immediately prior to shipment with one of the following fumigant agents:

<ul style="list-style-type: none"> • Methyl Bromide or PH3 • Aluminium Phosphide • Mg Phosphide 	<ul style="list-style-type: none"> • Atmospheric: 60g / Cubic Meter / 48 Hours • 1 tablet /33 M3 • 1 degesh plate / 33 M3 72 hours
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6.4 Raisin process

- **Harvesting**

Raisin harvesting procedures are the same of grape explained in par. 4.5

- **Drying**

The drying process in Afghanistan is carried out in two ways: sun drying and shade drying. Green raisins are dried in shaded, ventilated houses (Kishmish Khanas), while raisins are sun dried on rooftops and the ground. After the drying process, raisins are swept up from the ground and bagged. The final product has a moisture content of 12 to 13 percent. Aftabi raisins are dried in minimal space without a protective mat or sheet and are often mixed with dust to reduce the drying period. These drying techniques result in poor quality raisins that cannot compete on the global market.

With respect to plum, the economic relevance of raisin has promoted more scientific articles. From the scientific literature is possible to retrieve the Drying ratio: the amount of raisin weight or yield obtained from a given amount of fresh grapes is the drying ratio.

To calculate the drying ratio, divide the fresh weight of the grapes by the dry weight of raisins (adjusted to percent of moisture). This ratio is mostly influenced by grape sugar content.

Table 7 reports the predicted drying ratio in 0.5 °Brix increments of soluble solids. This information is particularly useful in determining the economics and returns for making raisins as compared to selling grapes on a fresh weight.

Grape soluble solids	Dry ratio (fresh weight : dry weight)	Raisin yield (tons of raisins from 9 tons fresh grapes)
15 °Brix	5.42 : 1	1.66
15.5 °Brix	5.27 : 1	1.71
16 °Brix	5.14 : 1	1.75
16.5 °Brix	5.00 : 1	1.80
17 °Brix	4.87 : 1	1.85
17.5 °Brix	4.75 : 1	1.89
18 °Brix	4.63 : 1	1.94
18.5 °Brix	4.51 : 1	2.00
19 °Brix	4.39 : 1	2.05
19.5 °Brix	4.28 : 1	2.10
20 °Brix	4.17 : 1	2.16
20.5 °Brix	4.06 : 1	2.22
21 °Brix	3.96 : 1	2.27
21.5 °Brix	3.85 : 1	2.33
22 °Brix	3.74 : 1	2.41
22.5 °Brix	3.64 : 1	2.47
23 °Brix	3.54 : 1	2.54

Table 7 predicted drying ratio in 0.5 °Brix increments of soluble solids



- **Raisin Process**

Raisin processing includes washing the raisins twice, passing them through a scanner where waste (stems and foreign matter) is removed. After being sorted by hand (airstream or laserbeam), they pass through an X-ray machine before being sprayed with paraffin for being packed in boxes. In Afghanistan the grading and sorting operations are made by hands (Tabasom is the only exception).

- **Sorting and Grading**

Airstream sorter machine grading and laser sorter are machineries normally present in a raisin factory. These grading methods separates raisins based on their ability to drop in a column of air at a calibrated pressure differential (airstream) or laser sorter. Laser sorters are ideal for targeting glass, rocks, metal, rodents, insects and other field debris.

- **Packaging**

This phase is not critical per se. Packaging normally is fully automatized process with specific machinery for weight, labeling and pack the raisin. Raisin packing is strictly related to the final customers. Different countries have different requirements in terms of label and required information. In general packaging have the follow generic requirements:

- The cardboard should be clean and strong suitable for the packaging of goods.
 - The polyethylene bags should be food-grade and shouldn't be dirty and torn.
 - The products are packed in cardboard boxes with inner polyethylene plastic bag, in blue or other non-transparent color.

6.5 Raisin process in Afghanistan

- **Raisin Process**

The raisin process involved only sun-dried raisin i.e. green raisin is almost ready to be packed. It required only grading and sorting quick steps. Red raisin, on the contrary, must be processed in dedicated factories (washing, sorting, wax, and packaging). As reported in the Report #1 May-June 2014, one of the major constraints facing the Afghan raisin industry is the drying process as it predominately occurs in conditions that produce raisins not suitable for export to countries with high food safety standards. Red raisin is dirty and with an incredible amount of foreign materials (animals, soils, iron, etc.). For such reason, residues are a major problem for raisin exporters.

These types of raisins, often need double washing to make them competitive in countries with high food safety standards.

The current trend is to improve the quality of Kishmish (green raisins) by reducing the drying period and using chemical solutions. In Afghanistan such solution is broadly applied but with very limited knowledge of blench proportion with the result of an high amount of chemical residues.

- **Raw Materials (Figure 16)**

Raisin is mixed with soil by farmers, because is believed that it will speed up the drying process and protect and preserve the raisin quality. In addition, is a trick to get more money from the buyer. Both such beliefs are completely wrong. Even if soil may preserve raisin from an excessive moisture, the soil contamination is so high that it compromise the raisin quality. Traders (middle man or factory owners) are perfectly awarded about the consequences of soil addition and they reduced the final price accordingly. The approach should be exactly the contrary. Produce a better and clean raisin to get an higher price.

The raw material is mixed with soil. In the raisin factory the raisin is washed in water tank (Figure 1). Such solution is always insufficient because the water flow is too low and/or the tank dimension is not adequate to the speed of the conveyor belt. A possible solution is to create a secondary washing tank to improve the washing efficiency.

Raisin is normally dried directly on soil. A simple improvement, like using nets to avoid the contact of grape with soil, will have huge positive influence on the final quality. In addition raisin is left uncover and exposed to contaminations during the night and often the dried fields are close to grazing animals. Dried fields should be protected with plastic tarpaulins and closed with fences.



Figure 16 Raw materials ready to be processed



Figure 15 Raisin dried directly on the ground



Figure 18 Raisin dried on mats



Figure 17 Raisin drying on open space without protection

- **Sorting and Grading**

All the existing raisin processing machinery are from the Soviet period. Such machinery are completely antiquated and are a structural barrier to reach western markets. The application of international

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standard on food security, in such conditions, is not possible. In fact, the required high investment makes it impossible to start from zero without an adequate financing. In addition, the whole equipment and premises are not adequate to the minimal HACCP standards. In such critical situations the only possible interventions are limited to the improvement of the premises and/or to the sorting steps.

6.6 Possible interventions:

1. Decrease the microbiological and chemical contamination risks and improve the raw material quality.
2. Providing plastic basket for harvesting (on going with SO3 intervention).
3. Test and introduction of the alternative drying system (e.g. solar systems)
4. Providing training directly to women on hygienic procedures (on going with SO3 intervention).
5. Create producers groups and processing center where tools (boxes, grading table, potable water) are shared among the groups.
6. Provide drying nets (on going with SO3 intervention).
7. Feasibility study for electrical ovens
8. Protection from contaminations (animal, dust) during the day and protection from temperature and humidity fluctuations during the night.
9. Provide different boxes with appropriate labels for each different class (on going with SO3 intervention).
10. Decrease the contamination by way of the introduction of a written harvest procedure that consider the Hazard Risk Analysis.
11. Decrease the foreign bodies (normally the rate is about 15% of the raw material) by providing drying nets (on going with SO3 intervention).
12. Promote Khishmish production building improved Khishmish Khana with mud traditional bricks but using HACCP procedures, mosquito nets, protection from rodents, etc.
13. Introduction of premises division between different factory compartment
14. Installation of more efficient illumination system and conditioned air.
15. Introduction of the fumigation techniques.
16. Introduction of double washing tank.

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دولت جمهوري اسلامي
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د افغانستان اسلامي
جمهوري دولت
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Islamic Republic of Afghanistan
Ministry of Agriculture, Irrigation and Livestock



To:

Georgios Koundourakis

Team Leader

"Support to the Development of Agriculture Private Sector: Perennial Horticulture" (HPS)

EU funded program.

Relief International

Dear Georgios,

Let me to introduce you the Nangarhar Valley Development Authority (NVDA) which is one of the largest and most important agricultural projects in the eastern zone of Afghanistan which is founded in 1961, it is complex project had 3100 ha olive and 2100 ha citrus orchards, 70 km main canal with the capacity to irrigate 31000 ha land, it also has olive processing factory, citrus sort and grading three facilities, livestock farm and 11250 ha land manage by NVDA.

NVDA currently leased about 4,000 ha land to the private sector/farmers and has the objectives to encourage the private sector to invest in and work for the agriculture development in Nangarhar.

With the above contents, the NVDA legal status has been changed from the government organization (Nangarhar Valley Development Authority) to the government company NVAC (Nangarhar Valley Agricultural Company) in 15.Sep.2014, and will operate as company under the government companies' law.

We can assure you that, under the companies' law, NVAC will have the opportunities to operate under the companies' law and create an arena for a successful partnership with the HPS project.

Thank you,


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