Survey of the
HORTICULTURE SECTOR
2003
Contents

Foreword vii
Acknowledgements v

INTRODUCTION 1
BACKGROUND 2
MAIN FINDINGS AND CONCLUSIONS 3
RECOMMENDATIONS 5

NATIONAL SURVEY OF RESEARCH STATIONS
AND FRUIT NURSERIES 7
  ■ Research stations 7
  ■ Nucleus fruit nurseries 8
  ■ Private fruit nurseries 12

NATIONAL SURVEY AT THE VILLAGE LEVEL 15
  ■ General village and rural family information 15
  ■ Occurrence of natural disaster and manmade calamities 15
  ■ Irrigation systems 15
  ■ Farm power 15
  ■ Land use in horticulture and crop management 16
  ■ Cultivation of vegetables 16
  ■ Fruit crop production 18
  ■ Status of production of the main grown fruit species 20
  ■ Orchard management practices 23
  ■ Marketing horticultural crops 24
  ■ Handling, packaging and marketing practices 25

ANNEX 1
SURVEY METHODOLOGY 29
  ■ Phase I 29
  ■ Phase II 29
  ■ Phase III 29
  ■ Data collection tools 29

ANNEX 2
SURVEY QUERIES 32
Maps

MAP 1
Active and non-active research stations in Afghanistan

MAP 2
Number of fruit species in the nucleus nurseries/district

MAP 3
Nucleus nurseries/districts with the highest number of indigenous varieties of apricot

MAP 4
Number of active private fruit nurseries per province

MAP 5
Number of local varieties of apricot in the private nurseries/provinces

MAP 6
Province/private nurseries having species with the highest number of local varieties

MAP 7
Province/private nurseries with the highest number of trees (local varieties) in the stock plant block

MAP 8
Number of trees with the highest number of exotic varieties in the stock plant block of private nurseries/province

MAP 9
Number of trees of exotic varieties of almond in the stock plant block of private nurseries/province

MAP 10
Number of apple trees (exotic varieties) in the stock plant block of private nurseries/province

MAP 11
The most common vegetables grown in the provinces

MAP 12
The most fruit species grown (number of trees and jeribs) by province

MAP 13
Area (jeribs) surveyed and covered with horticultural crops by province

MAP 14
Number of jeribs of grape by province

MAP 15
Provinces with the highest apple area (in jeribs)

MAP 16
Number of almond trees (local varieties) in the stock plant block of private nurseries

Figures

FIGURE 1
Altitude (m) of research stations in Afghan provinces

FIGURE 2
Size of active research stations (in jeribs) in Afghan districts (February 2003)

FIGURE 3
Main crops grown in Afghan research stations (February 2003)

FIGURE 4
The altitude of Afghan nucleus nurseries (m)
Acknowledgements

This report is the result of a collaborative process undertaken by the Afghanistan Ministry of Agriculture and Animal Husbandry (MAAH) and both the FAO Emergency Operations and Rehabilitation Division (TCE) and the FAO Crop and Grassland Service (AGPC). The Government of Italy is also acknowledged for its generous contribution that made this survey and report possible.

We would like to acknowledge the dedicated work of more than 90 brave field staff in Afghanistan who conducted the survey despite adverse climatic conditions and the chronically insecure situation. Very special thanks are addressed to Mr Abdul Wahab, the National Survey Assistant, Mr Mir, National Survey Coordinator and Mr Etienne Careme, FAO International Information Officer, in Afghanistan and the team of data entry clerks for their invaluable contribution and tireless work.

FAO would like to thank the dedicated work of Messrs. Gul Ahmad, M. A. Asifi, G.R. Samadi, Z. Noor, A.S. Nazari, A.R. Shinwari and M. Morad.

FAO would also like to acknowledge the invaluable efforts of Giuseppe De Bac, project coordinator of the survey and this report.

Thanks also go to the consultant editor, Barbara Hall, consultant graphic designer, Filippo Maiolo, CD-Rom specialist, Ivan Grifi, FAO Operations Officer, Marco Miagostovich and FAO Art Editor for their valuable efforts, Marina Criscuolo.
Foreword

Agriculture is essential in establishing a stable and prosperous society in Afghanistan. The country has been devastated by conflict over the past 23 years and by several years of drought from 1999-2002. Prior to this period of drought and war, 70 to 80 percent of the country's population was engaged in agriculture. Despite its difficult terrain, adverse climatic conditions and limited arable land, Afghanistan was largely self-sufficient in food and a significant exporter of some agricultural products in the early 1970s.

Horticulture is one of the areas of greatest challenge and opportunity in Afghanistan. The environmental conditions are highly favourable for the large number of endemic horticultural crops. Afghanistan is a unique centre of genetic diversity and of great value to the international horticulture community. Carrot, radish, cherry, plum, apricot, peach, pear, apple, walnut, pistachio, fig, grape, pomegranate, honeydew melon, and almond are among the species present across the country, providing a unique array of useful agro-botanical traits.

In 1972, horticultural commodities supplied 40 to 60 percent of all export earnings. Afghan dried fruit accounted for 60 percent of the world's market. Now horticultural production is drastically less than 1972 levels. Many fields are abandoned, many orchards destroyed, and tree nurseries, seed sources, water, input and knowledge are limited or non-functional.

Afghan farmers show an increased interest in cash crop production, which has a comparative economic advantage over the production of traditional subsistence crops. Horticulture crops are in a stronger position to sustain food security, to provide alternative livelihoods to opium poppy cultivation, and to support the rehabilitation of the Afghan rural economy.

The survey results should be used not only by the people of Afghanistan, but also by all donor countries, private investors and international organizations looking for facts and figures. The aim is also to highlight the need for a long-term development programme to rehabilitate the Afghan horticulture sector.

Serge Verniau
FAO Representative
Afghanistan
Introduction

A national horticulture sector survey on the state of Afghan horticulture was conducted in spring, 2003 by a team of 90 national technicians and 1 international survey coordinator in 1,808 villages in 327 districts and all 32 provinces, covering more than 99 percent of the representative horticultural areas in the whole country.

This booklet contains a summary of the field survey data analysis and provides main findings and conclusions. It is accompanied by a CD-Rom, which provides the electronic version of the booklet with hyperlinks to the databases, a compendium of all the essential technical data collected at the district and province level.

At the beginning of the war in 1979, the horticultural sector was one of the pillars of the Afghan economy because it was contributing over 40 percent to total export earnings due to the production of quality fresh and dry fruits. This sector utilized only 6 percent of the total cultivated land and about 12 percent of permanently irrigated crops. The following 25 years of war and civil strife contributed dramatically to the decline of the sector, which destroyed orchards and nurseries as well as most of the irrigation systems and infrastructures. Consequently, the post-harvest technology and marketing channels were completely disrupted. In addition, the recent four years of drought contributed to the almost total collapse of the horticulture sector, which is based on fruit, nut and vegetable production.

In 1996, FAO carried out a national survey of the horticulture sector in 79 districts, which covered 7,000 villages. The results indicated that in spite of the conflict situation, which considerably impeded production and marketing activities, there was an increased interest from farming communities in developing horticultural cash crops. Due to the end of the war, we are now in the rehabilitation phase in which the horticulture sector will play a critical role in rebuilding the agricultural industry.

In 2003, in response to this need, the Italian Voluntary Contribution to the Immediate and Transitional Assistance Programme (ITAP) 2002/2003 in Afghanistan project (OSRO/AFG/212/ITA) funded this Afghanistan Survey of the Horticultural Sector 2003 of the current state and condition of orchards, vineyards, nut plantations and vegetable crop production throughout Afghanistan. This survey was one of the eight projects within this Italian contribution.

It should also be stressed that this survey has been accomplished despite adverse climatic and dangerous security conditions, which frequently hampered the regular execution of activities in the country.

Most of the information gathered in this survey refers to technical aspects such as the species grown, existing genetic resources, occurrence of calamities, irrigation and crop management. It is expected that this information will provide a basic tool for strategic planning and for the development of medium- to long-term projects and programmes.
Background

This Survey was conducted in three distinct phases according to the timeframe of the consultants’ missions and the seasons, in order to ensure a smooth implementation of the activities at the field level.

**Phase I** included conducting a national survey for all research stations, nucleus fruit nurseries, and private nurseries, the latter selected according to data gathered from previous FAO Afghan horticultural projects.

All the local and exotic fruit trees species and varieties present in the nucleus fruit and private nurseries were listed, including the number, age and the phytosanitary conditions of the trees. Questionnaires were conducted on research station and fruit tree nursery surveys (A, B, C), using altimeters and Global Positioning System (GPS), and information was collected on the elevation and exact position of both the nucleus and the private nurseries.

Phase I also implemented a test survey of the horticulture sector at the village level. It was carried out in December 2002 and January 2003 in three selected provinces (Kabul, Khost, Nangarhar) to avoid any possible technical and logistical constraints for the implementation of the national horticulture survey. Information gathered on the data entry of the test survey was analysed.

**Phase II** focused on launching the Afghanistan Survey of the Horticultural Sector 2003, which was officially launched on 20 February 2003, considered Afghan springtime, the ideal season to commence the survey field activities.

The field survey mobilized staff that included 87 field researchers (3 for each province), 7 Regional Survey Coordinators and 1 National Survey Coordinator. All the field researchers were recruited through the Afghanistan Ministry of Agriculture and Animal Husbandry (MAAH) and were assigned to stations in their home provinces.

The questionnaire was divided into four different sections (D1, D2, D3, D4) and included questions on farming systems, occurrences of natural disasters and manmade calamities, farm size, farm power, farm families, the crops cultivated and irrigation sources. In addition, the questionnaire covered the status of horticultural crop production, farmer income and problems related to access to the domestic horticultural product market.

**Phase III** focused on data entry and analysis of the results of this national horticulture survey and the national survey for all nucleus fruit nurseries, national research stations and private nurseries.

The random crosscheck at the field level, which included the monitoring of data collected in the ten selected provinces, was completed on 30 April 2003. Data entry of the horticultural survey was completed in June 2003. The data analysis included queries and was analysed using Microsoft Access and Excel programs to assist with numeric operations and graph design. Further, Arc View software was utilized for drawing maps.
Main findings and conclusions

A large number of agricultural areas were monitored in order to assess the status of fruit and vegetable cultivation at the household level and not just in specialized areas. In fact, the areas for fruit and vegetable production intended to supply local markets and export have almost completely disappeared, apart from negligible scattered pockets of lands. Most production is presently for self-consumption only.

Results for all the nucleus fruit nurseries and private nurseries indicated that the fruit sector collapsed during the last five years. The number and quality of fruit trees available from and marketed by fruit nurseries at the private level have decreased. Nevertheless, the nurseries remain the only reliable source for the collection of fruit tree materials.

The survey also provided the following main findings:

• The nucleus fruit and private nurseries have a valuable collection of local genetic resources. In the case of apricot and grape, the collection is totally represented by indigenous varieties.

• The development of horticultural crops is limited by the poor level of post-harvest practices. The entire sector has been depressed by the highly perishable nature of most horticultural products associated with poor grading practices, the absence of cold storage facilities, a lack of adequate packing material, and the total absence of farmers’ organizations to market their produce.

• Afghan farmers are increasingly interested in vegetable crop production, which gives a more immediate and greater source of cash than do traditional subsistence crops. Horticultural crops are therefore in a strong position to support food security and the rehabilitation of Afghan rural economy.

• Afghanistan is mostly rural with a total number of 128,407 farming families, equal to 89 percent of the total number of families in the areas surveyed. The number of farming families would have been higher had it been taken into account that in districts with villages near largely populated cities, such as Mazar-i-Sharif, Jalalabad and especially Kabul, the percentage of farming families is reduced as a result of the alternative job opportunities offered by the urban centres.

• The rate of families with their own land is obviously high, being 91 percent of all the families interviewed. The rate of land ownership in the remote rural areas far from the biggest urban centres is close to 99 percent.

• A deficit in irrigation water is reported in 20 percent of the surveyed areas, and is considered by the farmers as the main limiting factor to the development of horticultural crops. Irrigation is carried out through furrows (54 percent). The main water sources are “karez” (underground channels) (17 percent), springs (21 percent) and wells (8 percent).

• The development of agricultural and horticultural crops is severely limited by the very
low level of farm power. Indeed, animal traction is still the main farm power option for 42 percent of the farmers, followed by mechanized power (32 percent) and manual labour (26 percent).

• Within the range of natural disasters and manmade calamities that have affected the villages from 1999 to 2002, drought has been reported as the most common calamity, followed by civil unrest. In response to these disasters, humanitarian agencies offered assistance to 45 percent of the surveyed villages.

• On average, 13 percent of the arable land and 25 percent of the irrigated land were used for the cultivation of horticultural crops. These figures are therefore indicative of the increasing role being played by horticultural crops in the rural economy despite the difficult agro-economic reality of the country.

• The most common fruit species grown in Afghanistan are grape, apple, almond, apricot and pomegranate. Main vegetable species are watermelon, honeydew melon, onion, potato, tomato, carrot and turnip. In the fruit orchards and the grape vineyards, only 44 percent of the farmers practise pruning, 78 percent chemically control pests and diseases, and 53 percent use chemical fertilizers.

• Production quality still remains at a low standard despite the country's highly suitable climate for producing high quality fruits. This results in a lower market value for the fruits and lost opportunities for farming families to increase their income.

• Low plastic tunnels (LPVs) are mainly used by the farmers in Loghar and Balkh Province for the production of early vegetable crops. These farmers are more innovative and inclined to invest in the application of this remunerative practice.

• Farmers have recently been paying more attention to the management of short cycle crops such as vegetables, as compared to that of fruit orchards.
Recommendations

Major parts of the country continue to be severely affected by the unstable security situation. In a few districts and particularly in the western and central-eastern provinces, the horticultural sector is presently in a more advanced stage of development. Future technical assistance programmes on horticulture should then focus on these areas, involving a wider participation of farming communities.

An irrigation water deficit remains a very serious limiting factor to crop production. The rehabilitation of irrigation structures and the training of farmers on improved water resources management practices should be considered top priorities as part of integrated programmes for crop production development.

Farmers show an evident lack of horticulture technical know-how; a long-term horticulture programme should aim at the development of community-based extension schemes promoting a farmers’ field school approach and “Integrated Production and Protection” (IPP) practices.

The country possesses a valuable collection of local genetic resources of fruit species, which are still preserved in the collection block of the nine identified nucleus nurseries. Any future intervention in the horticulture fruit sector should therefore give priority to the conservation of the indigenous resources, their characterization, evaluation and further multiplication.

Once a stable level of security in the country has been established, reactivation of the local fruit trees market will be facilitated. Immediate assistance should be given to private farmers who are willing to rehabilitate their fruit nurseries, providing them with the appropriate technical training on fruit tree propagation and management.

Most farmers face difficulties in accessing quality agricultural inputs and farm equipment at affordable prices. Assistance will be required to monitor this market sector in order to provide information to private entrepreneurs and community organizations on technical specifications and sources of agricultural inputs.

Peri-urban horticultural crop production creates job opportunities for urban and peri-urban populations while also contributing to the alleviation of poverty and malnutrition in these areas. Farmers show a very strong interest in cultivating high value vegetable crops, which could provide a good source of immediate income, and in innovative agricultural practices to achieve better yields. Support should be given to vegetable crop production in peri-urban areas be considered a concomitant component in any horticultural crop production programme.
MAP 1. Active and non-active research stations in Afghanistan

- Active research stations
- Non-active research stations
National survey of research stations and fruit nurseries

**RESEARCH STATIONS**

Twenty-eight research stations were covered by the survey, sixteen of which are presently either active in research or in other agricultural activities. The data collected give the exact location and altitude of the research stations, land size, type of prevailing soil and the condition of the irrigation system. It also included information on the main crops grown and the type of ongoing and past technical assistance received from UN agencies.

- Figure 1 shows the altitude of the research stations, 40 percent of which are above 1,500 a.s.l. The average size of the research stations is 322 jeribs (64 ha)¹ (see Figure 2). The largest research station is located in Turnak, having 5,800 jeribs (1,160 ha).

- Drought was the main limiting factor in the last four years for about 40 percent of the research stations.

- The research station in Faizabad located in Badakhshan Province is the only one that was affected by floods within the last five years.

- As Figure 3 below indicates, the main crop grown at the stations is cereal (wheat), followed by fruit trees and vegetables.

---

¹ A jerib is 2,000 square metres, or one-fifth the size of a hectare.
NUCLEUS FRUIT NURSERIES

Nucleus fruit nurseries represent the main centres of fruit tree multiplication and distribution in the country. The general status of each nursery was assessed, the irrigation system was monitored, and estimates were provided on all different fruit tree species, varieties, the number of trees and their condition.

There are 11 nucleus fruit nurseries in Afghanistan, all of which are located on government land. In the past, all of these nurseries received technical assistance from FAO. Now, the Afghanistan Government with the assistance of FAO intends to re-launch the activities of fruit training and propagation in some of these nucleus nurseries.

The survey indicates the following:

- The nucleus fruit nurseries represent the main centres of in-situ germplasm fruit tree collection in their respective provinces and are the main distribution source to the private satellite fruit nurseries for improved fruit trees.
- Each nucleus fruit nursery has a mother plant collection block and is generally divided into tree blocks - rootstock, budwood and stock plant block, the latter of which is inaccurately named locally as “sapling block”.
- The most common species in the nurseries are apricots, apples and plums, the former of which also has the highest genetic diversity. The collection of indigenous varieties is wide and most of them are still considered valuable by growers.
- Seventy percent of the nurseries have mechanized power (four-wheel tractors).
- The drought severely affected 80 percent of the nurseries in the past four years with a 30 percent loss of fruit trees.
- The nucleus fruit nurseries are located at different altitudes to cover the different agro-climatic conditions from north to south and west to east (Figure 4). They therefore include a wide range of temperate fruit tree species and varieties in their collections.
MAP 2. Number of fruit species in the nucleus nurseries/district

MAP 3. Nucleus nurseries/districts with the highest number of indigenous varieties of apricot
I
PRIVATE FRUIT NURSERIES

Despite the recent civil unrest and drought, 62 percent of the private fruit nurseries are still active. Results of the survey include:

• Wardak is the province with the highest presence of active private fruit nurseries, followed in order by Farah, Hirat and Paktika.

• The average size of the private fruit nurseries is 1.5 jeribs (.3 ha), and they occupy 17 percent of the farmland.

• Most of the private fruit nurseries include a rootstock block, budwood block and stock plant block. However, due to inefficient crop management, the condition of trees is poor and skilled technicians are very scarce.

• Almond is largely grown in the Ghazni and Wardak Provinces. Paktika is the main centre for the production of almond landraces.

• Apple is the most common species grown in the nurseries. Paktika Province has the highest number of exotic apple trees in the stock plant block. It is the most important fruit tree in Wardak, as shown by the total number of trees (3,500) in the stock plant block of the six private nurseries.

• Apricot is by far the most common species of the indigenous varieties grown by the private nurseries. The nurseries in Paktika and Ghazni produced the highest number of trees.

• Regarding the indigenous varieties of grape, the main centre of grape production is in Farah Province.

• The only source of local varieties of guava, loquat, persimmon, figs and mulberry is found in Nangarhar Province.

• Peach is grown intensively in the private nurseries of Hirat and Paktika, the latter producing the highest number of exotic varieties.

• The main centre of plum production is in Hirat; nine landraces are commonly grown in these nurseries.

• Furrow irrigation is the most common system used.

• Paghman District (Kabul Province) is the only one with a karez. The others use canals or deep wells.

• The nucleus fruit nursery in Nangarhar Province also includes sub-tropical species, such as guava and loquats.

• Two nucleus fruit nurseries, in Balkh (Mazar) and in Kandahar (Arghandab), are not presently active due to civil unrest and drought.

• The two nucleus fruit nurseries of Kunar Province have the highest number of fruit tree species in their collections, 15 species in Asad Abad and 13 in the Asmar District.

• Gazara District in Hirat Province has the highest number of indigenous grape varieties (32) and is the only one with a collection of wild pistachio landraces.

• The nucleus fruit nursery in Khwaja Omari District has the richest collection of indigenous varieties of apricot (17) and plum (7).

• Loquat and orange exotic varieties are available in the Matun District (Central Bagh nursery) in Khost Province.

• Mitharlam has a valuable collection of indigenous varieties of fig and pomegranate. Exotic varieties of other fruit species also represent a high portion of available genetic material in the district.

• Gozara District in Hirat Province is the main collection centre for exotic varieties of apples, pears, apricots and plums.

• The district nurseries of Mitharlam, followed by Asada Abad and Gozara, have the highest number of exotic almond varieties (five). A valuable citrus (orange and lemon) collection of exotic varieties is also present in the Beshood nursery in Jalalabad.
MAP 4. Number of active private fruit nurseries per province

- Hirat
- Farah
- Uruzgan
- Zabul
- Paktika
- Helmand
- Kandahar
- Ghazni
- Wardak
- Kabul
- Logar
- Nangarhar
- Balkh
- Takhar
- Jawzjan

Color Key:
- 14
- 12
- 10
- 9
- 6
- 4
- 3
- 2
- 1
- 0
MAP 5. Number of local varieties of apricot in the private nurseries/provinces

MAP 6. Province/private nurseries having species with the highest number of local varieties
MAP 7. Province/private nurseries with the highest number of trees (local varieties) in the stock plant block

- Hirat
- Peach, plum, pomegranate
- Grape, citrus, plum
- Citrus, fig, guava, loquat
- Almond, apricot
- Nangarhar
- Farah
- Paktika

No. of trees by class:
- 3231 - 10600
- 101 - 3230
- 76 - 100
- 75
- < 75
MAP 8. Number of trees with the highest number of exotic varieties in the stock plant block of private nurseries/province

MAP 9. Number of trees of exotic varieties of almond in the stock plant block of private nurseries/province
MAP 10. Number of apple trees (exotic varieties) in the stock plant block of private nurseries/province

- Hirat
- Wardak
- Logar
- Nangarhar
- Paktika

No. of apple trees
- 1451 - 7430
- 1101 - 1450
- 121 - 1100
- 51 - 120
- 50
- < 50
National survey at the village level

A total of 1,805 villages covering 327 districts in all 32 provinces were monitored. (Two districts were not included due to adverse weather conditions and insecurity.) The survey covered information on farming systems, horticulture crops, and the occurrences of natural disasters and manmade calamities. Questionnaires also focused on farm size, farm power, landless families, crop management, and irrigation sources. The analysis was conducted taking into account the different sections outlined in the questionnaires (D1, D2, D3, D4) and grouped according to selected queries (see Annex II).

**GENERAL VILLAGE AND RURAL FAMILY INFORMATION**

For each village surveyed, information was collected on the number of farming families and the relative number of landless families sustaining their livelihood through land rent. Information was also collected on the altitude of the village, such as lowland or mountainous area, as well as on the collocation of the agriculture system in a well-defined agro-climatic area.

According to the total villages monitored, 89 percent of all families were rural farming families (128,407). Ninety-one percent of all the families interviewed own their own land.

The areas near big cities and in districts close to the country’s borders show a higher number of families renting land because of the availability of alternative job opportunities for the landowners and the emigration of land tenants.

**OCCURRENCE OF NATURAL DISASTERS AND MANMADE CALAMITIES**

The importance of the incidence, type, and impact of natural disasters and manmade calamities from 1999 to 2002 and their relationship to horticultural practices (see Figure 6) were assessed. Monitoring was performed on the eventual assistance given by humanitarian, organizations international and non-governmental organizations.

**IRRIGATION SYSTEMS**

The situation of the present irrigation system was assessed and the main problems in relation to water deficiency were addressed. Farm power was also monitored, as well as the extent to which this it can be a limiting factor to crop production development.

Fifty percent of the farmers irrigate their crops; however, due to four consecutive years of drought, 80 percent of the farmers in the traditionally rainfed areas of the north were forced to irrigate their lands.

**FARM POWER**

The results show striking evidence of a very severe deficit in farm power and machinery (see Figure 7), which greatly limits crop production development and efforts to rehabilitate the land.

---


- Flood: 47%
- Civil unrest: 29%
- Pests/Diseases: 8%
- Drought: 16%

**FIGURE 7. Farm power in Afghanistan (spring 2003)**

- Tractor: 42%
- Manual labour: 32%
- Animals: 26%
**LAND USE IN HORTICULTURE AND CROP MANAGEMENT**

The proportion of irrigated and rainfed arable land being used for growing horticultural crops and its prospects for horticultural crop production development were analysed.

On average, 13 percent of total arable land area (both irrigated and rainfed) was used for horticultural crop cultivation, of which 6.3 percent was cultivated for orchards and 6.7 percent for vegetable crops (including potato). Only 25 percent of the irrigated land was used for horticultural crop cultivation.

Horticultural crops therefore continue to play an increasing role in the rural economy. Peri-urban districts showed a higher percentage of land used for horticultural crop cultivation than did rural areas.

---

**CULTIVATION OF VEGETABLES**

The total area of vegetable crops grown in each of the selected villages and cultivation preferences of vegetable species, both for home consumption and market purposes, were included. Special emphasis was also given to queries on aspects of crop management such as pests, diseases and fertilization applications, and on horticultural constraints.

The survey yielded the following findings:

- Afghan farmers presently focus more on short-cycle crops that can produce immediate income such as vegetables, rather than on fruit orchards, due primarily to the uncertain socio-economic situation.
- Only villages in Laghman Province (23.4 percent) used plastic tunnels for early vegetable crop production.
- Sixty-six percent of the farmers used chemical fertilizers, 9 percent used manure, and 78 percent controlled pests and diseases. Farmers make a much greater use of chemical fertilizers and pesticides on vegetable crops than on fruit orchards, reflecting the recent trend of farmers choosing to invest in a vegetable crop production that can guarantee an almost immediate and more reliable income.
- Only a limited number of villages use “improved” vegetable seeds. While the farmers are familiar with these seeds from local varieties, in most cases, the varietal purity is very poor.
- The first and most relevant problem encountered in and associated with horticultural crop management was lack of irrigation water (Figure 12). The second was the prevalence of diseases, followed by insect damages, a lack of improved vegetable seeds and fruit varieties, insufficient marketing facilities and the need for farmers’ cooperatives.
- As Figures 8 and 9 show, in descending order, the top six vegetable crops grown nationally are watermelon (123 000 jeribs or 22 600 ha), the most frequently grown vegetable in eight provinces, followed by honeydew melon (73 000 jeribs or 14 600 ha), onions, potatoes, tomatoes and carrots. Other vegetables with a limited area of cultivation were turnips, (with less than 9 500 jeribs or 1 900 ha) and pumpkin (with about 6 500 jeribs or 1 300 ha), which ranked seventh and eighth, respectively.
- Farming communities lack awareness of the technical and economic advantages of growing and consuming a diversified range of vegetable products in order to increase farm income and improve the nutritional status of their families.
- Where water is available, Afghanistan has both an excellent climate for growing all kinds of vegetable crops and considerable potential to promote vegetable crop production.
- The data indicates that honeydew melon is very common in Farah, Zabul, Uruzgan and Baghlan Provinces, and is widely spread elsewhere. Onions are largely grown in Kapisa, Nangarhar, Kunar, Badakhshan, Logar and Kandahar, and potatoes in Ghor, Nimroz, Parwan and Bamyan. Beans are the main crop cultivated in Nuristan, followed by potatoes.
- Farmers demonstrate the most diversity in their vegetable cultivation in Nangarhar, Kabul and Hirat Provinces.
MAP 11. The most common vegetables grown in the provinces

FIGURE 8. Vegetable species with more than 2 500 jeribs (500 ha) in the monitored villages (spring 2003)

FIGURE 9. Vegetable species with less than 2 500 jeribs (500 ha) in the monitored villages (spring 2003)
The status of fruit crop production by species was assessed, future production trends evaluated and further support requirements identified. The level of the most basic orchard management practices was examined as well as the possibilities for their improvement.

Findings of the survey are as follows:

- The country analysis (data of all villages analysed) showed that grape, followed by apples and almonds, pomegranates and apricots represent the highest percentage of orchard area for fruit species (see Figures 10,11).
- Grapes are the major cultivated fruit species in more than 15 provinces, representing 48 percent of the country.
- Apple is the most cultivated crop in Wardak as well as in four other provinces.
- Almond is the fruit tree farmer’s first choice in Uruzgan Province.
- Pomegranates with their valuable native varieties are commonly grown in Balkh, Nimroz and Kapisa Provinces.
- Mulberries are mainly grown in Badghis.
- Nangarhar is the sole province where farmers grow subtropical trees due to the favourable climatic conditions and to its proximity to Pakistan.
- Orange trees are the most common fruit crop in Nangarhar.
- Data on ages of tree, including those from 0-10 years old and those older than 10 years old, show a moderately high incidence of fruit orchards younger than 10 years old (58 percent). These figures indicate an encouraging, positive trend of fruiticulture despite Afghanistan’s recent instability, which certainly did not favour the establishment of new orchards or the flourishing of market opportunities. This also means that the Afghan farmer considers fruit a vital part of the country’s traditions as well as a major crop in the daily diet.
- It is particularly difficult to estimate the actual land area covered by orchards throughout the country due to how some fruit species are grown. Most fruit trees are inaccessible, placed extensively in marginal areas such as along irrigation canals and in home backyards enclosed by walls. Therefore, it is extremely difficult and subjective to estimate the actual number of trees. Nonetheless, an estimate of the number of trees per jerib and ha was included in the questionnaire.
MAP 12. The most fruit species grown (number of trees and jeribs) by province

MAP 13. Area (jeribs) surveyed and covered with horticultural crops by province
STATUS OF PRODUCTION OF THE MAIN GROWN FRUIT SPECIES

In general, the domestic fruit market is very restricted by current economic instability, limited security, harsh climate, water scarcity, and poor roads, which impede market accessibility. The domestic market for dry fruits, on the other hand, is quite active, because the product is not perishable and can be easily transported and marketed despite poor roads.

Grape

In the 327 districts surveyed, grape cultivation is the primary fruit species being produced in the country, accounting for 48 percent of the total fruit-growing area. However, these figures fluctuate significantly from district to district. In most districts, grapes are not cultivated for commercial purposes, but mainly for family self-consumption. This is because grape production is specifically affected by low yield, low local market demand, difficult market accessibility and market disadvantages. Further, due to unstable market prices and a dramatic reduction of grape drying houses, many farmers are obliged to sell their production of fresh grapes in a predetermined period of the season.

The country has indigenous grape genetic resources of excellent quality that are cultivated almost everywhere. The core of the local varieties collection is in selected nucleus nurseries and research stations. The production of seedless grape varieties (called “kismish”), which are dried for the raisin export market, is still common, especially in the southern region. Unfortunately, this activity was badly affected during war with the destruction of a large number of grape drying houses (“kismish khanas”). As a consequence, many farmers are selling their produce as fresh grapes but with minimal benefit, since local fresh markets are saturated at the time of grape harvesting.

In addition, the average grape yield fluctuates greatly and most of the production is now reduced to subsistence production. The low yield is mostly due to the traditional growing practices as well as farmers’ reluctance to invest in a crop that does not produce a reliable source of income.

Most vineyards are irrigated and grown using the tree training system, and in the case of the espalier system, pruning is not practised regularly. In some cases, the vines lie against an earth embankment, which inclines at about 35 to 40 degrees. This produces a saw-tooth series of alleys and the vines lie on the supporting slope. Moreover, grapes vines are grown on old trees, using them as natural supports; in the few cases where artificial supports are used, they are generally not renewed. The result is a low yield (generally from 9 000 to 18 000 kg/ha in the main grape growing areas) and poor quality.

In the case of green grapes production, there is usually a raisin-drying house in the centre of the vineyard. This structure is made out of mum bricks and has lattice curtain walls to allow adequate ventilation for the drying of the fruit. When the raisins are harvested, they are placed on bamboo trellises to dry inside the house. Those raisins that fall to the ground are taken outside and dried on the mud floor, becoming the red raisins that make up the bulk of the processed raisins exported. The traditional drying technique takes 60 days to produce a raisin. However, if the grapes were dipped in a solution of potassium carbonate, the drying time could be reduced to 8 days.

Apple

Afghanistan has proven favourable climatic conditions for the production of apple trees. Apples are still an important fruit in the country despite conditions limiting the domestic market. The more accessible areas and local markets have heavy competition from imported fruits from Iran and Pakistan. Nevertheless, cultivation is still widespread and mainly aimed at satisfying the small rural local markets and the farmers’ subsistence production. The current apple production in the country largely depends on the few exotic varieties imported 20 years ago.

Apricot

The cultivation of apricots is oriented towards local varieties, which Afghan farmers traditionally consider more valuable than the imported (exotic) cultivars. The quality of these varieties is excellent; some even better than the Mediterranean commercial cultivars in terms of taste and resistance to pests and diseases.

Production is very common but crop management is poor. Most of the trees left after the drought and the long conflict did not receive care, thus resulting in low yields and poor quality. In spite of these constraints, apricots are certainly one of the most promising fruit species with the highest future potential for
MAP 14. Number of jeribs of grape by province

MAP 15. Provinces with the highest apple area (in jeribs)
MAP 16. Number of almond trees (local varieties) in the stock plant block of private nurseries

- Hirat
- Wardak
- Nangarhar
- Paktika

Legend:
- 8701 - 14100
- 1201 - 8700
- 201 - 1200
- 0-200
- No trees
development due to the farmers’ familiarity with their cultivation, the excellent quality of indigenous genetic resources, and easy to dry characteristics of their varieties. There is a good potential in increasing the value-added aspects of the product through improved production, processing and marketing practices.

**Almond**

Afghanistan farmers grow many almond landraces of excellent quality, both hard shell and soft shell, which have an excellent potential for the export market. In addition, the favourable agro-climatic conditions of the country are ideal for the development of almond production in a wider number of districts. At present, almond production is mainly concentrated in Uruzgan, Kunduz, Balkh, Saripul and Kandahar Provinces.

**Pomegranate**

Afghanistan can be considered the country of the pomegranate fruit, not only because of the traditional cultivation of this species, but also because of the excellent quality of the landraces grown. In fact, the local varieties grown in the main production area of Kandahar Province (4 032 jeribs or 806 ha) are known for their high quality and productivity. Farmers reported average yields ranging from about 1 720 kg/jerib (344/ha) in Dand District to more than 3 800 kg/jeribs (760 kg/ha) in Arghandab District. Farah Province is also well known for pomegranate production and the high quality of its fruits, as indicated in the targeted villages by the survey (1 097 jeribs or 219 ha). Pomegranate ranks second as its main fruit crop.

**Peach**

Although peaches can be easily grown in a number of districts, the development of commercial orchards remains limited due to its fragile and perishable nature that makes it difficult to market. The main provinces for peach production are Takhar and Ghor.

**Forest trees**

Eucalyptus, poplar and wild pistachio trees are very common in the higher areas of northern Afghanistan. However, few farmers are growing forest trees for market purposes, with the exception of Bamyan Province, which has the highest rate of poplar tree cultivation at the village level, with a total of 215 jeribs (43 ha).

**Information on sources of vegetable seeds and planting materials**

The survey collected information on sources of vegetable seeds and planting materials, the availability of planting material in the local markets and all possible constraints related to seed security and to the supply of good quality seeds. These results were ascertained:

- The formal seed sector is almost absent in the entire country, especially in the remote areas. More specifically, farmers rely completely on the informal seed sector for the procurement of vegetable seeds (see Figure 13).

---

**Queries**

Queries in the survey also examined the most common orchard management practices. In this respect, the interviewed fruit growers gave indicative responses related to their problems (Figure 12).

---

**Figure 12. Main problems of Afghan farmers (in percentage of responses) related to crop management (spring 2003)**

![Figure 12](image1)

**Figure 13. Seed sources in Afghanistan (spring 2003)**

![Figure 13](image2)
Only the farmers who live in areas where private fruit nurseries are established and still active are advantaged in procuring fruit planting material.

Local adapted varieties of seeds and planting material are preferred. The most important criteria in these choices are high productivity, followed by high market value and “better taste” (see Figure 14).

**MARKETING HORTICULTURAL CROPS**

**Farmers’ access to markets**

Figure 15 shows where Afghan farmers sell their own horticultural products in 2003. To have an indication of the trend in farmers marketing their crops, responses from the previous National Horticulture Survey 1996 have been compared to the Survey of the Horticultural Sector 2003. Data on the kind of markets used are shown in Figure 16.

There is a great disparity from district to district depending on whether the markets are in remote areas or close to cities or borders. In most cases, farmers in remote areas market their products at the village level. Farmers often contracted their crops to traders. In the case of fruit crops and some vegetable crops like potato, the crop is often contracted before harvesting, based on an estimate of the yield, and the trader takes care of the harvesting and packaging processes. In this case, farmers have a very limited bargaining power and cannot effectively estimate the actual yield of their crops. Once the contractual agreement has been made with the trader, the farmer tends to pay little heed to the management of his crops. Such practices are explained by the poorly developed marketing system and most farmers’ lack of transport facilities to carry products to the district or provincial level markets.

It is more common for farmers from peri-urban districts to market their products themselves, because they have access to transport and are in a better position to negotiate with different traders and wholesalers. However, these negotiations always take place on an individual basis between the farmer and traders; hence, an individual farmer always has limited bargaining power against a group of traders.

Farmers from cross-border districts have a better opportunity to export their products...
themselves at a better price, but it appears that they do not take full advantage of this comparative geographical advantage. This may be due to the absence of transport and the lack of farmer organizations to market their products (e.g. growers’ associations or cooperatives).

**HANDLING, PACKAGING AND MARKETING PRACTICES**

There is no packaging standard for horticultural products in Afghanistan. However, packaging is a very crucial issue because most horticultural products are fragile and highly perishable. Survey results show that an average of 49 percent of the villages pack their horticultural products in jute bags (mostly for tubers, roots and bulb vegetables), which shows an increase of 10 percent over the 1996 survey (38 percent); 36 percent are packed in crates (mostly for fruit species and vegetables); and 15 percent in baskets (mostly pomegranate and leafy vegetables).

Packaging of the produce to minimize damage and maximize presentation is not really considered. Consequently, the depth and volume of transport containers are often inappropriate, causing severe bruising of produce. Straw is often used as packing material and tinsel as decoration for the top of the crate. If packaging requirements were properly understood and addressed, spoilage would be substantially reduced. However, cardboard packaging is not readily available in rural areas, so their best option is wooden crates, especially during travel on rough roads. Produce quality can be improved in how the fruit is cushioned in the crates and in keeping the crates cool on their journey to the market.

Considering the poor roads, packaging quality is of paramount importance for horticultural products. Poor roads and the lack of adequate packaging materials are factors limiting the market development of fragile horticultural products such as peach, pear, plum, cherry and tomato.

**Marketing problems of horticultural products**

The problems met by farmers in marketing their horticultural products are important indicators in assessing the status of the sector as a whole (see Figure 17). The lack of growers’ associations and cooperatives makes it difficult for farmers to negotiate with traders on a fair bargaining basis. As indicated by Figure 17, 22 percent of farmers attribute the most important problem to limited bargaining power and 12 percent to middlemen. Another serious constraint recorded during the survey is the limited availability of market information. As stated in the 1996 survey report, the Export Department of the Ministry of Commerce of Afghanistan used to provide market information to traders and establish export quality criteria. The Agricultural Bank of Afghanistan and some cooperatives also provided market information to farmers. However, these services were disrupted with the war, and nowadays traders and farmers have no access to any kind of centralized market information. Without such information, farmers have little possibility to rationally plan their production. As a result, they often refer to the previous year’s market prices when planning...
This can lead to high volatility in the production and market prices of a given horticultural product from one year to another, and subsequently cause situations of alternating produce gluts and shortages.

The most common horticultural cash crops

This enquiry was included in the questionnaire to crosscheck the data gathered on horticulture crops. The farmers ranked the most important crops in relation to cash income and market opportunities.

For vegetables, potato ranks as the most profitable, followed by watermelon, tomato and onion. For fruits, grapes followed by apricots, almonds and apples are the most important cash crops (see Figure 18).

The crops mentioned are also in line with the data gathered on the most commonly cultivated horticultural crops in the country (see Figure 19).

The average percentage of fruit production marketed by farmers indicates that grape is the most important crop, followed by almonds, pistachio, mulberry, walnut, apricot, peach and plums. Apple, with almost 50 percent being marketed, is also an important marketed product (see Figure 20).

Concerning vegetables, honeydew melons, watermelons and potatoes are the most marketable with more than 60 percent of production marketed at the village level. Data indicated that beans, onions, okras and carrots are also marketed in large quantities (see Figure 21).
ANNEX 1
Survey methodology

The survey was conducted in three distinct phases according to the timeframe of the consultants’ missions, the project take-off and the seasons. The onset of spring was the ideal time to launch the large national survey of the horticulture sector.

The survey was conducted in selected villages, chosen according to data gathered from FAO (land cover map and information), from the Ministry of Agriculture and Animal Husbandry (MAAH) and from the Vulnerability Analysis and Mapping (VAM) Unit of the World Food Programme (WFP). The selection of villages for the national survey was made randomly, taking the most traditional areas of fruit production into consideration. Six to seven villages for each of the 329 districts were chosen for a total of about 1,800 villages.

The country was divided into seven regions in order to more efficiently manage the conducting of the survey at the field level. This required seven teams composed of a Regional Coordinator and three field researchers for each of the 32 provinces surveyed. These areas or sub-regions were assigned to the appointed National Professional Project Personnel (NPPPs).

The three phases were implemented as follows:

### PHASE I

#### Sub-Phase (a)
A national survey was conducted of all nucleus fruit nurseries, national research stations and private nurseries. Private nurseries were selected according to data gathered from previous FAO horticultural projects in Afghanistan.

**Organization and management**
The survey was organized and launched by one international horticulture survey specialist and a national horticulture survey coordinator.

- Questionnaires were prepared and translated into the Dari and Pashto languages.
- A team of regional field survey coordinators was established. Priority was given to the MAAH personnel when available.
- Coordination was established with FAO Area Managers to facilitate logistics and the placement of field researchers.
- Computers and adequate support were provided for data entry and analysis and communication facilities were procured.

#### Sub-Phase (b)
A test survey was conducted of the horticulture sector in Kabul Province, Nangarhar Province and Khost Province. It was conducted in at least five villages for each district in each province. A range of between five to seven villages for each district was monitored by the survey.

**Organization and management**

- District level field researchers (9-11) were recruited and trained for about 10-20 days. Each appointed field researcher had to be familiar with the area to be surveyed.

- The FAO Area Manager assisted in providing logistical support in the targeted areas.

- The questionnaire translated in Dari and Pashto was tested in Kabul Province.

---

<table>
<thead>
<tr>
<th>Designated survey regions within Afghan provinces</th>
</tr>
</thead>
<tbody>
<tr>
<td>REGION</td>
</tr>
<tr>
<td>North</td>
</tr>
<tr>
<td>North-east</td>
</tr>
<tr>
<td>West</td>
</tr>
<tr>
<td>East central</td>
</tr>
<tr>
<td>South-east</td>
</tr>
<tr>
<td>South</td>
</tr>
<tr>
<td>South-west</td>
</tr>
</tbody>
</table>
• In the district where private nurseries are present and still active, at least three villages of the five to seven villages monitored were chosen to be surveyed according to their vicinity to the private nurseries.

• Collection of data and information for the test and fruit nursery surveys was implemented in December 2002.

• Data entry and analysis of Phase I nursery survey results were conducted in January 2003.

• Following the results of the test survey, questionnaires were reviewed. The National Horticultural Survey at the village level was then prepared and launched on February 2003.

**PHASE II**

Results of Phase I (a) and (b) of the survey were analysed.

**Organization and management**

• One international horticulture survey specialist and a national horticulture survey coordinator launched and supervised the National Horticulture Survey and finalized the baseline study (6 weeks).

• A team of regional field survey coordinators (8 nationals) was established.

• District level field researchers (87) were recruited and trained for 22 days; most of them were assigned to the province where they reside.

• The FAO Emergency Area Manager assisted in providing logistical support in the targeted areas.

**PHASE III**

Data entry and analysis of results of the national horticulture survey (Phase II) were completed.

**Organization and management**

• One international horticulture survey specialist finalized the baseline study (1 month); three to four clerks (3 months each) worked on data computerization and processing.

**DATA COLLECTION TOOLS**

The main data collection tools were the questionnaires and notebooks for the field researchers’ remarks.

The questionnaire forms were prepared in English and translated into Dari and Pashto. The questions are shown in Annex II.

Field researchers’ remarks were used to obtain additional information not included in the questionnaire for debriefing purposes.

A team of three field researchers was assigned to each province. Following meetings and discussions previously held with provincial authorities, local guides were provided by the District Administration through consultation with the Provincial Shura (Council) or another designated liaison institution.

The criteria for selecting a target community for questionnaire completion were representative groups of 30 to 100 families who cultivated an identifiable geographical area.

Each field researcher used one questionnaire form per village. One village usually consisted of between 30 to 100 families. According to the size of the village a representative group of five to ten readily available and knowledgeable farmers residing were interviewed through group discussions.

For a village of over 100 families, there were usually sub-groups within the community. In these instances, one or more questionnaires were filled out by the field researcher according to the number of sub-groups.

Villages with less than 30 families were...
combined with neighbouring families to meet the criteria for completing the questionnaires. Exceptions arose where a village was smaller than 30 families and was located at a considerable distance from a neighbouring village. In such cases, exceptions to group criteria could be made. Exceptions were also made in the case of villages larger than 100 families that could not be divided into separate units because the agricultural land of the village could not be partitioned into separate sub-groups; doing so would have risked overestimating the total land area.

The group selected for the interview possessed sound local knowledge of the cultivated land of the area and its communities.

The field researchers marked the villages monitored on the district maps provided by the Afghanistan Information Management Service (AIMS), which were returned to FAO at the end of the assignment in order to facilitate data crosschecking. All the new codes and selected villages were therefore matched and updated according to the AIMS maps and data system.

Field surveys were monitored and assisted by FAO horticultural national staff to ensure the accuracy of the interviews conducted. Each completed questionnaire was checked and verified in the field to maintain high levels of accuracy. A random check was performed in 10 provinces and in a total of almost 30 districts for verification before computer data entries were made. Moreover, field researchers were debriefed by the Regional Survey Coordinators following their return from the field to extract all necessary information pertaining to the districts surveyed.

Method of data analysis
The data collected were entered in a Microsoft Access database to facilitate further processing and analysis. The data entries were also checked and verified before processing for final analysis purposes. Microsoft Excel was also used for the database analysis.

Methodology limitations and possible causes of errors
The data collection and entry are inevitably subject to minor causes of errors, despite accurate crosschecks conducted at both the field level and during data computerization. Some of these causes are as follows:

- Most of cultivated land cannot be physically measured and all figures quoted by farmers must be considered as estimates only.
- While the group interview is a useful method for conducting large-scale surveys, this approach can prevent all members of the group from having an equal opportunity to express their views, and some individuals’ opinions can be influenced by the group.

It should nevertheless be mentioned that the field survey was conducted in more than 1,800 villages from 99 percent of the districts and all provinces. Therefore, even with some minor errors, the figures remain highly representative of the condition of the horticulture sector in Afghanistan.
ANNEX 2

Survey queries

Phase III of the National Survey for all nucleus fruit nurseries, national search stations and private nurseries included the following selected queries:

(a) GENERAL VILLAGE AND RURAL FAMILY INFORMATION
   Number of families/number of farming families
   Average Altitude
   Number of families that own land/number of families that rent land
   (percentage)

(b) OCCURRENCE OF EMERGENCIES
   Natural disasters within the last five years
   Cases such as drought and flood
   Effect of the event upon farming families
   Emergency assistance

(c) THE IRRIGATION SYSTEM AND MECHANIZATION
   Total arable land/irrigation area/rainfed area
   Area irrigated in 2003 by province
   Type of irrigation used
   Percentage of mechanized farms

(d) HORTICULTURE CROP MANAGEMENT
   Main horticultural crop management problems encountered

(e) VEGETABLES GROWN
   Ranked by species (cultivated land in jeribs)

(f) FRUIT TREES GROWN
   Ranked by species (number of trees)
   Average age of trees

(g) FRUIT NURSERIES (NUCLEUS NURSERIES AND PRIVATE NURSERIES)
   Active, non-active
   Altitude
   Type of irrigation
   Size in jeribs
   Calamities that occurred within the last five years
   Total number of fruit species
   Local germplasm resources (indigenous varieties)

(h) MARKETING OF HORTICULTURAL CROPS
   Farmers’ access to markets
   Handling, packaging and marketing practices
   Marketing problems of horticultural products