

Report No. 1324-AF

Horticultural Subsector Survey

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Afghanistan

(In Two Volumes)

Volume II

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Projects Department
Europe, Middle East and North Africa

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CURRENCY EQUIVALENTS

(Average Free Market Rate)

<u>Year</u>	<u>Afghanis (Afs) per US\$1</u>
1971	85.28
1972	84.73
1973	80.00
1974	60.98
1975	56.10
May 1976	52
August 1976	46
1976 Average	45
Conversion Rate used in this Report: Afs 50 = US\$1	

MEASURES

1 beswa	=	0.05 jerib
1 jerib	=	0.2 ha
1 ha	=	2.47 acres

WEIGHTS

1 man	=	4 kg
1 seer	=	7.66 kg

While the same terms (man and seer) are used throughout the country their metric equivalents vary between regions. The above values are those most commonly used.

ANNEXESAFGHANISTAN HORTICULTURAL SUBSECTOR SURVEYVOLUME IITable of Contents

	<u>Page No.</u>
ANNEXES	
1. HORTICULTURAL PRODUCTION	1
A. Introduction	1
B. Climate	2
1. Temperature	2
2. Precipitation	4
C. Irrigation	5
1. Present Situation	5
2. Irrigation and Soils	7
3. Irrigation and Evapotranspiration	10
D. Soils	11
1. Soil Types	11
2. Soil Fertility	12
3. Soil Capability	13
E. Land Use and Labor	14
1. Land Use	14
2. Farm Size and Value	17
3. Labor	17
4. Cost of Labor	18
F. Government Service	19
1. Extension Service	19
2. Research	21
3. Education	22
G. Crop Production	24
1. Crops	24
2. Vegetables	27
3. Grape Production	33

H.	Crop Yields and Financial Returns	36
1.	Crop Yields and Returns	36
I.	Recommendations	37
1.	Crop Production Programs and Climatic Analogues	37
2.	Improved Variety Selection and Seed Production.	39

Appendices

1. Vegetable Seed Production in Afghanistan: Requirements and Estimated Investment Costs
2. Certified Potato Seed Production in Afghanistan: Recommendations and Estimated Investment Costs
3. Production of Fruit Tree Nursery Stock in Afghanistan: Recommendations and Estimated Costs and Revenues

Table 1 - Nursery Stock Development Program

Table 2 - Establishment Cost of Proposed Deciduous Fruit Tree Nursery (500 Jeribs)

Table 3 - Deciduous Fruit Tree Nursery - Costs and Revenue (500 Jeribs)

4. Costs and Revenues for Traditional and Improved Methods of Fruits and Vegetables in Afghanistan

Table 1 - Estimated Costs and Revenues for Improved and Traditional Fruit Production

Table 2 - Estimated Costs and Revenues for Improved and Traditional Production of a Number of Vegetable Crops

Table 3 - Estimated Costs and Income for a 100 Jerib Vegetable Farm

5. Horticultural Crop Husbandry and Crop Varieties in Afghanistan
6. Detailed Climatic Data for Some Areas in Afghanistan
7. Specimen Soil Profile Analysis from the Khodaman Valley in Afghanistan

2. AFGHAN 7-YEAR PLAN TARGETS, 1355-1361 (1975-76-1982/83)

Table 1 - Production of Important Agricultural Products According to Proposed 7-Year Plan, 1355-1361 (1976-1982)

Table 2 - Commercial Exports During the 7-Year Plan, 1355-1361 (1976-1982)

Table 3 - Commercial Imports During the 7-Year Plan, 1355-1361 (1976-1982)

Table of Contents (Continued)

3. TRADE

Appendix 1 - Direction of Afghanistan Exports to Principal Regions

Appendix 2 - Afghanistan Exports Duties & Customs Structure

Appendix 3 - Custom House & Border Station Locations

Appendix 4 - Afghanistan Horticultural Export Trade Data

Table 1 - Direction of Afghanistan Horticultural Exports by Country & Commodity, 1972-1976

Table 2 - Foreign Market Shares of Afghanistan Horticultural Exports by Country & Commodity, 1972-1976

Table 3 - Regional Distribution of Afghanistan Horticultural Exports, 1972-1976

Table 4 - Regional Distribution of Afghanistan Fresh & Dried Fruit & Nut Exports, 1972-1976

Table 5 - Direction of Afghanistan Horticultural Exports by Commodity Group, 1972-1976

4. MARKETING - DOMESTIC AND FOREIGN

Appendix 1 - Afghanistan Market Distribution Systems for Vegetable, Fresh and Dried Fruit & Nuts

Chart 1 - Typical Domestic Marketing System

Chart 2 - Fresh Fruit Product Flow Chart

Chart 3 - Dried Fruit Product Flow Chart

Chart 4 - Nut Product Flow Chart

Appendix 2 - Export Marketing Systems

Appendix 3 - The Export of Raisins
The Raisin Institute

Table 1 - Export Raisin Production, Processing and Marketing Costs in Afghanistan (May, 1976)

Table 2 - Annual Raisin Prices of Selected Exporters in the U.K. Market (1973)

Appendix 4

Table 1 - World Competitive Position of Afghan Producer Prices

Table of Contents (Continued)

Appendix 5 - Cooperative Development in Afghanistan

Appendix 6 - Market Prospects for Individual Commodities

5. PROCESSING

Appendix 1 - General Observations on Raisin Processing
in Afghanistan

Table 1 - Raisin Processing Plant Visits

Table 2 - Raisin Processing Costs (1974 estimates)

Appendix 2 - Marketing Margins: Apricot Dehydration

Appendix 3 - Kandahar Canning Factory

Appendix 4 - Juice Concentrate Plant

Appendix 5 - Other Processing

Appendix 6 - Cost of Labor

6. GOVERNMENT ORGANIZATION

Chart 1 - Afghanistan - Organization Chart for the
Ministry of Commerce

Chart 2 - Afghanistan - Organization Chart for the
Ministry of Agriculture

ANNEX 1

HORTICULTURAL PRODUCTION

Table of Contents

	<u>Page No.</u>
A. INTRODUCTION	1
B. CLIMATE	2
Temperature	2
Precipitation	4
C. IRRIGATION	5
Present Situation	5
Irrigation and Soils	7
Irrigation and Evapotranspiration	10
D. SOILS	11
Soil Types	11
Soil Fertility	12
Soil Capability	13
E. LAND USE AND LABOR	14
Land Use	14
Farm Size and Value	17
Labor	17
Cost of Labor	18
F. GOVERNMENT SERVICES	19
Extension Service	19
Research	21
Education	22
Afghan Fertilizer Company	23
G. CROP PRODUCTION	24
Crops	24
Vegetables	27
Grape Production	33
H. CROP YIELDS AND FINANCIAL RETURNS	36
Crop Yields and Returns	36
I. RECOMMENDATIONS	37
Crop Production and Climatic Analogues	37
Improved Variety Selection and Seed Production	39

Table of Contents (Continued)

APPENDICES

1. Vegetable Seed Production in Afghanistan: Requirements and Estimated Investment Costs
2. Certified Potato Seed Production in Afghanistan: Recommendations and Estimated Investment Costs
3. Production of Fruit Tree Nursery Stock in Afghanistan: Recommendations and Estimated Costs and Revenues

Table 1 - Nursery Stock Development Program

Table 2 - Establishment Cost of Proposed Deciduous Fruit Tree Nursery (500 Jeribs)

Table 3 - Deciduous Fruit Tree Nursery - Costs and Revenue (500 Jeribs)

4. Costs and Revenues for Traditional and Improved Methods of Fruits and Vegetables in Afghanistan

Table 1 - Estimated Costs and Revenues for Improved and Traditional Fruit Production

Table 2 - Estimated Cost and Revenues for Improved and Traditional Production of a Number of Vegetable Crops

Table 3 - Estimated Costs and Income for a 100 Jerib Vegetable Farm

5. Horticultural Crop Husbandry and Crop Varieties in Afghanistan
6. Detailed Climatic Data for Some Areas in Afghanistan
7. Specimen Soil Profile Analysis from the Khodaman Valley in Afghanistan

HORTICULTURAL PRODUCTION

A. INTRODUCTION

1.01 Horticulture is a major farm enterprise in Afghanistan. Horticultural crops are produced on 6% of the total irrigated area in Afghanistan (Table 1). The total area of horticultural crops is 231,600 ha, of which 140,300 ha are used for fruit and nut production and 91,300 ha are used for vegetable crop production. Grape production is the most important single enterprise (70,300 ha). The importance of horticulture in Afghanistan's agricultural economy is also evidenced by its high contribution to the value of agricultural exports. In 1975 (IBRD Agricultural and Rural Development Sector Report, 1975), the value of horticultural products amounted to \$79.0 million (50%) out of a total agricultural export trade of \$159 million. Even by world standards, horticulture is an important industry. The size of the industry and its distribution in small-scale production units, provides the basis for a widespread indigenous horticultural expertise which should be a valuable asset in achieving the future potential for horticulture in the area.

1.02 The high value of horticultural crops provides for a better per unit area farm income and also ensures that high value fully irrigated lands are used to their full potential. Wheat has an approximate gross value of 3,000-4,500 Afs/jerib, depending on the region of the country. Some form of double cropping could increase the gross return to 6,000-8,000 Afs/jerib. However, most orchards crops or vegetable rotations have a gross return of 20,000-30,000 Afs/jerib. Costs of production of horticultural crops would be higher but even so net return from these crops can at a minimum be double those based on wheat as a major component in the crop rotation.

Table 1: Total Irrigable Area and Area Under Main-Crop Cultivation

<u>Description</u>	1350	1351	1352
	<u>1971 - 1972</u>	<u>1972 - 1973</u>	<u>1973 - 1974</u>
	-----'000 ha-----		
Total Irrigable Area	12,495	12,495	12,495
Area Under Maincrop Cultivation	3,694.9	4,214.8	3,590
Wheat	2,350	2,897.1	2,236
Barley	315	320	322
Rice	200	210	210
Corn	500	460	470
Cotton	54	51.6	74.8
Sugar Cane	4.4	4.6	5.3
Sugar Beet	2.5	0.5	0.7
Oil Crops	42	42.5	42.5
Vegetables	91	92	92
Fruits and Nuts	136	136.5	136.7

Source: Ministry of Agriculture, Kabul, 1976.

B. CLIMATE

Temperature

1.03 Afghanistan's climate is continental, located in the low latitude desert and steppe belt of the Asiatic Climatic System. the climate is arid with hot summers and cool or cold winters. Maximum precipitation occurs from December to March. ^{1/} The climate readily lends itself to the production of a wide range of horticultural crops. It varies from a cool temperate zone such as Bamyan, (137 frost days per year), where only potatoes and other such cool season vegetables can be grown, to a sub-tropical zone such as Nangarhar, where citrus is grown and very little frost (315 frost free days/year) is experienced (Table 2). Crop distribution has naturally followed this variation in the temperature and/or frost-free location within the country.

1.04 Although summer temperatures are high, the incidence of winter frosts which can be severe and frequent in some places, defines the climate as temperate with definite seasons for cool and warm season crops. Fruit production practices are also limited by the range of temperatures experienced.

^{1/} See Appendix for details of climate in South Salang, Ghazni, Kabul, Jabul Seraj, Merat and Lashgargah.

Table 2: Climatic Data for Selected Towns in Afghanistan

<u>Station</u>	<u>Elevation</u>	<u>Average Annual Precipitation</u>	<u>Years of Record</u>	<u>Mean Date of First & Last Killing Frost</u>	<u>Mean Number of Frost- free Days</u>
Faizabad	1,200	548	8	Nov 4 - Mar 24	224
Kunduz	455	371	13	Nov 27 - Mar 13	258
Baghlan	510	271	13	Nov 27 - Mar 12	249
Mazar-i-Sharif	378	197	13	Nov 16 - Mar 7	253
Maimana	815	376	12	Nov 11 - Mar 19	236
Herat	964	207	13	Nov 3 - Mar 19	228
Farah	660	75	11	Nov 20 - Feb 22	270
Kandahar	1,005	180	8	Nov 20 - Feb 21	271
Laskargah	780	106	11	Nov 16 - Feb 19	269
Jalalabad	566	172	13	Dec 4 - Jan 22	315
Ghazni	2,183	296	13	Oct 12 - Apr 6	188
Khost	1,146	492	9	Nov 25 - Feb 13	284
Kabul	1,803	346	13	Oct 26 - Mar 29	210
Jabul Seraj	1,630	510	10	Dec 6 - Feb 24	284
Salang North	3,366	1,169	11	-	-
Salang South	3,172	1,168	9	Oct 4 - May 19	137

Source: Afghanistan Central Statistical Office, November 1974.

1.05 An accurate description of the climate in Afghanistan and the definition of distinct climatic zones in that country would greatly help in arriving at suitable crop production programs based on climatic analogues. Areas of southern California and Arizona have a climate very similar to Afghanistan. Much the same could be said for the arid part of Spain, Turkey, and Iran. Once the climatic analogues are determined and assuming that many of the other physical characteristics such as soils, irrigation, etc. are alike, crop production programs based on a high degree of research and extension in an area like California can with some degree of confidence be applied to similar areas in Afghanistan.

Table 3: Mean Monthly Temperature and Degree Days (April to October) for a Number of Locations in Afghanistan and Elsewhere

<u>Location</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Degree Days</u>
Bordeaux, (France)	52	59	64	68	68	64	55	2519
Fresno, (USA)	60	67	76	82	81	73	64	4680
Bakersfield (USA)	63	70	78	84	82	74	65	5030
Safiabad (Iran)	69	82	90	93	93	85	76	7254
Kabul	53	64	72	77	76	68	55	3829
Herat	60	71	82	86	84	72	61	5682
Khandahar	68	82	88	90	85	76	64	6211
Jalalabad	68	83	92	93	91	84	70	7067

* Degree days to base 50°F.

1.06 Some different climatic areas are identified in Table 3. However, although areas such as Herat and Khandahar have more degree days than Bakersfield in California, the extent of the cropping program is limited by winter frost. Citrus and warm season crops can be produced in this area of California year round, whereas citrus would not do well in Herat or Khandahar, and the seasons for warm season vegetables is strictly defined by the mean date of frost and last killing frost (Table 2). Jalalabad has a low incidence of frost and a very short frost period. Citrus growing has started in this area, although a severe frost 5 years ago severely damaged young citrus trees. Warm season vegetables could not be produced in the area year round, though the season of production could be considerably extended by improving plant raising techniques and using low cost plant protection methods.

Precipitation

1.07 Availability of water is a major factor limiting production, and it is for this reason that less than 10% of the total land area in Afghanistan is utilized for crop production. Rainfall, which varies from a low of 75 mm in Farah (Table 2) to 1,168 mm in South Salang, occurs mostly in the winter months and particularly in the February/April period. At other times of the years, rain seldom, if ever, occurs. This pattern of rainfall distribution accounts for the very irregular seasonal distribution of river flows. Percentage runoff in the Hari Rud is estimated to be 44% in the April/May period. In July/September period the amount is 12%. In the Kabul river, 40% run-off occurs in the April/May period, whereas only 6% occurs in July/September period. In the Panjshir, which services the irrigation requirements of the Parwan area, run-off in April/May amounts to 15.5%. In July, August, and September, run-off amounts to 38%. In the Ghazni River, runoff

in the July/September period, run-off is zero. ^{1/} The heavy rainfall in winter months on steeply-sloping over-grazed and sparsely vegetated land leads to considerable soil erosion. In flood periods all the rivers carry large silt charges, reaching to 8 to 10 kg/m³ water. However, much of the precipitation occurs as winter snows which are the major sources of river and hence irrigation water in the summer months.

C. IRRIGATION

Present Situation

1.08 Approximately 3.3 million ha of the land area is irrigable, but only 2.4 million ha of this area is cultivated each year, and even then much of this receives an inadequate supply of water. The main sources of irrigation water supply is as follows:

<u>Sources of Water</u>	<u>Area (ha)</u>
Canals	2.10 million
Springs	0.19 million
Karezes	0.17 million
Wells	0.02 million

Canals are the main means of irrigation water supply. These canals are based on primitive stone and brush intakes with gravity flow conveyance canals. In many places, these traditional intakes are unable to divert sufficient water into the canals when river levels are low, and both intakes and canals together with irrigated lands and crops are frequently damaged by floods. To increase the area of cultivated land, a number of irrigation schemes have been undertaken with particular reference to the development and storage of water for agricultural use. The projects have been located in the Helmand valley (243,000 ha), Arghandab (89,000 ha), Nangarhar (30,000 ha), Ghazni (14,000 ha) and Parwan (25,000 ha), and some of these, together with small projects in the Seven Year Plan, are listed in Table 4.

^{1/} Source: N.D. Tkachev et al, Survey of Land and Water Resources, Afghanistan, FAO Rome 1965 (FAO/SF:9/AFG).

AFGHANISTAN

Table 4 - Capacity of Projects and Development of Irrigation During the Seven Year Plan
(1355-1361)

Name of Project (1)	Anticipated Capacity			Irrigation Development			Irrigation Development			Carry Over to Next Plan		
	Total	New	Existing	Total	New	Existing	Total ¹	New	Existing	Total	New	Existing
	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
I. <u>Carry over and New Irrigation Projects</u>	499.7	119.8	379.9	17.6	0.8	16.8	271.4	42.4	229.0	210.7	76.6	134.1
A. Carry over Projects	184.3	39.3	145.0	17.6	0.8	16.8	128.7	33.5	95.2	38.0	5.0	33.0
Gawargan-Chardarah	28.3	3.4	24.9	-	-	-	28.3	3.4	24.9	-	-	-
Kokcha /1	12.1	12.0	-	-	-	-	7.0	7.0	-	5.0	5.0	-
Ghorband	1.1	0.5	0.6	0.6	0.3	0.3	0.5	0.2	0.3	-	-	-
Khanebad	30.0	-	30.0	-	-	-	30.0	-	30.0	-	-	-
Parwan	24.4	9.5	15.3	15.3	-	15.3	9.5	9.5	-	-	-	-
Sange Mehr	1.3	1.3	-	0.2	0.2	-	1.1	1.1	-	-	-	-
Sardeh	13.1	12.0	1.1	1.1	-	1.1	12.0	12.0	-	-	-	-
Nahre Karim	0.7	0.6	0.1	0.4	0.3	0.1	0.3	0.3	-	-	-	-
Salma Reservoir Dam (Harirud)	73.0	-	73.0	-	-	-	40.0	-	40.0	33.0	-	33.0
B. New Projects	315.4	80.5	234.9	-	-	-	142.7	8.9	133.8	172.7	71.6	101.1
Khosh Tapa	100.0	50.0	50.0	-	-	-	-	-	-	100.0	50.0	50.0
Farah Rud (1st Phase)	60.7	-	60.7	-	-	-	40.7	-	40.7	20.0	-	20.0
Kelagai /2	11.0	25.0	56.0	-	-	-	-	-	-	52.7	21.6	31.1
Chashmeshafa	76.0	-	76.0	-	-	-	76.0	-	76.0	-	-	-
Small irrigation projects												
Kokchenar, Ishkamesh Jan Areq, etc.	16.8	5.6	11.2	-	-	-	16.8	5.6	11.2	-	-	-
Kama irrigation and electricity generation	9.2	3.3	5.9	-	-	-	9.2	3.3	5.9	-	-	-
II. <u>Carry over projects and new projects in Helmand and Nimroz Valley</u>	388.3	262.1	126.2	72.6	59.0	13.6	125.3	19.6	105.7	190.4	183.5	6.9
A. Carry over Projects	104.4	65.9	38.5	72.6	59.0	13.6	26.4	6.9	19.5	5.4	-	5.4
Upper Shamalan	16.0	12.2	2.8	13.8	11.0	2.8	2.2	2.2	-	-	-	-
Lower Shamalan (Lashkargah Shamalan)	2.2	2.2	-	-	-	-	2.2	2.2	-	-	-	-
Upper Darweshan	16.0	16.0	-	16.0	16.0	-	-	-	-	-	-	-
Lower Darweshan	5.4	2.5	2.9	-	-	-	5.4	2.5	2.9	-	-	-
Marja	18.0	18.0	-	18.0	18.0	-	-	-	-	-	-	-
Nade Ali	14.0	14.0	-	14.0	14.0	-	-	-	-	-	-	-
Babaji	3.2	-	3.2	3.0	-	3.0	0.2	-	0.2	-	-	-
Repair fo Saraj Canal	11.2	-	11.2	7.8	-	7.8	3.4	-	3.4	-	-	-
Lashkeri Nimroz Canal	18.4	-	18.4	-	-	-	13.0	-	13.0	5.4	-	5.4
B. New Projects	283.9	196.2	87.7	-	-	-	98.9	12.7	86.2	185.0	183.5	1.5
Kamal Khan (Irrigating right and left areas)	153	123.0	30.0	-	-	-	30.0	-	30.0	123.	123.	-
Saraj	25.3	9.8	15.5	-	-	-	25.3	9.8	15.5	-	-	-
Western Kajski (Kajaki up to Shamalan)	17.5	13.9	3.6	-	-	-	5.0	2.9	2.1	12.5	11.0	1.5
Khwabnah diversion dam	48	35.0	13.0	-	-	-	13.0	-	13.0	35.0	35.0	-
Siekhsar	40.1	14.5	25.6	-	-	-	25.6	-	25.6	14.5	14.5	-
Total Carry Over Projects	298.7	105.2	183.5	90.2	59.8	30.4	155.1	40.4	114.7	43.4	5.0	38.4
Total New Projects	599.3	276.7	322.6	-	-	-	241.6	21.6	220.0	357.7	255.1	102.6
Grand Total	888.0	381.9	506.1	90.2	59.8	30.4	396.7	62.0	334.7	401.1	260.1	141.0

/1 In Kokcha projects, only new land is indicated, because existing land which counts for about 32 thous. ha. is not taken into consideration during the Seven Year Plan Period.

/2 In the total capacity of Kelagai, capacity of Gawargan and Chardara are included.

1.09 Groundwater has been traditionally utilized through springs and through the kareze system of irrigation. However, many growers have shown interest in shallow and deep wells as sources of irrigation water. The groundwater potential has not been fully identified. Much of the surface water readily percolates into the coarse alluvial deposits on the mountain slopes and the importance of groundwater as a source of water is evidenced by the fact that many rivers are fed by groundwater and by the extensive use of the kareze irrigation system. The use of pumped well water through modern irrigation systems could materially affect the efficiency of water use. Such systems can be integrated into efficiently organized fruit and vegetable projects in areas not previously sufficiently well irrigated by traditional means.

Irrigation and Soils

1.10 Classification of soils on the basis of their suitability for irrigation were based on the following six classes:

Class I	: Very suitable for irrigation
Class II	: Moderately suitable for irrigation
Class III	: Marginally suitable for irrigation
Class IV	: Non-arable land; not suitable for irrigation, except under special conditions for irrigated pasture
Class V	: Non-arable land; undetermined suitability for irrigation
Class VI	: Non-irrigable land

Data on the present land use in each area is given in Tables 5 and 6. These tables show the extent of the different classes of soils present in the survey areas, and the extent they were utilized at the time of the survey and could be in the future. These limited surveys showed that although there were no Class I soils in the survey area, there was considerable potential to develop Class II and III soils. Class I soils are deep, medium texture and water-holding capacity, moderate percolation with no salts. The topography is favorable with a uniform gentle slope, the soil fertility status is high. Class II are suitable for irrigation but fail to reach Class I soils in production capacity. Special practices that may be required included, levelling, special tillage requirements, low fertility etc. Class III soils require special treatments to overcome major problems, e.g. extensive levelling drainage, contour irrigation, etc.

Table 5: Distribution of Soils in the Areas Surveyed into 6 Soil Irrigation Classes

Name of Valley and Area	Total Area Surveyed in Hectares	Land Classification*				
		Class II	Class III	Class IV	Class V	Class VI
Hari Rud Valley	410,770	75,730	63,700	84,930	60,760	125,650
Farah Rud Valley	50,900	25,000	2,600	5,800	14,900	2,600
Adraskand Valley	155,000	24,700	5,000	5,300	100,000	20,000
Ghazni Area:						
Ghazni Valley	250,000	56,100	49,700	25,200	78,600	40,400
Jilga Valley (Ghazni Tributary)	139,990	20,050	24,340	15,720	32,280	47,600
Nahar Valley	123,400	5,600	43,000	19,300	10,500	45,000
Wazikhwa Area (Katawaz)	54,900	-	11,600	14,000	6,000	23,300
Dil Area (at Ab-i-Istada Lake)	310,000	74,740	65,000	15,230	35,530	119,500
Kabul Area	104,300	6,240	54,460	26,900	11,650	5,050
Logal Valley	36,000	19,400	16,600	-	-	-
Ghorband, Shakar-Dara Panjshir Valley	98,000	27,300	48,400	-	-	22,300
Total Area	1,733,260	334,860	384,400	212,380	350,220	451,400

* No Class I lands were identified in the Project Surveys.

Source: Trachev and others, FAO, Rome 1965 Report No. FAO/SF:9/AFQ.

Table 6: Land Use Under Existing Conditions

Name of Surveyed Area	Total area of lands sur- veyed	Lands current- ly irri- gated II-III Cl,	Irrig- able lands- not ir- rigated at pre- sent due lack of water II-III Cl,	Provision- ally irrig- able lands requiring reclamation. Currently used as pas- tures and partially for dry farming IV-V Cl,		Class V & VI lands used only as pasture
1	2	3	4	5	6	7
Hari Rud Valley	410,000	54,700	84,730	84,930	-	186,410
Adraskand Valley	155,000	11,000	18,700	5,300	-	120,000
Farah Rud Valley	50,900	15,100	12,800	5,800	14,900	2,600
Ghazni Valley	250,000	30,000	75,800	25,200	-	119,000
Jilga Valley	139,990	13,940	30,450	15,720	-	79,880
Nahar Valley	123,400	9,010	39,590	19,300	-	55,500
Wazikhwa (Katawaz Area)	54,900	2,870	8,730	14,000	-	29,300
Dil Area (at Ab- i-Istada)	310,000	10,000	129,740	15,230	-	155,030
Kabul Area	104,300	27,500	16,400	26,900	10,650	6,050
Valleys of Ghorband, Panjshir and Shakar- Dara	98,000	38,400	36,300	-	-	23,300
Logar Valley	36,000	16,000	20,000	-	-	-
Total	1,733,260	245,320	473,240	212,380	25,550	777,070

Source: As for Tables.

1.11 The cultivated soils are mostly formed on alluvial, colluvial and loess deposits. The flat alluvial plain soils can be easily irrigated and are mostly suitable for mechanical crop production. The loess and colluvial deposits occur in a rolling topography. To make these soils suitable for irrigation, many of them have been terraced, the amount of terracing undertaken being a function of the extent of land slope. However, in most cases, terracing has resulted in the formation of a large number of very small fields, mostly unsuitable for any form of mechanization. Extensive levelling as seen in the Nangahar project does add substantially to the cost of an irrigation project. In such circumstances, and where groundwater reserves are high, the use of shallow or deep wells should prove to be a much more efficient way of introducing irrigation.

Irrigation and Evapotranspiration

1.12 The quantity of water required by crops depends on temperature, humidity, solar radiation and the effects of these on leaf temperature and evapotranspiration. For instance, water requirements for grapes have been shown to vary from 16-20 acre inches of water in areas with less than 2,500 $^{\circ}$ F degree days to 42-54 acre inches of water in areas with over 6,000 degree days. In Khandahar, summation of degree days over a base of 50 $^{\circ}$ F amounts to 6,590 degree days and hence crops in the area have a high water requirement. Water requirements can also be estimated from other factors, such as measurement of solar radiation and its effect on evapotranspiration. Estimates of this can be obtained from evaporation from an open water surface. In Jalalabad this is estimated to be 79.6 inches per year, in Kabul 63.4 inches, and in Ghazni 55.9 inches.

1.13 The amount of available water in soil in relation to these very high requirements is very small. Water capacity varies according to the physical characteristics of the soil. In some soils in the Khodaman Valley, water capacity amounts to 3-4 inches of water per acre foot of soil. Sandy soils contain considerably less. In general the amount retained by soils in relation to water requirements is small. However, water holding characteristics do have an important effect in influencing the way and number of times a soil needs to be irrigated. In general, water holding capacity of Afghan soils is reasonably good, percolation is not excessive and therefore gravity irrigation can be once every 1 to 3 weeks, depending on location and time of year.

1.14 The availability of well irrigated land should not limit horticultural crop production. One reason for expanding horticultural crop growing is to make better use of highly valued well irrigated land by growing valuable cash crops on them. Horticultural crops should then be grown on land previously used for low value crops such as wheat. They should also be included as an important component of the farm rotation in newly developed and irrigated areas such as has been done in the Nangarha project. In other circumstances, smaller irrigation developments based on pump well could be developed as the cost of these is acceptable in horticultural crop production.

D. SOILS

Soil Types

1.15 The soils of Afghanistan are zonal soils (order Aridisols of the 7th Approximation), developed under the dominating influence of climate and living organisms. The soils of the country have been developed under dry conditions. Since moisture is low, chemical weathering and soil formation takes place at a slow rate and most of the weathering products are retained within the soil body itself. Calcification is the dominant soil forming factor. Because of the lack of moisture, very little leaching takes place, salts of calcium and magnesium accumulate within the soil profile and the soil becomes base saturated. In many areas, due to continued use of irrigation water laden with silt, etc., and the combined application of a mixture of farmyard manure and soil has led to the formation of man-made agro-irrigation soils often up to 1 m. deep.

1.16 The soils are generally light in texture since physical disintegration dominates over chemical weatherage. In many areas, the texture remains more or less uniform throughout the soil profile. Organic matter levels are very low with less than 1% organic matter in them. Consequently soils, particularly those intensively cultivated, have a poor structure or no structure at all. Soils with a cloddy structure are friable when moist, but hard to very hard when dry. As a result, the formation of hard crusts could have a serious effect on germination and seedling emergence of small seeded vegetable crops.

1.17 The soils are highly calcareous 1/. Most soils have an 8-10% calcium carbonate in them; some of the soils in the Panjsher Valley have less than 1% calcium carbonate in them, while some soils have up to 20% in them. Extreme cases show calcium carbonate levels of 30-40%. pH values predominate in the 8.0-8.5 zone, though some have values of 10, showing the incidence of excess sodium in the solum. The incidence of high calcium levels and high pH leads to situations where many of the minor elements will not be available. Thus deficiency symptoms of iron and manganese are endemic, and the possibility of copper, zinc and boron deficiency is extremely high.

1.18 Since organic matter is low, nitrogen levels are also low, being 0.05% or less nitrogen on average. Phosphorus levels are also low. The water-soluble phosphorus content of the soils varies from trace to 1 part per million. As the soils are highly calcareous, a large part of the applied phosphorus will be fixed by the soil, leading to some inefficiency in phosphorus fertilizer use. Potassium levels are low. The water-soluble potassium ranges from 5 to 20 parts per million (ppm), whereas exchangeable potassium levels vary between 500 to 1,000 ppm ordinarily present. However, with increased use of phosphorus and nitrogen fertilizers, more and more potassium will also be taken up from the soil, and the need for potassium fertilizer is likely to develop.

1/ Analyses of some specimen profiles from the Khodaman Valley are given in the Appendix 2.

1.19 Moisture-holding characteristics of the Afghan soils vary according to texture. In general, they have 30-35 moisture capacity, or 3 50 4 inches of water per acre foot of the soil. The moisture-holding characteristics are important in determining the frequency of irrigation required to maintain sufficient soil moisture required for maximum plant growth.

Soil Fertility

1.20 One of the major factors limiting Afghan agriculture is the lack of fertilizer use. Soils are deficient in all plant nutrients, and especially nitrogen in view of the very low organic matter levels. Nutrient depleting crops such as wheat, corn, rice and barley have been grown for many years without replenishing the nutrients removed. Some farmyard manure has been used, but the nutrient inputs obtained in this way are insufficient to meet crop demands and maintain nutrient levels in soils at a satisfactory level.

1.21 Fertilizer use is relatively new in Afghan agriculture (Table 7). Fertilizer consumption since 1966 has increased tremendously from 8,500 tons in 1966 to an estimated 60,000 tons in 1975. This is equivalent to 9.6 kg (N, P2O5) per ha in 1975. Indications are that optimum fertilizer use for wheat and corn varies between 60 and 150 kg/ha. ^{1/} The use of 9.6 kg (N, P2O5) at present highlights the need for a much greater use of fertilizers in Afghan agriculture.

1.22 Fertilizer use in horticultural crops is generally much greater as nutrient requirements for vegetable crops are much higher. Ministry of Agriculture recommendations for vines indicate the need for 470 kg/ha N, P2O5 and K2O. In vegetable crop production approximately 500 kg/ha N, P2O5 and K2O would be needed to maximize production, especially in view of the present low fertility of Afghan soils.

1.23 In fruit and vegetable production farmyard manure is used on most crops. In vegetable crop production, 50-100 tons of farmyard manure per ha are often used. In vine growing, 100 tons of farmyard manure are applied every second or third year. Fertilizer use tended to be quite low, namely 25-50 kg N, P2O5/ha for vegetables and 90 to 120 kg N, P2O5/ha in vineyards. These rates of fertilizer application and use of farmyard manure are obviously much higher than the general average but again far short of the optimum rates recommended. The need for higher rates of fertilizer in horticulture is evidenced by the high level of nutrient uptake some high-yielding vegetables crops (Table 7).

^{1/} Tamboli, P.M. Soil Fertility and Fertilizer Use in Afghanistan. FAO, Rome, 1971. Report FAO No. TA 3016.

Table 7: NUTRIENT UPTAKE BY CROPS

<u>Crop</u>	<u>Uptake kg (N, P2O5 and K2O) ha</u>
Carrot	350
Onion	180
Potato	450
Tomato	400

Source: Knott, J.E., Handbook for Vegetable Growers, New York, 1962.

1.24 Apart from the major nutrients, minor nutrients, because of the very high pH conditions in these soils, should be applied routinely for many crops. In particular, iron deficiency was endemic (and probably manganese and zinc also). Crops of pomegranates, citrus and apples were very chlorotic, showing advanced symptoms of iron deficiency. However, the growers and extension agents were generally unaware of the problem, and no control measures were used to correct these deficiencies. In fact, the general lack of awareness of the possibilities of minor element deficiencies is evidenced by the omission of minor element salts or chelates from the stock list of the Afghan Fertilizer Company (Table 8).

Soil Capability

1.25 Although afghan soils are very low in plant nutrients and being calcareous, prone to various nutrient deficiencies, soil fertility problems once recognized should not limit crop production capacity. It will mean however that crop husbandry programs should involve both major and minor element use as a routine part of the program. However, soil physical characteristics are not so easily managed and considerable care needs to be taken to ensure the best management practices used on them. Except for the tendency to crust, the soils have good porosity and water holding capacity. The crusting tendency can be lessened by good management. It is evident that where an intensive system of cultivation is used, considerable quantities of farmyard manure are required to maintain soil physical condition. Otherwise, crop rotations based on alfalfa or clover breaks will need to be considered. Soil physical condition in calcareous soils can also be considered. Soil physical condition in calcareous soils can also be improved by cultivating those soils at the correct moisture content (about 8%) and the use of the appropriate equipment in cultivating them. Seedling emergence could also be improved by proper timing of irrigation and the right planting techniques and depth.

Table 8: Stock of Pesticides Afghan Fertilizer Co.
Kabul, Afghanistan, July 1975

<u>Name of Product</u>	<u>Packaging Particulars</u>	<u>Quantity</u>
1. Warfarin Rhodenticide	100 cans	10,000 cans
2. Metasystox R	1 ltr. cans/bots.	2,000 cans
3. Thiodan Emulsifiable conc:	1 ltr. bots.	10,000 bots.
4. Methyl Parathion E. conc:	1 ltr. bots.	2,000 bots.
5. Malathion Emulsifiable conc:	1 ltr. bots	10,000 bots.
6. Phostoxin	tablets	25,000 tablets
7. Baygon Emulsifiable conc:	500 cc bots.	1,500 bots.
8. Ceresan seed treatment fungicide	1 kg packs	3,000 kilos
9. Wettable sulphur	1 kg packs	3,000 kilos
10. Basic copper fungicide (copper oxychloride)	1 kg packs	1,000 kilos
11. Azodrin E. Conc:	ltr. bot	4,000 bots.
12. 2-4 D Amin (40% amine salt) (Emulsifiable conc)	20 ltr cans	16,000 US gallons
13. Phosphamidon	1 ltr. bots	1,000 bots.
14. Disodium Methanearsonate (DSMA, Post emergence grass weed killer for cotton)	4 gallon cans	500 US gallons

Source: Afghan Fertilizer Co., May 1976.

E. LAND USE AND LABOR

Land Use

1.26 Horticultural crops occupy in general about 6% of the total irrigated area (Table 9). This varies from 1.3% in Nimroz to 22.9% in Parwan. In Bamyan Province, 14% of the area (4,300 ha) is used to produce horticultural crops. Potatoes are singly the most important crop in the Province, being produced on 3,000 ha. The Parwan Province (including Kapisa) has the greatest concentration of horticultural crops (22.9%), the most important of these being grapes, occupying 12,400 ha of the 22,500 ha used to produce horticultural crops. Ghazni produces 10,800 ha horticultural crops (6.8%). Potatoes (2,300 ha) are fairly important there. Kabul, a small province in irrigated land area, has 10,600 ha of horticultural crops (15.1%), of which vegetables (7,200 ha) are the most important. Kunduz has approximately the same total amount of horticultural crops (10,300 ha), but these only amount to 3.6% of the total irrigated area. Khandahar has the largest area of horticultural crops (24,200 ha). Grapes occupy 15,000 ha of this area, together with 3,600 ha of other fruits and nuts, and 5,600 ha of vegetables. Khandahar

has a fairly large total irrigated area, and horticultural crops occupy 14.7% of this. Nangarhar, including Kunar Province, is also an important province in terms of horticultural crop production. Nearly 12% of its irrigated area is used for horticultural crops, comprising 16,100 ha in all. Grapes represent a small proportion of this (2,900 ha), whereas other fruits and nuts are produced on 7,000 ha there. Nangarhar has a large area of vegetables, 6,200 ha as compared to 7,400 ha in Parwan and 7,200 ha in Kabul. However, the area used for vegetable crop production in Nangarhar has a greater significance in terms of total production as mostly 3 crops can be produced there in one year as against approximately 2 crops in Kabul and Parwan. Horticultural crops in Laghman, Lohgar and Wardak, though not large in size (4,000-6,400 ha), occupy a significant percentage of the total irrigated area (12.5%-13.9%). Herat Province has the greatest total irrigated area (363,000 ha), and though 12,200 ha of horticultural crops are produced there, the percentage contribution to crop production is much smaller than the national average (3.4%).

Area of Agricultural and Horticultural Crop Production
(000's ha)

Province	Total Irrigated Area	Total Area of Horti- cultural Crops	Area of Fruit and Nuts	Area of Grapes	Area of Vegetables	Area of Potatoes	Horticultural Crops as % of Total Irrigated Area
Urozgan	138	3.6	3.0	0.2	0.6	0	2.6
Badghis	104	5.6	4.2	1.5	1.4	0	5.4
Bamyan	30	4.3	1.0	0	3.3	3.0	14.0
Badakhshan	136	7.1	4.0	0.5	3.1	1.0	5.2
Baghlan	177	10.5	5.3	1.0	5.2	1.0	5.9
Balkh	291	10.7	6.7	3.0	4.0	0	3.8
Parwan							
(with Kapiss)	102	22.5	15.1	12.4	7.4	1.2	22.9
Paktia	87	6.3	3.6	1.5	2.7	0	7.2
Takhar	232	10.5	6.3	2.0	4.2	0	4.5
Jawzajan	251	9.6	6.5	3.0	3.1	0	3.8
Zabul	73	3.3	2.6	2.0	0.7	0	4.5
Samanghan	134	6.7	4.7	2.0	2.0	0	5.0
Ghazhi	158	10.8	6.5	4.0	4.3	2.3	6.8
Ghor	125	3.0	1.6	--	1.4	0	2.4
Faryab	236	8.5	5.3	3.0	3.2	0	3.6
Farah	138	3.6	2.0	1.0	1.6	0	2.6
Kabul	70	10.6	3.4	2.0	7.2	0	15.1
Kunduz	286	10.3	6.3	1.3	4.0	0	3.6
Kandahar	165	24.2	18.6	15.0	5.6	0	14.7
Nangarhar							
(with Kunar)	135	16.1	9.9	2.9	6.2	1.0	11.9
Laghman	46	6.4	2.6	1.5	3.8	1.0	13.9
Lohgar	41	5.6	2.0	1.0	3.6	1.5	13.6
Nimroz	174	2.3	1.8	0.5	0.5	0	1.3
Nardak	32	4.0	1.0	0	3.0	2.0	12.5
Herat	363	12.2	11.0	7.0	5.2	0	3.4
Helmand	160	9.3	5.3	2.0	4.0	0	5.8
Grand Total	3,884	231.6	140.3	70.3	91.3	14.0	6.0

Source: Ministry of Agriculture, Afghanistan

Farm Size and Value

1.27 The average farm size is generally low. The average for the country is 17.5 jeribs, though many holdings are smaller. A high proportion of the total cultivated area is owned by a small number of large landowners. In Khandahar, average farm size is estimated to be 20-25 jeribs. In Herat, 30 jeribs is estimated to be the average farm size. In Parwan Province, average farm size was much smaller, viz 4-6 jeribs. In Parwan, horticultural crops are a major component of the total cropped area, but full use of this area is restricted by a lack of water for irrigation. In terms of vineyards, 60% of them were less than 3 jeribs, and 88% were less than 10 jeribs. Only 2% of these were greater than 23 jeribs in size. Estimated land values were extremely high. They varied from 60,000 Af/jerib in Bamyan, 100,000 Af/jerib in Khandahar and Herat, and up to 200,000 Af/jerib of vineyard in Parwan.

Labor

1.28 Vegetables are highly labor-intensive and require one man/jerib. Vineyards and orchards are less labor-intensive, and in general one man could manage 3-5 jeribs of crops such as these. The system of payment and the terminology used varies from one region to another. Common arrangements are as follows:

- | | |
|-----------|--|
| Buzgar: | share-cropper, paid 20%-50% of crop value.
Note: the term "buzgar" can also be used
to denote an area of wheat, namely 20 jeribs. |
| Kustagar: | the landlord's agent on larger farms. He is
responsible for employing labor (buzgars) and
receives a percentage of the crop value (about
25%). |
| Agaradar: | A person who rents land and is entirely respon-
sible for employing labor (usually at a daily
rate) and arranging crop production. Rent amounted
to approximately 2,500 Af/jerib. |

1.29 In Herat, labor costs are said to have considerably increased due to increased demand for labor in Iran and the Gulf states and the higher wages paid there. In the Herat region, the buzgar share-cropping system was used as well as labor hired on the basis of a regular income per year, viz. 15,000 Afs.

1.30 In Parwan, gardeners were employed at 1,000 Afs per month and were expected to take care of 3 jeribs of vineyard. However, in all circumstances the overall labor costs were similar regardless of the system used, as indicated in Table 10.

Table 10: Approximate Labor Costs for Different Horticultural Enterprises in Afghanistan

<u>Type of Labor or Terminology Used</u>	<u>Approximate Income (Afs/year)</u>
Casual labor at 50 Afs/Day	12,000-15,000
Government labor at 15,000 Afs/year (Herat)	15,000
Tarznak (Government seed farm) - labor at 1,264 Afs/month	15,000
Buzgar - 1 jerib vegetables (30,000 Afs) at 50% share-cropping	15,000
Buzgar - 20 jeribs wheat (60,000 Afs) at 20% share-cropping	12,000
Buzgar - 3 jeribs vineyards (75,000 Afs) at 20% share-cropping	15,000
Buzgar - 3-4 jeribs pomegranates (90,000 Afs) at 20% share-cropping	

1.31 In the context of Afghan agriculture, the use of the term share-cropper may be a misnomer. The share-cropper is really a laborer, and the buzgar system is generally a reasonably successful system of labor management and control. However, it does mean that any real progress in the development and modernization of farming methods must come from the involvement of, and investment by, the landowner in land development and equipment. The buzgar is landless, has no real interest in developing the land, and has no collateral on which to borrow money if he did so desire. The interest of the landowner or farmer in developing his own land may be accelerated by an increasing cost of labor and a decrease in its availability. In Herat, for instance, a farm on which 24 workers were employed in 1975 had only 12 employed there in 1976. To counter this, the farmer had offset his labor requirement by buying a tractor together with some basic tilling equipment. In other instances, farmers adopt a "laiser faire" attitude and till as much land themselves as they feel able to do. In one case, a 100 jerib farmer cropped 60 jeribs of the area himself, but had 40 heribs farmed under a share-cropping system. In this case, a decrease in the availability of labor and the need to improve income generally will increase the need for investment to ensure a more efficient operation of his whole farm area.

Cost of Labor

1.32 The relative low cost of labor in Afghanistan is an important factor in identifying the most suitable crop programs for development. Relative labor costs for some crops in similar climatic areas such as Turkey and California are given in Table 11. Labor requirements for crops in the USA are relatively low due to the high degree of mechanization in crop production obtained there. However, even with the advantages of a high degree of technology in California, many crops still retain a high labor demand. Other labor-demanding crops in California include asparagus (1,257 hours/ha),

cauliflower (1,067), cucumbers (1,898), lettuce (2,600) and strawberries (5,334 hours/ha). These high labor-demanding crops should be important in Afghan agriculture, especially when one considers that labor cost in the USA, at \$3.00 (153 Afs/hour is approximately 25 times greater than in Afghanistan (6 Afs/hour).

Table 11: RELATIVE LABOR REQUIREMENTS IN CROP PRODUCTION

<u>Crops</u>	<u>/1</u>	<u>/2</u>
	<u>Turkey</u>	<u>California</u>
	-----Hours/ha-----	
Wheat	141	51
Sugar beet	575	102
Potatoes	491	229
Onions	491	386
Tomatoes - processing	-	294
- pole	-	3,028
Table Grapes	-	1,831
Raisins	-	305
Apples	-	828

/1 IBRD Mission to Turkey, Washington, 1975.

/2 University of California, Cooperative Extension Service, 1975.

F. GOVERNMENT SERVICES

Extension Services

1.33 The extension service is a function of the Ministry of Agriculture. The Department of Extension and Agriculture is one (Chart 1). In each Province, the line structure for the extension service involves a Director-General of Agriculture, the Director of Extension, Extension Supervisors and Extension Agents. Other sections such as Cooperatives, Plant Protection, etc., operate under the direction of the Directorate of Agriculture.

1.34 The most important function of the rural extension workers is to arrange the distribution of chemical fertilizer and improved seed to farmers. Fertilizer is marketed through the Afghan Fertilizer Company, and improved seeds are obtained from seed multiplication projects on research stations, from private farmers who contract to supply seed, and from imports. This input distribution occupies the entire field staff for about 6 months of the year. A secondary function is to arrange crop demonstration plots on farmers' properties. For a demonstration plot, an individual farmer is chosen and supplied with improved seed and fertilizer. A plot is about one-tenth ha. The farmer himself carries out all the necessary operations using traditional

methods and receives the product after the yield has been measured by an extension agent. These yields are recorded, but in many cases their accuracy is questionable.

1.35 Seed distribution is one of the Extension Service's major responsibility. Seed is presently produced at seed multiplication farms at Tarnak (Khandahar), Ghazni, Helmand Valley and Gorgan, and also at some of the Ministry of Agriculture research farms. This responsibility is soon likely to be passed on to a Government-sponsored seed company which would produce seed in its own right, and also contract with farmers to produce certified seed from foundation stocks. By 1980 it is planned that the company would supply 20% of the wheat seed requirements, and 100% of cotton seed requirements. No provision has been made for the multiplication of vegetable seed stocks by this company in the initial years of its development. The proposed company would incorporate a research and development section. Other extension activities include the regular radio broadcasts for farmers by the Information Directorate of the Extension Department, which also produces large numbers of simple, illustrated pamphlets dealing with crop production.

1.36 Plant protection activities are the responsibility of the Ministry of Agriculture, Department of Plant Protection and Quarantine. In each of the provinces the Director-General of Agriculture supervises a small staff of 5 to 10 people concerned with plant protection activities, but there are no village-level workers equivalent to the extension agents of the Extension Department.

1.37 The total staff of the Department of Extension and Agricultural Development comes to 2,550 people. The total number of field extension workers comes to 1,600, each of whom services over 450 farmers, or 1,000 ha. In more developed areas, one extension agent usually services about 200 farmers. The extension service only operates in approximately 40% of the agricultural areas of the country. The total staff required is estimated to be 7,200 field workers with the same number of back-up workers in other aspects of agriculture. The total staff in the Headquarters of the Extension Department is 170. In Herat, there is a total staff of 250, of which only 140 operate as extension agents. In the Herat area, there are 11 districts with 16 extension supervisors, and 7-8 extension agents per extension supervisor. In Parwan, there are 85 extension agents with 10 extension supervisors. In Khandahar there are 85 extension agents covering less than 20% of the agricultural area and each extension agent advises 400-500 farmers.

1.38 Apart from the lack of extension staff, a major drawback is the technical training and ability of the staff presently in the extension service. Allied to this is the level of literacy generally in the country, which is given as 5%. In the younger one-third of the population, literacy amounts to 20-30%. Out of the total 2,550 employed in the Extension Department only 179 have had a university education, and most of these are located in administrative type positions. Of these, 27 have Masters degrees, and 2 have obtained PhD. Of the remainder, 1,140 have reached the equivalent of 12th grade education, and 1,710 have obtained up to but generally less than 9th

grade education. The 9th grade graduates have received no school training in Agriculture. In-service training is offered, but the general lack of suitably qualified personnel offers limited scope to the efficacy of these training courses.

1.39 Even though horticulture represents a major value component of Afghan agriculture, there are no specialist horticultural extension agents. In fact, only five professional staff with a horticultural training are employed by the Extension Department. In the Faculty of Agriculture, horticulture is taken as a subject in other options. In the Plant Science and Extension Cooperative Programs in the University of Kabul, horticultural crops are given 11 and 8 hours respectively. This corresponds to 7% and 5% of the respective course loads. This lack of properly trained horticultural staff is a serious constraint to the Development of horticulture in Afghanistan.

1.40 In-service training is offered. Extension agents attend short (2-3 day) and long (10-15 day) annual courses at provincial level. The extension supervisor also discusses on-going problems with the extension agents at weekly meetings. Extension supervisors attend annual meetings organized by the Ministry of Agriculture in conjunction with a number (5-6) of other Provinces. Extension directors, and General Director of Agriculture attend annual meetings in Kabul. There are no staff presently in external training courses, due to a shortage of funds. In-service training for horticultural crop production is extremely restricted due to:

- i) lack of suitability trained horticulturists, particularly at Provincial level
- ii) the low level of research development on horticultural crops

Research

1.41 Research is mainly the responsibility of the Ministry of Agriculture. The Faculty of Agriculture has a research farm in Kabul in which different aspects of agricultural research are carried out. Included in its program is work on agricultural crops, vegetable crops and orchard fruits planted in 1966. In the Ministry of Agriculture, research is carried out by the Research Department, supported by the Soil and Plant Services Unit. In addition, the Water and Power Authority (WAPA) has a research unit covering hydrology and soil survey and classification.

1.42 The Ministry of Agriculture has research farms in a number of provinces. The main research stations are located as follows:

Kabul, with six farms covering all aspects of agricultural and horticultural work;

Khandahar, the research station at Kocharan (45 ha) does work on wheat, fruit and vegetable crops;

Parwan, the Kohpica station works on vegetables and wheat for seed increase;

Kunduz (55 ha), cotton, wheat and horticultural crops;

Balkh (75 ha), cotton, wheat and horticultural crops;

Bamyan (6 ha), potatoes, cereals and vegetables;

Herat (220 ha), cereals, vegetables and vineyards.

1.43 Research is a relatively new development in Afghanistan. The research farms visited had poor facilities, were inadequately staffed and there was a constant staff turnover. For instance at the Shism Bagh, Research Station, Jalalabad, plant raising facilities were inadequate in an area where this aspect of crop production should be important. In Herat, much of machinery and equipment was out of use due to difficulties in obtaining service and spare parts. At the Badam Bagh fruit station outside of Kabul, the farm manager (M.S. graduate from Idaho) had just been appointed and only 250 jeribs of the 500 jeribs farm were irrigated. Much of the work of the research farms is devoted to raising of foundation seed and fruit tree stocks and to seed multiplication. In 1974/75 some 30% of the total area was devoted to this. In 1975, there were 117 graduates employed in the Research Department, some of them with training at foreign universities. About 25 graduates work at the Darulaman Research Station in Kabul, but in the provinces and some of the farms in the Kabul area staff in general were limited to 1 or 2 graduates at each research station.

Education

1.45 University of Kabul, Faculty of Agriculture. The faculty of Agriculture offers a four year course with four basic options:

- crop science with 25% participation
- animal science with 5% participation
- extension with 70% participation
- education with 1% participation

There are 194 students in the final year class. The first two years of the course are devoted to such basic subjects as chemistry, botany, zoology, mathematics, etc., whereas in the final two years students concentrate on the appropriate subject in the option of their choice.

1.46 There are 70 staff members, 20 of whom are away in in-service training courses. The University of Wyoming (USA) has operated a cooperative project with the faculty of Agriculture in Kabul. At one time there were up to 15 visiting professors on the staff, now only two. The staff is organized

under a Dean, Assistant Dean into ten departments, namely Soil Science, Plant Protection, Horticulture, Agricultural Engineering, Education, Extension and Cooperative, Economics, Crop Science, Animal Science, and General Science (chemistry, zoology and botany). The staff is well trained, and most have up to Phd training obtained at various American universities and the American University in Lebanon. This work has been supported mostly by USAID program.

1.47 There are no tuition fees and accomodation with a small amount of spending money is supplied out of government funds. Most of the students gain employment in the Ministry of Agriculture (90-95%) some (2-3%) are employed by the University, the remainder by mostly government agencies. There are a total of 750 students and enrollment is increasing annually by 10-15%.

1.48 It is apparent that the Faculty of Agriculture has been a very successful institution and obviously has an important role in the future in supplying the core of well qualified personnel required by the various government agencies. The Faculty to date has a poor record in carrying out research due primarily to lack of funds and facilities. This same constraint, i.e., funds, will also affect the way in which the Faculty can provide the proper conditions for teaching and demonstration when student members continue to increase by 10-15% each year. There are 7 staff members involved in horticulture teaching and research. It is planned that horticulture will be offered as an option from 1979 onwards.

1.49 Three secondary schools graduate about 300 students per year up to the equivalent of a 12 grade standard. Some new agricultural schools are planned at Jalalabad, Darvashan, Farah, Herat, Quisaar, Mazar-i-Sharif, and Baghlan. Each school will offer courses in four specialities - extension and cooperation, plant science, animal science and mechanization. Each school, located on a 40-60 ha farm, will include fully operative fruit and vegetable units. Foundation plantings of fruit trees and vines will be undertaken. In vegetable production good facilities e.g. cold frames, etc., will be supplied. Over the next seven years, 6280 students will graduate, of whom 1560 will have a crop science (and some horticulture) speciality.

Afghan Fertilizer Company

1.50 Sales of fertilizer are expected to increase from 60,000 tons in 1975 to 373,000 tons at the end of the seven year plan in 1982 (Table 12). This will amount to the equivalent of approximately 60 kg (N,P₂O₅ and K₂O) ha. The cost of fertilizer has been established by the Supreme Council as follows:

Urea	-	9,600 Afs/ton
Diammonium phosphate	-	11,000 Afs/ton
Potassium sulphate	-	11,000 Afs/ton

and these prices will not be changed during the period of the seven year plan. Purchase costs of these fertilizers at present are:

Mazar-i-Sharif

Urea	7755 Afs/ton
Imported Urea	13,584 Afs/ton
DAP	13,674 Afs/ton
Potassium Sulphate	13,534 Afs/ton

1.51 The Mazar-i-Sharif will have the capacity to produce 100,000/tons urea per year. Sales of urea by 1978 should exceed this amount and by 1981 double it. Sales of potassium sulphate will be insignificant; the first purchase of 3,000 tons is planned for 1980. As a consequence, the Afghan government will subsidise the use of fertilizers and maintain fertilizer cost constant over the period of the Seven Year plan. The extent of the subsidy will increase over the period of the Seven Year Plan but it should have a desirable effect in improving the use of fertilizers in crop production.

1.52 The Afghan Fertilizer Company will endeavour to increase its sales, particularly through the agency of the extension service and in particular by the extension staff, the AFC intends to employ its own technical staff to demonstrate fertilizer use at farm level.

Table 12: Projected Sales of Fertilizer in the 7 Year Plan 1975-1982

Type of Fertilizer	<u>Sales of Fertilizer</u> (Preliminary Projections)			
	1976	1978	1980	1982
Urea	68,000	114,000	171,000	243,000
DAP	341,000	57,000	85,000	122,000
Potash	-	-	-	-
Total	102,000	171,000	259,000	373,000

Source: Afghan Fertilizer Company, Kabul

G. CROP PRODUCTION

Crops

1.53 An extensive range of fruit and vegetable crops as seen from the following list, are grown; the main items being asterisked.

<u>Vegetables</u>		<u>Fruits</u>
<u>Cool Season</u>	<u>Warm Season</u>	
*Asparagus	*Bean	*Apples
*Brassica crops in general	Corn	*Apricots
Carrots	*Cucumber	Cherries
Cress	*Eggplant	Figs
Fennel	*Melons	Peaches
*Garlic	*Okra	Pears
*Leek	*Pepper	Plums
*Lettuce	Squash	*Pomegranates
*Onion	Sweet Potato	*Grapes
*Parsley	*Tomato	*Almonds
Pea	*Water melon	*Pistachios
*Potato		Walnuts
*Radish		*Oranges
*Rhubarb		Lemons
*Spinach		Grapefruit
*Turnip		Mulberries

1.54 The main areas for fruit and vegetable production are shown in Table 9. Vegetable acreage has declined or remained static because of the restriction on exports. New plantings of grapes, apples, pomegranates, citrus and olive have been undertaken, the latter two being a component of the Nangahar project, but the effect of this has not been demonstrated in the crop area figures. In vegetable crop production, rotation and the extent of multiple cropping varies according to location. Some examples of these for important locations are given in Table 13.

Table 13: Crop rotations in various climatic areas in Afghanistan

Length of growing season	No. of frost _____ days	Typical area	Crops/year	Typical rotation Crop(s) growing period	
Long	315	Jalalabad	2-3 crops	i) Wheat Rice	Oct/May June/Oct
				ii) Onion Eggplant Cauli- flower	Dec/May May/Feb Aug/Feb
Medium long	270	Khandahar	2 crops	i) Wheat Corn	Oct/June June/Oct
				ii) Green onion Eggplant/ <u>1</u> Spinach	Oct/April March/July July/Dec
Medium	210	Kabul, Herat	1 1/2crops	i) Wheat Carrot	Oct/July July/Dec
				ii) Radish & Eggplant/ <u>2</u> Spinach & Turnip/ <u>2</u>	March/July July/Dec
Short	140	B amyan	1 crop	i) Wheat	Oct/August
				ii) Potatoes	May/Sept

/1 Eggplant undersown with onions in March.

/2 See text for description of method.

1.55 In Jalalabad, nearly three crops are obtained each year, whereas in Khandahar due to the shorter growing season an average of two crops per year only can be obtained. In Parwan and in other areas too, a quick growing and a slow growing crop are shown at the same time but harvested at different times, e.g. spinach and carrots are sown together in July, the spinach is harvested September/October and the carrots in December. In these areas, approximately one and a half crops can be obtained each year by double cropping. In Bamyan however, due to the short season, only one crop per year is possible.

1.56 In fruit and nut production timing of production depends on locality and variety. For instance, in grape production, the first grapes are available in June in Kandahar from Khalchini and Racha varieties, while the variety Katta of Kohdaman matures in late October. Thus fresh grapes are available in major markets from June to November.

Vegetables

1.57 Potatoes are one of the main vegetables produced in Afghanistan, being produced over an area of 14,000 ha. Yields, at 6 - 10 tons/acre, are quite low. The main cultivars used are two local selections, Garma and Sarda. Sarda is small with good flavor. Garma, the most widely grown variety, is a higher yielder and has better storage qualities. New Indian introductions, Chandermochi and Kafarilooker, have better characteristics such as yield, quality and storage, and are being more widely grown.

1.58 Farmyard manure is used at 8 - 10 tons/jerib. Fertilizer is being used to a limited extent at low rates, namely 22 kg DAP and 14 kg urea per jerib. Potassium fertilizers are not available in Afghanistan. However, potatoes have a high potassium requirement and on high pH Afghan soils, zinc deficiency could be a problem. Cultivation and weed control is mostly done by hand. Insecticides or fungicides are seldom used; sprout-inhibiting chemicals are not used on ware crop potatoes prior to storing in 1 m. wide soil made pits. Storage losses can amount to 30% - 50%.

1.59 Yields could be considerably improved but one of the main obstacles is the lack of certified (disease-free) seed. Growers use their own produce as a source of seed and as a result contribute to spread of diseases, particularly virus disease. Consequently, vigor and yield potential are seriously reduced. The use of clean seed, fertilizers and better weed control, etc., could lead to higher yields. Varieties could also be selected to improve the timing of production; better storage conditions could effect a significant reduction in storage losses. Season of production could be extended considerably by planting potatoes earlier and later in Jalalabad. Frost risks should be minimal. At present, early production is not obtained primarily due to the use of unsuitable varieties. Winter supply could be improved by using good storage varieties for main crop production and supplementing this with a late Summer planted crop in Jalalabad. Timing of production for potatoes could follow that outlined in Table 14.

Table 14. Timing of potato crop production

Area	Mean date of Last Frost	Time of		Storage
		Planting	Harvest	
Jalalabad	Jan 22 Dec 4	a) Dec/Jan b) July	April/May Nov/Dec	No
Khandahar	Feb 21	Feb/March	May/July	No
In general	March	March/May	July/Oct	Yes
Bamyan	n.a.	May	Sept/Oct	Yes

In this way season of production could be lengthened by 4 - 6 weeks at the beginning of the season and storage requirements reduced by planting a fall crop in Jalalabad. A target yield of 15 tons/acre should be established.

1.60 Onions (bulb). The average yield of onions is given as 5.9 ton/ jerib. The main cultivars used by the growers are local, low yielding and highly heterozygous varieties. Onions cross pollinate by insect carried pollen, and so it is difficult to maintain stocks true to type. Some seed of Yellow and White sweet Spanish has been introduced and some of this is multiplied from foundation stock by the Ministry of Agriculture. In general, however, local varieties are used, and quality is poor.

1.61 Onion seed is sown broadcast by hand. Onions, a small seeded slow growing vegetable, need good soil conditions to effect germination and seedling emergence. On the poorly structured Afghan soils, particular attention will need to be given to moisture content of the soil and land preparation, irrigation and depth and position of seed placement. Hand sowing leads to uneven placement in relation to depth and lateral distribution. Using simple hand-operated sowers would overcome this and also make it possible to inter-row hand-weed more efficiently, especially as onions seeds are slow to emerge and weed control is generally difficult due to the lack of a complete leaf canopy. If chemical weed control is at any time envisaged, uniform depth of sowing will be most important.

1.62 Farmyard manure and, to a limited extent, urea and DAP are used in the production of onions. Onions are subject to zinc and manganese deficiency, and this could be a problem in the high pH Afghan soils. Pesticides and sprout inhibiting chemicals for storage are rarely, if ever, used.

1.63 Onion yields could be considerably increased by better husbandry practices. In particular timing of production could be expanded, yield and storage quality improved by proper selection of onion varieties from amongst the many that are available. At present, the varieties available do not mature until June, whereas better varieties should mature by May. To extend the period of supply by storage, suitable quality varieties with good skin

characteristics could be grown. Onions treated before harvest with maleic hydrazide to inhibit sprouting, properly cured, stacked 2m high and cooled by using low night temperatures to maintain stack temperature at about 34°F could last, depending on locality, up to April or May. Low cost, on farm insulated structures with fan ventilation are suitable for this purpose. A programme for onion growing developed as follows could lengthen season of production by 4 weeks at the beginning of season (Table 15).

Table 15. Timing of onion (bulb) production

Area	Degree of Frost	Sowing Date	Harvest	Storage
Jalalabad	Slight	Sept/Oct	May	No
Khandahar	Medium	Sept/Oct Feb/March	June/July July/Sept	No No
Other areas, e.g. Herat, Kabul, Ghazni	Severe	Mar/April	Aug/Sept Sept/Nov	No Yes

1.64 High quality onions should be available nearly year-round to supply local needs and for export to neighbouring countries. Onions with a high dry matter content for processing as dried onions could be produced in many areas of the country as a main crop (March-October).

1.65 Excellent quality garlic could also be produced in much the same way as described for bulb onions. Quality would depend on varieties and on good storage, grading and packaging facilities. Green onions, because of their weight and perishability, are much more important as a locally supplied vegetable. For green onion production, timing of production, with consequent earlier harvesting periods, could follow that as outlined for bulb onions. Fall production could be lengthened by extending time of sowing up to August.

1.66 Among other cool season vegetables small quantities of Brussel sprouts are produced in the Kabul area and in Jalalabad. Lettuce production is distributed throughout the country, but the main production areas are found in the Kabul/Parwan provinces. Winter cauliflowers are mostly produced in Jalalabad. Spinach production is general, though leeks tend to be an important crop in Khandahar. Yield production figures for many of these crops have not been documented.

1.67 There are a large number of different varieties of Brassica crops suitable for year-round production. Cabbage, kale, etc., should be available year-round in Afghanistan although distribution of production will vary with

location and climate. Cauliflowers should also be produced year-round, and broccoli at most times. Brussel sprouts should be available from October to March. Most Brassica crops are quick-growing, and using transplants they should fit into a crop rotation in which 2 or 3 crops can be grown in the one year.

1.68 Brassica crops need high levels of nitrogen to grow successfully, and up to 200 kg/ha nitrogen will be required for them on most Afghan soils. Boron deficiency could also be a problem in cauliflowers, and to a lesser extent Brussel sprouts. Brassica crops, in particular sprouts, can be severely affected by aphids. Control measures involve spraying with systematic organo-phosphorous insecticides which can effect a good control. Other insects such as leaf miners, etc., can be controlled by these and other sprays too.

1.69 Most crops of Brassica could be produced by using transplants, but summer-sown cauliflowers might do better when direct seeded. Crop production programs could be arranged as follows: (Table 16).

Table 16: Recommended Crop Production Schedules for Brassica Crops

Crop	Area	Harvest
Cabbage	Jalalabad	Winter spring
	Khandahar	Fall winter spring
	Herat	Summer fall
	Kabul	Summer fall
Cauliflower	Jalalabad	Winter spring
	Khandahar	Fall spring winter (frost-resistant varieties)
	Herat	Summer fall
	Kabul	Summer fall
Brussel sprouts	Khandahar	Fall winter
	Herat	Winter
	Kabul	Winter

1.70 Leeks are produced year-round and are grown as a perennial crop. In Khandahar, leeks are cut every 20 days in the summer, and every 40 days in the winter. Summer production can be affected by high temperatures, and therefore somewhat cooler areas such as Herat, Kabul and Ghazni could be more suitable for production at this time of year. Leek crops are grown and continuously cut for a number of years. Once the crop is established, production depends mainly on water and fertilizer use, in particular nitrogen, much of which is required to produce this leafy crop. Approximately 9 to 10 cuts are taken every year, and total weight produced is approximately 50 tons/ha.

1.71 Tomatoes. The average yield of tomatoes is about 5 tons per jerib. The main varieties used are local and also to a limited extent, an introduced one, Pearson Improved. Tomatoes self-pollinate, but even so local varieties are, though reasonable yielders, very poor quality highly locular types. In general, seed is sown in seed-beds and planted out when they are 10-15 cm high. Farmyard manure, and to a limited extent, fertilizers are used. No plant training systems are used as bush type cultivars only are grown.

1.72 Crops of tomato can be produced by direct seeding and singling out to a final stand. However, to increase the possibility of double and even triple cropping, transplant of suitable varieties should be used. Quality of transplants and timing of production could be considerably improved by using better nursery practice such as sowing in seed traps, pricking off into a well-prepared nursery bed or pots, using hot beds and simple polyethylene-covered structures to provide earlier and better quality plants. The high summer temperature in many places could adversely affect fruit setting. This effect is alleviated to some extent by the wide diurnal temperature changes and could be further lessened by using vigorous cultivars and appropriate training systems. Sunscald can be a problem, but such an approach would lessen this.

1.73 There are a large number of varieties available to provide important characteristics, such as high yields, early cool season production, main season production for fresh or processing use, and disease resistance. Many of the newer disease-resistant varieties are F1 hybrids unsuitable for seed production, as these are produced by crossing by hand pollination from two definite parent lines.

1.74 Presently, seed is sown late, plant propagation is poor and field planting delayed. Using better varieties, and by improving plant propagation techniques, and earlier planting the season of production should be extended by more than 4-6 weeks in the early part of the season and by a similar amount in the latter half of the season (Table 17).

Table 17: Timing of Production for Tomatoes

Area	Degree of Frost	Date of		
		Sowing	Planting	Harvest
Jalalabad	Slight	a) Nov/Jan /1	Jan/March	April/July
		b) May	July/Aug	Sept/Dec
Khandahar	Medium	Jan/Feb /1	Mar/April	May/Nov
Herat, Kabul	Severe	Feb/Mar	May	July

1.75 Prior to planting, soils should be properly prepared and much higher rates of fertilizer should be used. Potassium fertilizer use on tomatoes should be high in order to maintain yield, but more particularly, as the quality of the fruit produced depends on high levels of potassium in the soil. Training systems, pole or wire trellis, together with plant tying, training, deleafing, picking, etc., are largely labor intensive (Table 11), a fact which makes this method of crop production attractive in Afghanistan. Using this production system, yields of 20 tons per acre should be obtained, and even higher yields expected.

1.76 Other warm season vegetables. The other main warm season vegetables produced include cucumber, eggplant and melons, and to a limited extent, peppers. In cucumber, eggplant and muskmelon production, mostly local varieties are used. Some introduced varieties are used in pepper and watermelon production. All of these are insect pollinated and consequently seed stocks are probably highly heterozygous. Cucumber, especially early season ones, are produced in Jalalabad. Melons are one of the main crops in the Herat area. They are also extensively produced in the Northern regions. Eggplant is widely produced in all regions and is one of the most important vegetables grown in Afghanistan.

1.77 These crops are mostly produced from seed and singled out to the desired plant density. In some instances, eggplant seeds are sown in a cover crop such as early spring green onions, in which cases subsequent plant stand may be extremely unsatisfactory. Where a number of seeds are sown per position, they can be singled out to one or two plants as required with resultant good plant density. The general cultural practices for these crops follow those outlined for tomatoes. Land preparation is poor, varieties need proper evaluation and fertilizer use is quite low. Crop protection techniques are rarely used.

1.78 Yields could be increased by both soil preparation and increased fertilizer use, plant protection and the use of improved varieties. Timing of production could be improved by raising a proportion of the crop in the nursery area, protecting it from frost and planting out as soon as danger of frost has been mostly eliminated. Season of production could be extended by better plant care. In pepper and eggplant production sun scold could be reduced by growing a good vigorous variety that would provide a good leaf cover for the developing fruit. Improved cropping patterns for cucumbers, eggplant and peppers could be developed as follows: (Table 18).

Table 18: Timing of Production for Cucumbers, Eggplants and Peppers

Area	Degree of frost	Time of		Harvest
		Sowing	Planting	
Jalalabad	Slight	a) December b) Feb/March	Jan/Feb --	April/June
Khandahar	Moderate	a) Jan b) March/April	Feb/March --	May June/Sept
Herat, Kabul	--	April/May	--	July/Oct

- a) Nursery raised plants for transplanting - some form of frost protection required in nursery area.
b) Direct seeded.

Grape Production

1.79 Grapes represent one of Afghanistan's most important crops (70,000 ha). The main production areas are given in Table 9. The most important growing areas are the Kohdaman/Parwan valleys and Khandahar. Unlike vegetables and many other fruit tree crops as well, Afghanistan produces many varieties and various kinds of European type (*vitis venefera*) grapes. This clearly demonstrate the value of grapes in Afghan horticulture, and it clearly demonstrates that the Afghan grower has a good ability to identify and select the best types of grapes to use for both fresh and raisin production.

1.80 The climatic conditions of the grape-growing areas of Afghanistan are among the best in the world for grape farming. The bulk of the total grape production in Afghanistan is of Kishmishi group. Kishmishi grapes of Afghanistan are the same as Thompson seedless of California and Sultania of Australia, Greece, Turkey and Iran. Kishmishi grapes are composed of (a) common Kishmishi, constituting the major type, (b) Shindokhani, (c) Black Kishmishi, and (d) Red Kishmishi.

Kishmishi grapes are of unique importance in Afghanistan because:

- This variety is the most adaptable of all grapes and is commercially grown in all major grape-growing areas of the country;
- Kishmishi is a table grape producing different sizes and colors of fresh grapes for export and domestic consumption, and as well as the dominant raisin-making grape of the country producing natural red, golden green and black seedless raisins for export and domestic use.

1.81 The size of vineyards vary from one to 50 jeribs, the greater proportion being in the 2-4 jerib size category. The planting systems vary. In the Parwan province, the goblet system is used and vines are spaced 3m x 2.5m. In Khandahar, vines are planted in the bottom of a trench 1m deep and nearly 1m wide. Rows are 3-4m apart, and plants are paced 2-3m apart in the row. A 1m high bank is used to train the plants. In general for both systems 300 vines are planted per jerib. In Herat, to counter the effect of a hot westerly wind that blows from June through September, vines are planted in rows 5m apart in a trench 1m deep. The vines are trained up a man-made soil bank that rises from the edge of the trench to a height of 2-3m before it reaches the next trench. In Herat in particular, and to a lesser extension in Khandahar, the methods used are very labor-intensive. No mechanical aids can be used with these methods of growing. The shelter effect produced by the Herat bank could better be obtained by the use of good shelter belts. Trellis system have not been generally used. Where they have, considerable yield increases have been obtained. Farmyard manure is generally used, though chemical fertilizer use is more common in the Kabul/Parwan area. Plant protection chemicals are not widely used, though they have been identified by Ministry of Agriculture officials and appropriate recommendations made.

1.82 The national grape yield per vine in Afghanistan is estimated around 7 kg. However, by applying simple improved viticultural practices, yields of 10-14 kg per vine have been obtained. The application of optimum improved practices can push this average even higher, very probably up to 20 kg per vine. The highest yields of 28 to 35 kg per vine have been reported in Kohdaman/Parwan and Khandahar area.

Table 19: Afghanistan-Average and Good Grape Yields

Area	No. vines/ha	Yield (kg/vine)	
		Average	Good
Khandahar	1380	10	20
Kohdaman	1500	7	14
Parwan	1500	7	14
Faryab	950	20	35

Sources: Ghajoor, Abdul. Prospects for the Development of Grape Production and Marketing in Afghanistan.

1.83 The range of yields obtained indicate that high yields of grapes can be obtained in Afghanistan. Improving cultural methods, such as fertilizer use and plant protection programs should have good effects. In particular, more intensive trellis training systems should considerably improve yields and also quality by reducing the incidence of sunscold. Attention

should be given to developing the proportion of grapes sold fresh as this method of production is highly labor intensive and gives Afghan growers a distinct advantage in view of the low labor costs there.

1.84 Pomegranates. Pomegranates are a commercially important fruit and the production area increases annually. The main production areas are Tagau in Kapisa (Parwan), Kandahar and Nangarhar. Pomegranates are also produced in Samangan and Balkh.

1.85 Pomegranates need warm dry summers and cool winters with winter temperatures not less than -9.5°C . In some years, pomegranates in Tagau and Nangarhar are damaged by winter frost. Spring frosts can sometimes affect flower development and fruit set. Pomegranates are propagated by cuttings. The spacing system varies from 3m x 3m to 7m x 7m. The cuttings are sometimes rooted in a nursery but are usually direct planted; 2 or 3 cuttings being put into each planting hole. Wide spacing is required to give large trees with good light extinction in order to protect fruit from sunscald. However, with these wide spacing, it means that, as it takes 8-10 years to reach full production yields, income is very low during the years the orchard is being established. But, as stock material is cheap, higher than required initial plant densities could substantially increase production in the early years of an orchard's development. Optimum plant density could be attained by thinning out as required. Trees begin to bear fruit after 3-4 years. Maximum production is obtained after 8-10 years and an orchard lasts for 30-50 years. Yields vary for 5-10 tons/acre. Culls due to cracking of fruit, can be serious and amount to 25% of production. Cull fruit sells at 50% of first quality fruit. The cracking problem is most serious in Kandahar and may be associated with a variety defect. The Bedana variety grown mostly in Tagau is less liable to crack and is a sweet, juicy, soft seeded high quality variety. The Bedana variety is presently produced in Kapisa and Nangarhar but in view of its fruit quality, plantings of it should be made in Khandahar and other pomegranates areas as well.

1.87 Farmyard manure and fertilizers are used alternate years. Crop protection systems are sometimes used but aphids can be a serious problem. Iron deficiency was endemic in many of the orchards visited yet no control measures to correct iron deficiency had been used.

1.88 Better use of cropped area could be attained by producing plants from cuttings in a nursery area and as stated by using a higher than required initial plant density to increase early production. This problem is presently attacked by intercropping vegetables, alfalfa, and wheat with the pomegranates. The variety Bedana should be used in Khandahar and other areas too. Crop protection programmes should be encouraged and the use of iron chelate to correct chlorosis demonstrated to growers by the extension service. Fertilizer use should also be increased to ensure maximum protection.

H. CROP YIELDS AND FINANCIAL RETURNS

Crop Yields and Returns

1.89 Details of crop yields are given in Table 20. They were obtained during the Fruit and Vegetables Survey Mission from discussion with farmers, extension agents, Ministry of Agriculture officials and AgBank staff. Average California yields are included for comparison. The yields of wheat and sugar beet at 0.7 and 11.6 tons/acres respectively are extremely low and reflect the low level of production technology used, i.e. little or no fertilizer, poor seed and poor crop husbandry. The yield estimates for wheat and sugar beet based on a large wheat area and on a contracted sugar beet crop are accurate yield estimates. As against this, the yield returns for horticultural crop, are relatively higher especially when they are compared to crop yields obtained in generally similar climatic areas. As an example, Afghan yields of some vegetables are higher than those obtained in Egypt, Spain and Israel (Table 21). As mentioned the yield figures were obtained from interviews with local growers who it appears were among the better producers and from estimates of the Extension Agents and Ministry of Agriculture. There appeared to be a tendency to exaggerate and give high "average" yield figures. Thus these Afghan yield figures are high and should be interpreted accordingly. They are, however, much lower than the yields obtained in California.

1.90 High horticultural crop yields are a very practical possibility in Afghanistan. The climate is suitable, the labor plentiful with a considerable amount of experience in horticultural crop production and this, together with good husbandry, can produce high crop yields. As an example, it has been shown that grape yields can be considerably increased.

1.91 Farmgate prices in Afs/kg are also given in Table 20 together with expected gross return per jerib. It is evident that income for horticultural crops is significantly greater than that obtained from wheat and sugar beet. In most areas, two or three vegetables crops can be produced in one year giving a gross return of 20,000 to 30,000 Afs/jerib. Farmgate prices are estimated based upon a number of values and range of values obtained in different parts of the country. For instance, early cucumbers in Jalalabad made 2 Afs each in early part of the season as against 0.2 Afs per cucumber at full production. Onions may vary in price from 1.5 to 6 Afs/kg. Tomatoes vary in price from 2.4 to 27.0 Afs/kg on the Kabul retail market. Farmgate prices (Table 20) are mostly indicative of high production relatively.

1.92 The great range in prices for produce also indicate the potential that exists for allowing time of production to increase production in these high price periods.

Table 20: Yields and Gross Income Value of Some Selected Crops in Afghanistan

	<u>Afghanistan /1</u>		<u>California /2</u>	
	<u>Yield</u> <u>Tons/Ha</u>	<u>Price</u> <u>Income</u> <u>Afs/kg</u>	<u>Jerib</u> <u>Afs</u>	<u>Tons/Ha</u>
Wheat /3	0.7	6.4	2,240	1.2
Wheat (improved) /4	1.4	6.4	4,480	8.5
Sugar beets	11.6	1	2,350	6.5
Carrots	13.3	1.5	9,800	13.5
Cucumbers	9.2	2.0	8,500	20
Eggplants	7.2	2.5	9,000	10.4
Leeks (Mulricut)	7.1	-	30,000	na
Melons	7.5	2	11,250	17
Onions	10.3	3.5	18,000	50
Peppers	2.6	3.0	8,000	19
Potatoes	4.6	3.5	20,000	47
Spinach	6.8	2.5	5,600	25
Tomatoes	10.6	3.0	15,900	30
Watermelons	11.1	1.5	8,500	65.0
Apples	4.3	8	35,000	45
Grapes	6.0	8	37,000	10.0
Pomegranates	10.4	8	40,000	15

/1 IBRD Afghanistan Survey Mission 1976.

/2 Average California Yields, California Agriculture Expt. Stat., Bull 847, 1970.

/3 IBRD Report No. 848a-AF, 1975.

I. RECOMMENDATIONS

Crop Production Programs and Climatic Analogues

1.93 In horticulture crop production, one of the difficulties in identifying the correct production programs is the very large number of crops concerned. Ideally research should identify all these. In many respect this is impossible. For instance in vegetable crop production one can easily identify 30 different crops. To determine optimum fertilizer use only, a large number of experiments would need to be done over the variables of soil type, climate, location and time. For instance, on wheat, it has been 1/ suggested that approximately 7,000 unreplicated experiments over a 4 year period in six major climatic regions in Afghanistan would need to be undertaken. Vegetable crops in general, have a higher nutrient requirement than wheat indicating a great

1/ Tamboli, P.M. Soil Fertility and Fertilizer use, FAO Report No. TA 3016, Rome 1971.

need for a high degree of precision in determining their fertilizer requirements. If grapes, tree fruits and nuts are considered, the problem becomes even larger. Under these circumstances, therefore, a considerable amount of extrapolation needs to be done to arrive at fertilizer recommendations suitable for a range of vegetable crops.

1.94 Fertilizer use only refers to one aspect of crop husbandry. Information is also required on suitable varieties, time of planting schedules, etc. Research has only started in Afghanistan and as this information is not available there, it must be sought elsewhere. This can be done on the basis of climatic analogues.

1.95 Areas of similar climatic conditions can be identified and the research and general husbandry information obtained there can be applied to Afghanistan. For instance the National Research Council of Israel commissioned a study of the irrigated regions in the deserts of California and Arizona which are climatic analogues of the Negev ^{1/} before undertaking work there. These same areas have a climate very similar to that in Afghanistan. A considerable amount of research has been done in California and Arizona and high crop yields obtained from the crop production practices that have been suggested as a result of this work. Information can also be obtained for similar climatic specific crop production systems. Crop production programs covering only fairly specific recommendations on major aspects of crop husbandry should be developed. For instance:

Varieties. A short list of suitable varieties for each crop must be established. In terms of fruit and nuts varieties, the most suitable type of root-stock must also be indicated.

Fertilizer. Fertilizer recommendations for each crop must be made, including provision for application of minor elements as a soil or as a foliar treatment.

Plant Propagation - Timing of Production. Simple method of plant propagation, together with recommendation of systems of plant protection from frost, etc., must be made. The time of sowing (with suitable variety) and planting as well as expected time of harvest must be indicated within each climatic zone.

1.96 It is recommended, therefore, that an international horticultural expert, with provision for consultative support, and an Afghan counterpart be appointed for a 6-12 month term to:.

^{1/} Nuttenson, N.Y., 1962. American Institute Crop. Ecol., Washington, D.C.

- i. to list climatic analogues.
- ii. identify crop recommendations for similar climatic areas. However every effort should be made to use as much Afghan information as is available by consulting fully with those engaged in crop production in Afghanistan.
- iii. Prepare crop production programs for each climatic zone in English and Farsi.
- iv. Prepare and publish the information in a detailed form. The cost of this program would amount to:

<u>Item</u>	<u>US\$</u>
Horticulturalists, 18 man months	58,000
Travel, etc.	35,000
Horticultural Consultants, 12 man months	40,000
Travel	25,000
Afghan Horticulturalists	10,000
Travel	15,000

Administrative Expenses

Publication, etc.	<u>17,000</u>
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\$200,000

Improved Variety Selection and Seed Production

1.97 One of the main factors limiting vegetable crop production is the type and range of varieties presently available to the Afghan grower. Even though the climate is ideally suited to seed production, being essentially rainless with a very low humidity within the period June through September, initial supplies of seeds of new varieties should be obtained from established seed companies in the USA, Europe or elsewhere. Farmers may multiply from these sources, but should only be encouraged to do so when they adhere to the conditions set out below (Table 21):

Table 21: Seed Production Requirements

<u>Crop(s)</u>	<u>Method of Pollination</u>	<u>Prescribed distance between seed fields</u>
Beans, lettuce, pea, tomato	Self-pollination	15-150 ft. between seed lots
Beet	Cross-pollination	1 mile between seed lots
	airborne pollen	
Asparagus	Cross-pollination	
Cruciferae	insect-borne pollen	1 mile between seed lots
Unbelliferae	"	"
Curcurbitae	"	"
Solanaciae	"	"
Onions, leeks	"	"

1.98 Purchasing seed will increase cost of production. So will the use of fertilizers, plant protection chemicals, and increased mechanization, but the overall effect of increased yield obtained should readily offset these increased inputs (Appendices) and provide the extra profit incentive to the Afghan farmer.

1.99 Seed production as a definite enterprise should be encouraged in Afghanistan. There are 90,000 ha of vegetable produced each year. Excluding potatoes this comes to 75,000 ha of all seed grown vegetables. There are no statistics on distribution of vegetable production, but the following estimate is given as a basis to decide seed requirements.

Table 22: Seed Production in Afghanistan

<u>Crop</u>	<u>Cropped Area</u>		<u>Seed Use (ha) and Cost</u>		<u>Total Annual Afghan Seed Requirement and Cost</u>	
	<u>%</u>	<u>ha</u>	<u>lb/ha</u>	<u>\$/lb</u>	<u>lb</u>	<u>\$</u>
Onions	15	11,250	10	12	112,500	1,350,000
Eggplant	15	112,250	5	13.2	56,270	743,000
Cucumber	10	7,500	5	7.2	37,500	270,000
Green Onion	10	7,500	25	12	187,500	2,224,000
Lettuce	10	7,500	75	8.4	56,500	473,000
Brassian	10	7,500	4	12	30,000	360,000
Tomatoes	10	7,500	4	19.2	30,000	576,000
Melons	10	7,500	5	6	37,500	225,000
Other	10	7,500	5	6	37,500	225,000

VEGETABLE SEED PRODUCTION IN AFGHANISTAN:
REQUIREMENTS AND ESTIMATED INVESTMENT COSTS

1. Onions and eggplants are the major vegetables, the other main ones being cucumber, green onions, lettuce, various Brassica crops (cauliflower, tunips, Brussel sprouts, cabbage, etc.), tomatoes, melons including water-melon and cantaloupes and finally a miscellaneous other category. Total seed requirement is based on seeding recommendations listed above, and computed seed costs are based on quoted seed wholesale prices in the USA with a 20% charge for transport, handling and commission charges. Estimated total cost comes to \$6.46 m. However, it is likely that only a small number of growers would use improved seed and the net cost would then be a corresponding percentage of the total cost. The establishment of an indigenous seed industry would off-set these import costs and add to the general infrastructural development within the agricultural sector.

2. The area of seed crop production required for complete national sufficiency is approximately 700-800 ha. This estimate is derived from the following data.

Table 1: Seed Production Requirements in Afghanistan

Crop	Seed Production	Seed Production Requirements		
	lb/acre	Area (ha)	Seed (lb)	Cost (\$)
Onion	400	110	1,100	13,280
Eggplant	400	55	278	3,655
Cucumber	400	40	185	1,330
Green Onion	400	185	4,610	55,400
Lettuce	500	45	335	2,790
Brassica	500	25	95	1,135
Tomato	100	120	470	9,070
Melon	250	60	295	1,770
Other	220	75	370	2,115
Total		715		91,260

3. To allow for an efficient crop rotation practice, to improve soil condition, to minimize soil disease and also to allow for sufficient isolation of cross pollinated types, a 3,000-5,000 ha farm, depending on the size of the export component, would be required. The approximate estimated total costs of establishing a 3,000 ha seed farm are listed below:

<u>Item</u>	Cost (\$)	Foreign Exchange %
Land preparation	300 000	20
Seed processing equipment and buildings	1,000,000	75
Farm equipment, machinery and buildings	500,000	80
Technical assistance (5 years)	600,000	100
Vegetable research station	<u>320,000</u>	<u>80</u>
Total	2,720,000	-

4. These costs refer to the establishment of a 3,000 ha farm. Part of the area, approximately 750 ha would be alfalfa hay cropped; the remaining non-vegetable seed area could be used to produce some agricultural seed crops such as wheat cotton, etc. that would not affect the rotation requirement of the vegetable seed area. No provision has been in those cost estimates for seed sales staff, transport, distribution facilities, etc.

5. In practice, it would take at least 4-8 year to establish a seed production facility of this size. Also, it can be assumed that initially only about 5-10% of the vegetable growers would be likely to buy seed rather than produce it themselves. However, a good sales effort and demonstrations by the extension service should increase use of purchased seed to 80% of the vegetable cropped area within a 5-10 years period and production should be based on a 10% increase each year. The seed production facility could be formed with the purpose of exporting seed to neighboring countries. In a recent survey of the Middle East, the American Seed Trade Association 1/ studied the seed requirement and seed source of countries like Iraq, Egypt, Iran, Syria, Saudi Arabia and Sudan. Most of these countries produce some of their own seed at a low technological level. At present most of their imported seeds are purchased from seed companies in Western Europe and the USA.

6. The establishment of a seed company in Afghanistan with the object of exporting seed to the neighboring Middle East Countries would need the involvement of an international seed company with considerable experience in production and distribution. Seed production is a highly technological aspect of crop production. In Tables 25 and 26 only eight of the main types of vegetables are given of which an average of at least five varieties of each would need to be multiplied giving a total of 40 "crops" in all. Seed companies have most of their seed grown by growers on contract, 1/ producing

1/ Personal communication, ASTA, June 1976

only about 20% of their requirements on their own land. Having seed grown on contract depends on having well educated growers and a good mobile field staff to oversee the farm based operation. This type of organization lessens the seed companies overall management responsibilities and also provides for excellent isolation of out-crossing types in areas where similar type crops are not grown. It also provides a better opportunity for seed companies to grow these crops in the most suitable areas for both crop and seed production. The production of 100 ha of a large number of vegetable crops would be considered as a small commercial operation by large seed producing companies. In the Afghanistan context, therefore, an export market would have to be developed. The lack of experience amongst growers, the difficulties of traveling in Afghanistan and the lack of a qualified field staff would essentially mean that initially all the seed would have to be produced on the seed companies' own land. Eventually, field staff could become available from the staff trained on the seed production farm. However, it would initially have to be an enclave project with costs of the order outlined above. No provision is made for land costs here as it is anticipated that state property would be used.

7. In the development of seed production, the seed company would need to satisfy itself in:

- 1) the technical aspects of seed production in Afghanistan
- 2) the extent of neighboring seed market and transport facilities
- 3) the attitude of the Government to trading relationships with international companies

(Note: Reference should be made to the following publication:
"Administrative Guide to Seed Production in Underdeveloped Countries."

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CERTIFIED SEED POTATO PRODUCTION IN AFGHANISTAN:

RECOMMENDATIONS AND ESTIMATED INVESTMENT COSTS

1. The potato is one of Afghanistan's most important crops. Some 14,000 ha are planted each year giving a total seed requirement of 35,000 tons per year. To satisfy total requirements 3,000 ha of seed potatoes would be required every year.

2. Potato seed stocks can greatly "degenerate" or "run-out" due to the build up of disease organism in them through the natural process of asexual propagation. The most important of these degenerative diseases are those which cause stunting of plant growth and reduced production. Usually they are evidenced by mottling (Virus X), leaf-roll (virus X, M, S), milk mosaic (Virus A), rugose mosaic (Virus Y) and tuber virus. Ring rot, a bacterial disease caused by Corynebacterium sepedonicum is spread by diseased seed. Potato seed can also be affected by various fungi including common and powdery scab and blight caused by Phytophthora infestans.

3. In most certified seed potato schemes, seed crops can only be grown in areas known to be free of scab and root nematode. During the growing season, at least two field inspections are made during periods when conditions are most suitable for the detection of diseases and varietal mixtures. A typical standard on which certified seed potato certifications are issued is, for field inspection, as follows:

	1st Inspection, %	2nd Inspection, %
Leaf-roll	2	1
Severe mosaic	1	0.5
Mild mosaic	2	1
Tuber virus	2	1
Total all viruses	3	3
Ring rot	0	0
Weak plant	3	1
Mixture	0.25	0

Bin inspection excludes use of potatoes for seed if they are infected with blight, scab, soft-rot and weevil rot, freezing injury, mechanical damage, etc.

4. Seed production is usually confined to those areas where cool weather restricts insect growth and movement and therefore virus transmission. In the U.S.A., Maine produces 32% (63,000 acres) of USA seed requirements. Bamian in Afghanistan, presently produces 3,000 ha (21% of total) of potatoes. The area readily lends itself to seed potato production and consequently a certified seed production agency should be established in that area. A seed improvement scheme should also be established to provide a foundation stock

to be used primarily to plant up certified seed stocks. Other requirements include strict sanitary practices and greater care in handling and storing the foundation seed crop. In addition to this, laboratory, greenhouse and seriological work should be undertaken to identify virus strains. Work would also have to be undertaken to eliminate virus and X and X by using thermo-therapy.

5. A certified seed production program based on the projections in Table 21 should be established.

Table 1: Production Timing and Quantity of Potato Seed Produced in Proposed Potato Seed Production Scheme

Year	% of Total Area Requirement	Seed Production		Certified Seed (tons)	Foundation Seed (tons)
	%	Certified (ha)	Foundation (ha)		
1	2.5	75	-	1,128	-
2	5	150	2	2,250	30
3	10	300	5	4,500	75
4	15	450	10	6,750	150
5	25	750	20	11,250	300
6	35	1,050	40	15,750	600
10	45	1,350	100	20,250	1,500

6. The cost of establishing a Certified Potato Seed scheme is estimated to be as follows:

Office, laboratories	200,000
Greenhouse facilities	
Farm equipment and building (200 ha farm)	100,000
Potato storage facilities	400,000
Technical assistance	45,000
Travel	<u>15,000</u>
Total	US\$760,000

PRODUCTION OF FRUIT TREE NURSERY

STOCK IN AFGHANISTAN: RECOMMENDATIONS AND ESTIMATED INVESTMENT COSTS
AND REVENUES

Although grapes are produced in vineyards varying in size from 1 to 300 jeribs, most deciduous fruits occur as scattered trees generally around the sides of a vineyard. As an exception to this, large scale orchard fruits, Navel oranges, and olives have been planted in the Nangarhar project. Attached to this a 40 ha orange and olive tree nursery has been established. In 1975, nearly 90,000 apple trees, mostly varieties of "delicious" on local root-stock, have been planted in the Maidan area. In this area, commercial orchards have been established by 400 growers who between them have 200,000 apple trees or approximately a 6 jerib orchard each. This considerable interest in apple planting has to some extent been satisfied by the Wakiz nursery just outside of Kabul. On this nursery, 18 jeribs in all, there are 9 jeribs of apple nursery stock, 3 jeribs of plums, pears, peaches, etc. and six jeribs of vegetables. The nursery provided approximately 50,000 apple trees in 1975, but this was insufficient to meet demand. Prices in 1975 at 30 Afs/tree were double those obtained in 1974.

To continue the planting of commercial orchards of various types of deciduous fruit, good quality nursery-stock will be urgently needed. Only the best varieties available on the most suitable root-stocks should be used. Private nursery stock production should be encouraged. Each of the Research farms and farms attached to the agricultural schools should establish a nursery stock unit complimentary with requirements of the province or locality they serve. However, to accelerate the supply of good quality stock in fair quantity, a nursery stock farm should be established.

Annual nursery stock requirements are estimated to be 1.2 million trees per year. This is based on an industry comprising 70,000 ha in which 3% of the area will be replanted each year together with a 4% increase in orchard planting. The proposed nursery stock farm should meet 50% of the requirements and the suggested stages of development to reach 50% requirement capacity are given in Table 1.

Table 1: Nursery Stock Development Program

<u>Year</u>	<u>Production %</u>
1	0
2	0
3	12.5
4	25
5	50
6-10	50

The costs of the proposed nursery stock farm are summarized in Table 2, while an approximated cash flow table for this investment is given in Table 3.

Table 2: Establishment Cost of Proposed
Deciduous Fruit Tree Nursery
(500 jeribs)

1. Investment costs	<u>Afs</u>	<u>% Foreign</u>
Deep well pumps, irrigation distribution system, fences, etc.	5,200,000	20
Stock, 50 varieties, 100 of each for 100 jeribs	780,000 700,000	100 20
Planting, 100 jeribs stock care, Year 1 to Year 3	1,800,000	5
Machinery (500 jeribs)	2,940,000	100
Equipment (500 jeribs)	1,470,000	100
Office, buildings, storage	3,120,000	50
Vehicles	1,440,000	100
Plant raising, greenhouses, etc.	980,000	50
Miscellaneous	<u>1,500,000</u>	50
	19,930,000	
2. Management and Technical Assistance		
60 man-months	14,400,000	100
3. Working Capital		
Maximum costs for labor, fertilizer, etc. in nursery area	<u>10,445,000</u>	20
Total	<u><u>44,775,000</u></u>	
US\$ equivalent	<u><u>US\$995,00</u></u>	

At full capacity production, approximately 600,000 fruit trees would be required each year. A 100 jerib stock area composed of 100 trees of each of 50 different varieties would supply the bond-wood material for this nursery. Nursery plantings would be established on 240 jeribs each planting taking two years to reach full size (5,000 nursery trees/jerib). The rest of the nursery would be planted with alfalfa, to improve soil condition, and some vegetable crops, to supply out of season work for the nursery labor and staff.

TABLE 2 DECIDUOUS FRUIT TREE NURSERY-COSTS AND REVENUE (500 jeribs ^{/1})

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
	---(Afs)---									
INVESTMENT										
Deep well, irrigation, etc.	5,200,000	-	-	-	-	1,400,000	-	-	-	1,400,000
Stock	680,000	100,000	-	-	-	100,000	-	-	-	-
Planting 100 jerib	600,000	100,000	-	-	-	-	-	-	-	-
Stock husbandry	600,000	600,000	600,000	-	-	-	-	-	-	-
Machinery	2,940,000	-	-	-	-	1,000,000	-	1,000,000	-	1,000,000
Equipment	1,470,000	-	-	-	-	500,000	-	500,000	-	500,000
Office, buildings, etc.	2,000,000	1,120,000	-	-	-	-	-	-	-	-
Vehicles	720,000	720,000	-	-	360,000	-	-	-	360,000	-
Greenhouses, etc.	980,000	-	-	-	-	120,000	-	-	-	-
Miscellaneous	500,000	500,000	500,000	-	-	-	-	-	-	-
	15,690,000	3,140,000	1,100,000	-	360,000	3,120,000	-	1,500,000	360,000	2,900,000
OPERATING EXPENSES										
Labour ^{/2}	750,000	1,500,000	3,000,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000	4,500,000
Manure ^{/3}	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000	75,000
Fertiliser ^{/4}	480,000	960,000	960,000	960,000	960,000	960,000	960,000	960,000	960,000	960,000
Chemical ^{/5}	120,000	240,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000	480,000
Fuel and repairs ^{/6}	120,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000	240,000
Seed ^{/7}	120,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000	200,000
	1,665,000	3,215,000	4,955,000	6,455,000	6,455,000	6,455,000	6,455,000	6,455,000	6,455,000	6,455,000
OVERHEAD										
Management ^{/8}	3,700,000	4,280,000	4,480,000	4,480,000	4,480,000	4,280,000	2,000,000	2,000,000	2,000,000	2,000,000
Office and Administration ^{/9}										
local travel	300,000	450,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Miscellaneous	200,000	400,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000	600,000
Interest	1,995,500	2,901,000	3,696,000	4,071,000	-	-	-	-	-	-
Loan repayments ^{/10}	-	-	-	-	4,925,350	4,925,350	4,925,350	4,925,350	4,925,350	4,925,350
REVENUE ^{/11}										
Nursery stock	-	-	5,400,000	10,800,000	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000	21,600,000
Vegetables	1,600,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000	800,000
Alfalfa	-	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000	486,000
Loan	21,951,000	9,960,000	8,745,000	4,119,500	-	-	-	-	-	-
Net Income	(21,951,000)	(9,960,000)	(8,745,000)	(4,119,500)	5,790,000	3,985,650	8,305,650	6,805,650	7,945,650	5,405,650

Footnotes - See overleaf

Footnotes to Table 3: Deciduous Fruit Tree Nursery-Costs and Revenue

/1 Area:	120 jeribs	nursery, 2nd year	
	120 jeribs	nursery, 1st year	
	100 jeribs	stock nursery	
	50 jeribs	vegetables	
	90 jeribs	alfalfa	
	<u>480</u>		
	20 utility area		
	<u>500</u>		
/2 Labor:	300 workers and 15,000/Afs/year	4,500,000	
	year 1 - 50 workers	750,000	
	year 2 - 100 workers	1,500,000	
	year 3 - 200 workers	3,000,000	
	year 4 - 300 workers	4,500,000	
/3 Manure:	50 jeribs per year x 150 Donkey loads @ 10 Afs/load		
/4 Fertilizer:	2,000 Afs/jerib/year		
/5 Chemicals:	1,000 Afs/jerib/year		
	dormant spray, aphid control, leaf minors, minor elements, etc.		
/6 Fuel and Repairs:			
	500 Afs/jerib		
/7 Seed:	Vegetable and alfalfa @ 1,000 Afs/jerib x 80 jerib		
	Roostoch seed @ 120,000 Afs/year		
/8 Management: Technical Assistance	1 - General Manager (expatriate)	US\$ 50,000	
	2 - Ass't. General Manager (Afghan)	200,000	
	3.- Horticulturist (Afghan)	300,000	
	1 - Office Manager (Afghan)	100,000	
	1 - Marketing/Customer Service (Afghan)	100,000	
	30 - Foreman @ 22,000 Afs/year	660,000	
	Includes 35% fringe benefits		
		<u>AFS</u>	
	Total - AFS	1,360,000	
	- US\$ 2 52 Afs/\$	<u>3,120,000</u>	
		<u>4,480,000</u>	
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year 1, half local staff, expatriate
year 2, full local staff, 1 expatriate
year 3, full local staff, 1 expatriate
year 4, same as year 3
year 5, same as year 3
year 6, full local staff, 1 expatriate
year 7, full local staff

```

/9 Office and Administration:

Postage, telephone, local travel, etc.

/10 Loan 10 years at 10%

/11 Revenue: Vegetables, 100 jeribs, year 1, 50 jeribs thereafter
 @ 16,000 Afs/jerib
 @ 5,400 Afs/jerib

Nursery stock:

year 1	0
year 2	0
year 3	150,000 trees @ 40 afs.
year 4	300,000
year 5	600,000 full capacity
less 10% for losses	

Depreciation:

Vehicles depreciated at 25% per year
Power machinery depreciated at 20%/year
Equipment depreciated at 10% per year

COSTS AND REVENUES FOR TRADITIONAL AND IMPROVED PRODUCTION METHODS
OF AFGHAN FRUITS AND VEGETABLES

Contents

- Table 1. Estimated Costs and Revenues for Improved and Traditional Fruit Production.
- Table 2. Estimated Costs and Revenues for Improved and Traditional Vegetable Production.
- Table 3. Estimated Costs and Income for a 100 jerib Vegetable Farm.

The costs and returns in horticultural crop production have been estimated for a number of individual horticultural crops and also for a specimen vegetable farm in the following 3 tables.

In the vegetable farm, vegetables comprise less than 50% of the area cropped (40% of the area double cropped with maize and beans, 20% cropped with alfalfa).

These projections are based on conservative price figures and reasonable yield estimates. The estimates for vegetable crop production include a fairly substantial investment cost for tractors, machinery, etc. Depending on the size of the farm, the layout of fields, the availability of spare parts and repair service, investment of this type may be the least suitable approach to adopt. In those circumstances, the use of more oxen, improved equipment and more labour in crop production, together with increased use of fertilizer, chemicals and the use of good varieties should show equally attractive returns.

TABLE 1: ESTIMATED COSTS AND REVENUES FOR IMPROVED AND TRADITIONAL FRUIT PRODUCTION
(Afs./jerib)

	Improved Vineyard Shindokhani Variety	Improved Vineyard Kishmishi Variety	Traditional Vineyard Kishmishi Variety	Improved Pomegranates	Traditional Pomegranates	Improved Apricots	Traditional Apricots	Improved Apples	Traditional Apples
<u>INVESTMENT</u> ^{/1}									
Land Preparation ^{/2}	2,000	2,000	4,980	2,000	600	2,000	600	2,000	-
Vines or trees ^{/3}	3,000	3,000	1,980	1,200	1,200	1,500	400	1,500	1,500
Planting	900	900	1,800	1,500	900	200	200	500	250
Manure and fertilizer ^{/4}	15,000	15,000	10,660	15,000	1,400	15,000	1,500	21,000	21,875
Chemicals	1,000	1,000	200	2,500	-	2,500	-	12,000	10,290
Labor ^{/5}	15,000	15,000	15,000	15,000	14,000	15,000	14,000	15,000	10,500
Tools and implements	1,000	1,000	250	1,000	-	1,000	-	800	800
Irrigation	1,200	1,200	775	1,200	1,200	1,200	-	1,200	1,200
Trellis ^{/6}	14,700	14,700	-	-	-	-	-	-	-
Borders and walls ^{/7}	2,000	2,000	6,336	2,000	4,500	2,000	6,336	2,000	2,000
Equipment ^{/8}	2,500	2,500	1,000	2,500	1,000	2,500	1,000	2,500	1,000
Total Investments	58,300	58,300	42,981	43,900	24,800	42,900	24,036	58,500	49,415
<u>OPERATING COST</u>									
Labor and Pruning	3,000	3,000	3,600	3,000	2,800	3,000	3,000	2,000	2,000
Irrigation	400	400	200	400	300	400	150	400	400
Manure and fertilizer	3,000	3,000	800	3,000	1,200	2,000	300	3,000	3,000
Repair and chemicals	750	750	250	750	-	750	-	350	350
Harvest labor	500	500	200	800	1,000	500	450	700	700
Packing ^{/9}	5,714	7,142	Contract Sale	4,000	-	3,000	-	3,000	1,500
Total Operating Costs	13,364	14,792	5,050	11,950	5,300	9,650	3,900	9,450	7,950
<u>EXPENSE SUMMARY:</u>									
Operations	13,364	14,792	5,050	11,950	5,300	9,650	3,900	9,450	7,950
Overhead/Management ^{/10}	500	500	500	500	500	500	500	500	500
Depreciation ^{/11}	1,943	1,943	1,433	2,195	1,240	2,145	1,202	1,950	1,647
Land Tax	25	25	25	25	25	25	25	25	25
Total Expenses	15,832	17,260	7,008	14,670	7,065	12,320	5,627	11,925	10,122
<u>REVENUE</u>									
	<u>Grapes</u>								
Yield (Year 8) Tons	4	5	2	3.5	2.0	3.5	2.0	5	3
Price/Ton (Farmgate)	10,000	7,000	4,500	8,500	7,000	7,000	6,000	10,000	10,000
Gross Income	40,000	35,000	9,000	29,750	14,000	24,500	12,000	50,000	30,000
Net Income	24,168	17,740	1,992	15,080	6,935	12,180	6,373	38,075	19,878
	<u>Raisins</u>								
Yield (Year 8) Tons	1.25	1.25	0.5						
Price/Ton (Farmgate)	35,000	30,000	20,000						
Gross Revenue	43,750	37,500	10,000						
Net Revenue	27,918	20,240	2,992						

- ^{/1} Capitalized development and operating costs for five years, except apples are capitalized for seven years. Value of land is excluded.
- ^{/2} All traditional costs based on data supplied by the Agricultural Bank. Land preparation in the "Improved" vineyards and orchards reflects deep plowing and cost to level.
- ^{/3} Vineyard - 300 cuttings/jerib. Orchards - 50 trees/jerib. Improved orchards reflect the cost for improved trees at 30 Afs. each. Pomegranates planted from cuttings.
- ^{/4} Improved orchards, 225-275 kilos per year.
- ^{/5} One man per 5 jeribs @ 15,000 Afs. per annum. Tractors are not utilized except in initial "land preparation".
- ^{/6} Vineyard trained on cement post and wire trellis.
- ^{/7} Traditional costs include mud wall border @ 50 Afs./meter; Improved orchards have a shrub border.
- ^{/8} Includes shovels, pruning knives, power sprayers, etc.
- ^{/9} Improved orchards include packing materials (wooden boxes) in order to sell direct and achieve higher market prices. Wooden box costs: 7 kilo @ 10 Afs., 15 kilo @ 15 Afs.
- ^{/10} Reflects accounting, office and other overheads.
- ^{/11} Depreciation rates: 20 years for apricots and pomegranates; 30 years for vineyard; 40 years for apples.

Table 2 ESTIMATED COST AND REVENUES FOR IMPROVED AND TRADITIONAL PRODUCTION OF A NUMBER OF VEGETABLE CROPS
(Afs/jerib)

	TOMATOES						POTATOES						ONIONS						EGGPLANT							
	Traditional		Improved		Trellis		Traditional		Improved-Jalabad		Improved-Bamyan		Traditional		Improved		Improved (with storage)		Traditional		Improved		Traditional		Improved	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Investment Costs /1																										
Land Development /2	2,000	33	2,000	33	2,000	50	2,000	33	2,000	33	2,000	66	2,000	33	2,000	33	2,000	33	2,000	33	2,000	33	2,000	22	2,000	22
Fencing, etc	2,000	50	2,000	50	2,000	75	2,000	50	2,000	50	2,000	100	2,000	50	2,000	50	2,000	50	2,000	50	2,000	50	2,000	33	2,000	33
Buildings /3			5,000	125	5,000	188			5,000	125	5,000	250			5,000	125	5,000	125			5,000	125			5,000	83
Machinery /4		420	5,000	500	5,000	750			3,000	500	5,000	1,000			5,000	500	5,000	500			5,000	500			5,000	333
Equipment /4			3,000	300	3,000	450			4,000	300	3,000	600			3,000	300	3,000	300			3,000	300			3,000	200
Packaging /5	2,500	503	3,750	625	6,250	1,563	2,500	420	625	1,500	4,500	1,500	2,000	333	3,500	580	3,500	580	3,750	625	6,000	1,000	1,250	139	2,500	278
Trellis /6					2,000	4,000									--	--	--	--								
Storage /7															--	--	17,500	875								
Total	6,500		20,750	1,633	43,250	7,076	6,500	509	22,000	1,446	22,500	3,516	6,000	416	20,500	1,588	37,500	2,463	7,750	708	23,000	2,008		194	19,500	949
Operating Cost																										
Manure /8		1,500		1,500		1,500		1,500		1,500		1,500		1,500		1,500		1,500		1,500		1,500		--	--	--
Fertilizers /9		1,000		3,500		5,000		--		4,000		4,000		1,000		4,000		4,000		--		2,000		1,000	--	3,000
Seed /10		--		2,000		2,000		1,750		2,188		2,188		--		1,200		1,200		--		700		--	--	1,000
Chemicals		--		1,500		2,500		--		1,000		1,000		--		1,500		1,500		--		1,500		--	--	1,000
Labour /11		7,500		3,000		7,500		8,750		2,400		2,400		7,000		3,600		3,600		6,250		3,600		3,125		1,000
Irrigation		150		400		400		400		400		200		150		400		400		150		400		150		400
Fuel, Repairs	--	--		750		750		--		750		750		--		750		750		--		750		--	--	750
Total		10,150		12,650		19,650		12,460		12,238		12,038		9,650		12,950		16,350		7,900		10,450		4,625		7,150
Expense Summary																										
Depreciation		650		1,633		7,076		503		14,446		3,516		416		1,588		2,463		708		2,008		194		949
Operating Costs		101,150		12,650		19,650		12,400		12,238		12,038		9,650		12,950		12,950		7,900		10,450		4,625		8,150
Miscellaneous		1,000		1,500		2,000		500		1,000		1,000		1,000		2,000		2,000		500		1,000		200		400
Total		11,800		15,783		28,726		12,563		14,684		16,554		11,066		16,538		17,413		9,108		13,458		5,019		8,978
Yield		5		6.5		12.5		4		6.5		7.0		4		6.5		6.5		5.0		8		2.5		5.0
Price/ton Afs		3,000		3,500		3,500		3,500		3,500		3,500		3,500		4,000		32,506/12		2,500		2,500		2,500		2,500
Gross Income		15,000		22,750		43,750		14,000		22,750		24,500		14,000		26,000		15,807		3,392		6,542		1,231		3,522
Net Income		3,200		6,967		15,024		1,437		8,066		7,946		2,943		9,462		15,807		3,392		6,542		1,231		3,522

/1 Column A - Investment costs/jerib; Column B - Depreciation costs/jerib.

/2 Land development; 2,000 Afs/jerib depreciated over 30 year period.

- full cost to potato crop, Bamyan

- 3/4 cost to tomato trellis crop

- 1/2 cost to remaining crops except spinach

- 1/3 cost to spinach crop

/3 Buildings and fences, etc., 5,000 Afs and 2,000 Afs investment depreciated over a 20 year period:

- full cost to potato crop, Bamyan

- 3/4 cost to tomato trellis crop

- 1/2 cost to remaining crops except spinach

- 1/3 cost to spinach crop

/4 Machinery and equipment 5,000 Afs and 3,000 Afs depreciated over a 3 year period

- full cost to potato crop, Bamyan

- 3/4 cost to tomato trellis crop

- 1/2 cost to remaining crops except spinach

- 1/3 cost to spinach crop

/5 Packaging costs 5,000 Afs/ton, depreciated over a 3 year period.

- full cost to potato crop, Bamyan

- 3/4 cost to tomato trellis crop

- 1/2 cost to remaining crops except spinach

- 1/3 cost to spinach crop

/6 Tomato trellis, 20,000 Afs/jerib, depreciates over a 5 year period

/7 Onion storage 5,000 Afs/ton of onions in ambient air-cooled insulated onion storage shed

/8 Manure, 150 donkey loads/jerib, 10 Afs/load.

/9 Fertilizer, 500 Afs/bag.

/10 Seed purchased at USA equivalent.

/11 Labor for traditional crops based on 50% buzgar system. For improved systems, labor charged at 6 Afs/hour - Tomatoes, 500 hours/jerib; Trellis tomatoes, 1,250 hours/jerib; potatoes, 400 hours/jerib; Onions, 600 hours/jerib; Onions storage, 900 hours/jerib; spinach, 300 hours/jerib; eggplant, 600 hours/jerib; yields given in tons/jerib; price in Afs/ton.

/12 One half, 3.25 tons, sold at 4,000 Afs/ton, the other half out of storage at 6,000 Afs/ton.

ANNEX 1
Appendix 4
Table 3 footnotes

- /1 Land development costs 2,000 Afs/jerib.
- /2 Buildings costed at 1,000 Afs/jerib.
- /3 One small 35 hp and one medium size 55 hp tractor.
- /4 Ploughs, cultivators, trailers, sprayers, etc.
- /5 Packaging for potatoes and onions. Yield 6.5 tons/jerib at 500 Afs/ton, ½ cost to each crop, depreciating over 3 years.
- /6 Equivalent of 150 donkey loads, 10 Afs each, 30 jeribs treated each year.
- /7 Fertilizer, at 500 Afs/50 kg bag supplied at the following rate/jerib:
onions and potatoes, 8 bags; wheat, 3 bags; maize and beans; 2 bags;
tomatoes, 8 bags.
- /8 Improved seed of all crops used at the following rates and costs/jerib;
potatoes, 500 kg/jerib at 4.4 Afs/kg; onion, 1 kg/jerib at 1,200 Afs/kg;
wheat 20 kg/jerib at 6 Afs/kg; alfalfa, 100 Afs/jerib; maize, 20 kg/jerib
at 5 Afs/kg; beans, 10 kg/jerib, 10 Afs/kg; tomatoes, 1 kg/jerib at
2,000 Afs/kg.
- /9 Chemicals applied for pest and disease control on vegetable crop, 100 Afs/jerib
for potatoes, 1,500 Afs/jerib for onions, 1,500 Afs/jerib tomatoes.
- /10 Labor charged at 6 Afs/hour with the following labor requirement in hours/
jerib: onions, 600 hours; potatoes, 400 hours; wheat 100 hours; alfalfa
hay 150 hours; maize, 100 hours; beans, 100 hours; tomatoes, 500 hours.
- /11 Crop yields/jerib and prices/ton--onions 6.5 tons, 4,000 Afs; potatoes 6.5
tons, 3,500 Afs; wheat, 0.6 tons, 6,400 Afs; alfalfa hay, 3 tons, 1,800
Afs; maize 0.4 tons, 4,240 Afs; beans, 0.25 tons, 8,490 Afs; tomatoes,
6.5 tons, 3,500 Afs; vegetables yields increase by 5 percent in years 3 and
5. Gram yields increase by 10 percent in years 3 and 5. Area of each crop:
onions - 30 jeribs; potatoes - 25 jeribs; wheat - 20 jeribs (reduced to 10
jeribs year 4); alfalfa - 25 jeribs; maize - 30 jeribs (double crop); beans -
10 jeribs (double crop); grain tomatoes - 10 jeribs (of the wheat area).
- /12 Management cost 5 percent gross income.
- /13 Long-term loan repayment 5 years, 10 percent interest.
- /14 Seasonal loan repayment 1 year, 10 percent interest.

HORTICULTURAL CROP HUSBANDRY AND
CROP VARIETIES IN AFGHANISTAN

Some details of current general crop husbandry practices are given in Tables 1-6. The number of vegetable varieties used in Afghanistan is very limited; most of them are of local origin and are poor yielders with low quality. Seed stocks must be improved and the only reasonable way to do this initially is to purchase them from abroad and eventually arrange for their multiplication in Afghanistan. F1 hybrids, even though they represent excellent varieties, should be avoided in view of their cost and unsuitability for multiplication by the farmer. However, in vine production, a large number of excellent grape varieties have been recognized and their value appreciated by the grower (Table 2). A large number of apple varieties have been listed in Afghanistan (Table 3), although present day plantings are practically entirely Delicious types on native rootstocks. Recommendations for vegetable crops general indicate a high seed rate and fairly close plant spacing. Tree fruit plants on the other hand are fairly widely spaced (Table 5). Production of some of these, e.g. apples and pomegranates especially, could be hastened by increasing plant density at planting and decreasing it as the individual tree size increased. Higher yields, especially in the earlier years of an orchard's life, could be increased in this way.

Details on medicinal herbs available in Afghanistan are given in Table 6.

Table 1. Vegetable Crop Varieties in Afghanistan

a) Cool-Season

Asparagus	- local var.	Bean	- Local var.
Cabbage	- local var. - mechili Copenhagen market Mamouth red rock	Cucumber	- Green wax - Local var. Balkhi Zuchini Kabuli Shewaki
Cauliflower	- Local var. Snowball	Egg-plant	- Local var.
Carrot	- Local var. Long Imperator Nantes	Melon	- Local var.
Fennel	- Local var.	Okra	- Local var. Louisiana
Leek	- Local var.	Pepper	- Local var. California wonder Hungarian wax
Lettuce	- Local var. - Kabuli Great Lakes	Squash	- Local var.
Onion	- Local var. Yellow sweet spanish White " "	Sweet potato	- Local var.
Parsely	- Local var.	Tomatoes	- Local var. Pearson improved
Potato	- Garma - Sarda - Chandermochi - Kafirilooker	Watermelon	- Congo Klendix Charleston Gray Dixie queen
Rhubarb	- Local var.		
Squash	- Local Var. - Blooms de long - Atadoor		
Turnip	- Local var. - Purple white top		

Source: Ministry of Agriculture, Kabul 1976.

Table 2. Grape Varieties of Afghanistan

- | | |
|---------------------------------------|----------------------|
| 1. Kishmishi, common, white or Gerdak | 44. Chall |
| 2. Kishmishi, black | 45. Pestan-i-Buz |
| 3. Kishmishi, red | 46. Shahabi |
| 4. Shindokhani, white | 47. Turkmani |
| 5. Shindokhani, red | 48. Alaman Toyeedi |
| 6. Hussaini, common | 49. Gurda-i-Gau |
| 7. Hussaini, Kilk-i-Aroos | 50. Objosh |
| 8. Aita, white | 51. Ala Bara |
| 9. Aita, red | 52. Garangani |
| 10. Aita, black | 53. Zanboorak |
| 11. Black Kandahari, toran | 54. Lal (seeded) |
| 12. Katta | 55. Januz |
| 13. Kohdaman Kandahari | 56. Askari, white |
| 14. Gholadan | 57. Askari, red |
| 15. Munoga | 58. Pushanki, white |
| 16. Lal, Yakdana | 59. Pushanki, red |
| 17. Lal, white | 60. Ayati, white |
| 18. Lal, red | 61. Loghi, black |
| 19. Lal, seeded | 62. Loghi, red |
| 20. Racha, white | 63. Sangenak, white |
| 21. Racha, red | 64. Mir Hamadi |
| 22. Taifi, red | 65. Zerjumi |
| 23. Taifi, white | 66. Serkagi |
| 24. Khalili, white | 67. Qalamak |
| 25. Khalili, red | 68. Muskagi |
| 26. Soyebi, white | 69. Kha-i-Kauk |
| 27. Soyebi, red | 70. Chashm-i-Gau |
| 28. Shonetak | 71. Kasnadara, white |
| 29. Fakhri | 72. Kasnadara, red |
| 30. Herati | 73. Shabi, red |
| 31. Khalchini | 74. Shabi, white |
| 32. Sheikhali | 75. Khair-i-Ghulaman |
| 33. Sabooni | 76. Kishmishi Siagak |
| 34. Kala Ghauchak | |
| 35. Qalami | |
| 36. Shakar Angor | |
| 37. Maska | |
| 38. Oquili, white | |
| 39. Oquili, black | |
| 40. Kala-i-zagh | |
| 41. Obak | |
| 42. Zaghak | |
| 43. Atumcha | |

Table 3: Apple Varieties in Afghanistan

Apples

1. Golden Delicious
2. Double Red Delicious
3. All Red Jonathan
4. McIntosh
5. Cortland
6. Prima
7. Lodi
8. Northern Spy
9. Rome Beauty
10. Yellow Transparent
11. Grimes Golden
12. Ruby
13. Melba
14. Starkings Delicious (a delicious sport)
15. Gravensteiner
16. Melrose
17. Milton
18. Mutzu Cross
19. Wealthy
20. Winesap
21. Staymani Winesap
22. Rheinischer
23. Weiber Klarapfel
24. Roter Boskoop
25. Cox Orange Renetts
26. Fruher Uktoriaspfel
27. Bleinheimer Goldrenette
28. Ruhm von Kirchwesder

Table 4. Seed rating and planting distances for some
vegetable crops in Afghanistan

Crop	Seed rate (kg/ac)	Spacing		Time of planting
		Between rows (cm)	Within rows (cm)	
Bean	30-40	45-50	15-25	Spring and Autumn
Cabbage	1.6	50-70	40-50	Every Time
Carrot	2.0-3.0	30-35	10-15	Spring, Summer, Autumn
Cauliflower	1.6	50-70	40-50	Every Time
Cucumber	1.6-2.0	100-120	40-45	Spring
Eggplant	2.4	40-50	25-40	Spring
Leek	6.0-8.0	30-35	5-10	Spring and Autumn
Lettuce	1.8-2.0	30-35	25-30	Autumn and Spring
Melon	2.0	120-140	45-50	Spring
Okra	4.0	40-45	20-30	Spring
Onion	3.0-5.0	25-35	10-15	Spring and Autumn
Peas	320-640	30-35	10-15	
Pepper	2.4	30-35	15-20	Spring
Radish	3.0-4.0	30-35	10-30	Every Time
Spinach	8-10	25-30	10-15	Every Time
Squash	2.0	150-180	45-50	Spring
Tomato	1.6	120	35-45	Spring and Autumn
Turnip	2.0-4.0	30-40	20-25	Summer
Water melon	2.4	140-150	45-50	Spring

Table 5. Recommended Horticultural Practices for
some fruit crops in Afghanistan

	Stock	Spacing (m)
a) Deciduous fruits		
Apples	Local	7 x 7
	Mm 111	6 x 6
	Mm 106	4 x 4
Apricot	NA	6 x 6
Sweet cherries	NA	6 x 6
Almond	NA	6 x 6
Pear	NA	6 x 6
Plum	NA	5 x 5
Peaches	NA	4 x 4
Figs	NA	4 x 4
Pomegranates	NA	4 x 4
Mulberry	NA	9 x 9
Walnut	NA	14 x 14
Citrus	Sour orange	5 x 5 to 6 x 6
Grape wine	OR	2.5 x 3 Parwan Kohdaman 1.5 x 4 Kandahar Herat

Source: NA - Not available OR - Own roots

Table 6. List of Afghan Medicinal Herbs

Latin Name	French Name	English Name	Origin	Common Name	Quantity
1. Ephedra Div. Sp.	Ephedra	Ephedra	Mount- ainous Areas	Bandak, Madraq Ema Nema Oma Jerkana	++++
2. Eremurus Div. Sp.	-	-	Wild fields of Takhar, Maidan and War- dak	Seresh	++++
3. Colchicum luteum	Colchique	?	Areas with humidity and mare- cagenn	Sourenjan	++
4. Crocus sativus	Safran	Saffron	Herat (culti. plant)	Zafaran	+
5. Fraxinum Sp.	Manne de Perse	Manna	Herat	Shir Khesht	++
6. Quercus Baloot	Galle d'alep	Aleppo gall	Eastern and East- West mountains	Sabz Mazo- Balout	++++
7. Rheum Div. Sp.	Rhubarbe	Rhubarb	Central mountains and other areas	Riwand Chini	++
8. Berberis Sp.	Epine vineth	?	Central and North- East moun- tains	Zerk, Emran Zereshk Raz	++++
9. Papaver somniaferum album	Pavot blanc	White poppy	Eastern and North- East areas	Koknar Taryak	++++
10. Brassica nigra	Moutarde noire	Mustard	?	Oury- Kharde	+
11. Isatis Koelzii	-	-	Badakhshan Central mountains	Niel-e- Kabulit	++
12. Viola Div.	Violette	Violet	Mountains and areas with hu- midity	Banafsha	++

Table 6. List of Afghan Medicinal Herbs (cont.)

Latin Name	French Name	English Name	Origin	Common Name	Quantity
13. Althea Rosea	Rose tremière	Holly hock	Areas of central mountains	Khatmi-e-Safid	+++
14. Gossypium herbaceum	coton	Cotton	Kunduz, Helmand, Kandahar (Cultiv. plant)	Ponba-Pakhta	++++
15. Ricinus communis	Ricin	Castor oil	Ningarhar Laghman and Kandahar	Baid-e-Angir	+++
16. Linum usitatissimum	Lin	Flox	Takhar, Kunduz, Pul- e-Khumri etc.	Zegher, Katan	++++
17. Citrus Div. Sp.	Citrus	Citrus	Ningarhar, Laghman	Narenj, Limou Malta etc.	++++
18. Pistacie Kinjuk	-	-	North-East North Central Mountains	Khenjak	+++
19. Zizyphus vulgaïs	Jujube	Jujub	Farah	Onab	+++
20. Astragalus Sp.	Gomme adragaunte	Tragacanth	Herat	Katira - Gond	++
21. Glycyrrhiza glabra Div. var.	Reglisse	Liquorice	All over the country	Shirin Boya	++++
22. Trigonella foenum graecum	Fenuqrec	Fenugreck	(Culti. plant)	Holba	++
23. Rosa centifolia	Rose	Rose	Ningarhar, Kabul etc.	Gulab	+++
24. Punica granatum	Grenadier	Pomegranate	Kandahar, Herat, Ningarhar	Darakht-e-Anar	+++
25. Anethum graveolens	Aneth	Indian dill	Kabul, Parwan	Shebet	++
26. Carum copticum	Ajowan	Ajowan	(Culti. plant)	Jawani	++
27. Coriandrum sativum	Coriandre	Coriander	(Culti. plant)	Gashneez	++
28. Cuminum Div. Sp.	Cumin	Cumin	Badakhshan and Central mountains	Zeera	+++
29. Foeniculum vulgore	Fenaiul	Feunel	Kabul (Culti. plant)	Badyan	++
30. Frula asa foetida	Ase foetida	Asa foetida	Central, Northern, and North-East mount- ains, Moidan and Ghazni	Hing	+++
31. Datura stramonium	Stramoine	Mad apple	All over the country	Datoura	+++
32. Datura innoxia	-	-	Ningarhar, Kandahar	Damtoura	++
33. Hyos Cyonmus Div. Sp. H. Muticus	Jusquiarme	Henbane	All over the country	Bang-e-Diwana	+++

Table 6. List of Afghan Medicinal Herbs (cont.)

Latin Name	French Name	English Name	Origin	Common Name	Quantity
34. <i>Mentha longifolia</i>	Menthe	Menth	All over the country	Poudina Pouna	+++
35. <i>Ocimum basilicum</i>	Basilic	Basilik	Kabul (cultivated) Kandahar etc.	Raihaan	++
36. <i>Salvia Div. Sp.</i>	Sauge	?	All over the country	Ganda Baghal Sorkh Sawaj Kanowcha	++++
37. <i>Thymus afghanicus</i> at Div. Sp.	Thym	Thyme	All over the country	Kakouti Kawkouti	++
38. <i>Ziziphora afghanica</i>	Thym	Thyme	All over the country	Kakouti Kawkouti	++
39. <i>Plantago lanceolata</i> <i>Plantago major</i>	Plantain	Plantain	All over the country	Bartung or Zoof	++++
40. <i>Plantago ovata</i>	Ispaghul	Spogul	Mountainous areas	Esfarza	+
41. <i>Citrulus colocynthis</i>	Coloquinte	Colocynth	Ningarhar Kandahar	Tarboz-e-Abo Jehl Hanzal	++
42. <i>Rubia tinctorum</i>	Garance	Madder	Herat Ningarhar and almost all over the country	Royan	++
43. <i>Achillea Div. Sp.</i>	-	-	All over the country	Bouy-e-Madaran	++++
44. <i>Anacyclus pyrethrum</i>	Vrais pyrethre	Pellitory	Central Mountains	Eagar Akanqara	++
45. <i>Artemisia cina</i>	Semen contra	Warmseed	All over the country	Terkh-Kerem Bota, Derona	++++
46. <i>Artemisia absinthium</i>	Absinthe	Warmwood	All over the country	Afsantin	++++
47. <i>Chrysanthemum Div. Sp.</i>	Pyrethre insecticide	Pyrethrina	Central mountains	Pireteren	+++
48. <i>Cichorium intybus</i>	Chicorée	Chicory	All over the country	Kasni	++++
49. <i>Matricaria chamomilla</i>	Matricaire	Pever few	All over the country	Babouna Zard Sarak	+++
50. <i>Thevetia neriifolia</i>	-	-	Ningarhar (Culti.)	Shir Baid	++
51. <i>Amygdalus communis</i>	Amande	Almond	All over the country	Badam	++++
52. <i>Sesamum indicum</i>	Sesame	Sesame	North part of the country	Kunjid	+++
53. <i>Corthamus tinctorius</i>	Carthame	Sunflower	North part of the country	Masawer	++
54. <i>Althen officinalis</i>	?	?	All over the country	Khatmi	++
55. <i>Atropa acuminata</i>	Balladone des Indes	?	Noristan	?	+

Table 6. List of Afghan Medicinal Herbs (cont.)

Latin Name	French Name	English Name	Origin	Common Name	Quantity
56. Coton castor numularia	?	?	Urozgan	?	++
57. Indula helenium	?	?	Noristan	?	+
58. La vendula dentata	Lavande	Lavender	North of the Country		+
59. Melilotus officinalis	Melilot	?	All over the country	Reshqa-e-Gul- e-Zard	++
60. Melissa officinalis	Melisse	?	Humo. mountains	?	+
61. Verbascum Div. Sp.	Bouillon blanc	?	All over the country	Gosh-e-Kharak	+++

Note:-

Note

++++ Available and sufficient quantity for exportation and for processing purposes within the country

+++ Possibility of exportation exists

++ Insufficient quantity for exportation

+ Observed only one time

Div. : divers

Sp. : species

Source: University of Kabul
Faculty of Pharmacy
Prof. Dr. M. Ch. Younos, Kabul March 1976

DETAILED CLIMATIC DATA FOR SOME AREAS IN AFGHANISTAN

Table 1 - South Salang

Table 2 - Ghazni

Table 3 - Herat

Table 4 - Kabul

Table 5 - Jabul Seraj

Table 6 - Lashgargah

Table 1. SOUTH SALANG

Latitude: 35°21'N
Longitude: 69°03'E
Elevation: 31000 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum Temperature	-3.1	-1.8	3.0	4.8	8.2	13.7	15.7	15.8	12.2	8.6	1.8	-2.1
Mean Minimum Temperature	-9.8	-8.6	-5.6	-1.8	1.9	7.1	9.0	8.6	4.9	1.6	-4.2	-8.2
Mean Temperature	-7.0	-6.0	-2.9	1.2	4.9	10.0	11.9	11.6	8.0	4.4	-1.6	-5.8
Highest Monthly Temperature	5.0	6.4	9.5	13.7	18.9	21.1	22.3	23.0	19.5	18.5	10.2	8.1
Lowest Monthly Temperature	-23.8	-19.6	-22.8	-7.9	-5.2	0.3	3.9	3.7	-7.7	-8.4	-16.0	-17.4
Days Minimum °C or Below	31	28	30	20	7	0	0	0	1	13	26	31

Precipitation In mm

Mean Monthly Precipitation	110.4	210.5	233.1	346.2	105.8	2.8	3.8	0.4	5.8	17.5	74.5	95.7
Mean Relative Humidity	50	64	63	70	59	47	47	36	43	59	41	46

Mean Annual Temperature: 2.4 Mean Annual Temperature Range 18.9
Mean Annual Precipitation: 1206.5 Greatest Annual Precipitation 1448.4
Least Annual Precipitation: 1018.4
Years of Record: 5

Table 2. CHAZNI

Latitude: 33°32'N
Longitude: 68°25'E
Elevation: 2183 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum Temperature	1.6	4.7	10.9	16.3	23.4	28.3	30.4	30.9	26.8	20.7	12.0	4.9
Mean Minimum Temperature	-11.0	-7.5	-1.4	3.0	7.3	11.3	14.0	12.9	7.7	1.6	-3.6	-8.6
Mean Temperature	-5.9	-2.0	4.2	9.6	15.5	21.0	22.7	22.1	16.9	10.3	2.9	-2.8
Highest Monthly Temperature	12.5	17.8	20.5	25.2	31.4	35.0	35.5	34.9	32.5	28.0	21.2	13.0
Lowest Monthly Temperature	-31.1	-24.0	-11.5	-5.8	0	5.3	7.7	7.4	-0.6	-5.5	-13.8	-21.7
Days Minimum 0°C or Below	31	27	17	4	0	0	0	0	0	9	26	31

Precipitation In mm

Mean Monthly Precipitation	43.6	61.8	71.7	105.7	23.8	3.2	20.1	0.36	0	1.4	23.7	30.3
Mean Relative Humidity %	70	76	66	66	51	41	51	48	48	52	63	69

Mean Annual Temperature:	9.5	Mean Annual Temperature Range:	28.6
Mean Annual Precipitation:	385.6	Greatest Annual Precipitation:	554.5
Least Annual Precipitation:	264.5		
Years of Record:	8		

Table 3. HERAT

Latitude: 34°11'W
Longitude: 62°13'E
Elevation: 964 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum												
Temperature	11.1	14.0	18.3	23.2	29.0	34.6	36.5	35.2	31.4	25.2	17.4	11.6
Mean Minimum												
Temperature	-3.1	0.6	3.7	8.5	13.5	18.2	21.4	19.0	13.4	6.6	0.4	-3.3
Mean Temperature	2.9	6.2	10.3	15.8	21.5	27.0	29.4	27.6	22.6	16.2	8.0	2.8
Highest Monthly												
Temperature	24.4	27.6	30.5	30.2	39.7	42.4	44.4	41.5	39.3	35.2	30.0	23.2
Lowest Monthly												
Temperature	-26.7	-10.5	-13.3	-2.3	3.0	9.7	15.1	10.8	2.5	-4.2	-12.8	-22.0
Days Minimum												
0°C or Below	21	13	6	0	0	0	0	0	0	2	14	25

Precipitation in mm

Mean Monthly												
Precipitation	31.3	40.5	44.6	47.2	14.2	0.2	0	0	0	1.7	13.3	29.1
Mean Relative												
Humidity %	71	71	58	57	45	39	43	46	39	42	57	64

Mean Annual Temperature: 15.9
Mean Annual Precipitation: 220.0
Least Annual Precipitation: 131.2
Years of Record: 8

Table 4. KABUL

Latitude: 34°33'N
Longitude: 69°12'E
Elevation: 1802.6 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum Temperature	5.5	7.0	12.8	17.8	23.9	30.0	31.7	32.2	27.9	22.2	14.5	8.3
Mean Minimum Temperature	-7.7	-3.9	1.7	5.5	8.3	12.2	13.9	13.9	9.5	2.8	-1.1	-5.5
Mean Temperature	-2.2	0.6	6.6	11.7	17.3	22.8	25.0	24.4	20.0	12.8	5.0	-0.6
Highest Monthly Temperature	18.3	18.4	22.8	26.7	32.2	35.0	36.6	36.1	33.9	31.7	23.9	15.1
Lowest Monthly Temperature	-26.1	-21.7	-11.1	-1.1	0.6	6.6	8.9	7.7	0.6	-2.8	-9.5	-18.3
Days Minimum °C or Below	31	23	10	1	0	0	0	0	0	3	21	30

Precipitation in mm

Mean Monthly Precipitation	27.6	191.5	73.9	117.3	29.5	1.5	3.8	1.8	0.5	1.3	32.8	15.5
Mean Relative Humidity %	73	68	65	71	53	35	39	40	45	48	58	64

Mean Annual Temperature: 11.1
Mean Annual Temperature Range: 9.5
Mean Annual Precipitation: 367.8
Least Annual Precipitation: 199.9
Greatest Annual Precipitation: 499.6
Years of Record: 8

Table 5. Jabul Sara]

Latitude: 38°08'N
Longitude: 69°15'E
Elevation: 1628 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum												
Temperature	6.0	8.8	14.8	17.5	23.8	29.2	32.0	31.0	27.5	22.8	14.7	8.6
Mean Minimum												
Temperature	-2.1	1.8	5.8	9.5	14.9	20.8	22.3	22.4	18.4	12.9	5.6	0.6
Mean Temperature	1.4	5.1	9.5	13.2	19.3	24.9	27.1	26.1	22.4	17.3	9.9	3.2
Highest Monthly												
Temperature	17.8	19.4	21.6	28.5	33.3	34.9	40.5	35.1	33.5	29.5	24.5	15.2
Lowest Monthly												
Temperature	-15.4	-11.0	-4.7	3.4	7.0	13.9	12.4	16.5	7.6	5.5	-2.0	-12.9
Days Minimum												
0°C or Below	21	9	2	0	0	0	0	0	0	0	1	14

Precipitation in mm

Mean Monthly												
Precipitation	54.2	88.2	114.8	169.7	60.4	0.6	5.4	0	2.3	3.4	28.7	37.8
Mean Relative												
Humidity %	50	46	51	56	25	25	19	21	22	31	35	41

Mean Annual Temperature:	15.0	Mean Annual Range Temperature:	18.3
Mean Annual Precipitation:	564.2	Greatest Annual Precipitation:	835.7
Least Annual Precipitation:	355.1		
Years of Record :	8		

Table 6. LASHGARGAH

Latitude: 31°30'N
Longitude: 64°20'E
Elevation: 780 Meters

Temperature in °C

	J	F	M	A	M	J	J	A	S	O	N	D
Mean Maximum Temperature	15.5	18.9	24.1	28.4	35.5	40.6	41.5	39.7	35.3	29.4	21.3	13.4
Mean Minimum Temperature	0.7	4.4	9.1	13.2	17.8	21.3	24.1	20.6	15.0	8.6	3.0	-0.6
Mean Temperature	6.4	10.5	15.6	20.4	26.6	30.8	32.5	29.6	24.3	17.8	10.7	6.1
Highest Monthly Temperature	29.0	30.4	34.2	37.0	42.9	46.7	46.5	45.6	41.7	36.7	32.2	25.8
Lowest Monthly Temperature	-15.0	-5.8	-2.0	2.7	5.9	15.0	17.0	12.8	6.0	-1.4	-8.5	-11.8
Days Minimum 0°C or Below	14	5	1	0	0	0	0	0	0	0	7	18

Precipitation in mm

Mean Monthly Precipitation	12.2	17.3	6.5	19.4	4.9	0	0	0	0	0.2	2.2	13.6
Mean Relative Humidity %	64	61	44	48	32	28	22	22	27	36	39	53

Mean Annual Temperature:	19.2	Mean Annual Temperature Range:	26.1
Mean Annual Precipitation:	106.0	Greatest Annual Precipitation:	148.9
Least Annual Precipitation:	65.2		
Years of Record:	6-11		

SOME SPECIMEN SOIL PROFILE ANALYSES FROM KHODAMAN VALLEY

Profile No. 1

0-30 cms. Dark yellowish brown (10 YR 4/4) moist, very pale brown (10 YR 7/3) dry, sandy loam, medium angular blocky, slightly hard dry, friable moist, slightly sticky wet, plastic of roots and worm holes, effervescence with acid, pH 8.6.

30-60 cms. Dark brown (10 YR 4/3) moist, very pale brown (10 YR 7/4) dry, sandy clay loam angular blocky, slightly hard dry, friable moist, slightly sticky wet, plastic, roots and worm activity, effervescence with acid, pH 8.6.

60-90 cms. Yellowish brown (10YR 5/4) moist, very pale brown (10 YR 7/4) dry, clay loam, angular blocky, slightly hard dry, slightly firm moist, sticky, roots and worm holes, few calcium carbonate concretions, brisk effervescence with acid, pH 8.2..

Relief - flat
Drainage - good
Land use - vineyard

Profile No. 2

0-30 cms. Dark yellowish brown (10 YR 4/4) moist, very pale brown (10 YR 7/3) dry, sandy loam, angular blocky, slightly hard dry, friable moist, slightly sticky, slightly plastic, roots, worm holes, effervescence with acid, pH 8.4.

30-60 cms. Same as above, but sandy clay, pH 8.5

60-90 cms. Light yellowish brown (10YR 6/4 moist, light grey (10 YR 7/2) dry, sandy clay loam, angular blocky, slightly hard dry, firm moist, plastic, sticky, effervescence with acid, pH 8.6.

Relief - flat
Drainage - good
Land use - vineyard

Profile No. 5

0-30 cms. Brown (10 YR 5/3) moist, very pale brown (10 YR 7/4) dry, clay loam, medium angular blocky, hard dry, slightly firm moist, slightly sticky, plastic, plenty of roots, worm holes, effervescence with acid, pH 8.7.

30-60 cms. Brown (10 YR 5/3) moist, very pale brown (10 YR 7/4) dry, loam, slightly hard dry, friable moist, slightly sticky wet, slightly plastic, roots, calcium carbonate concretions, effervescence with acid brisk, pH 8.3.

60-90 cms. Dark brown (10 YR 4/3) moist, pale brown (10 YR 6/3) dry, sandy clay loam, medium angular blocky, slightly hard dry, friable moist, slightly sticky wet, roots, effervescence with acid, pH 8.2.

Relief - flat
Drainage - good
Land use - vineyard

Table 1: Some Specimen Soil Profile Analyses from Khodaman Valley

Depth cms	pH		E.C. milli mhos.	CaCO Total %	0.M. %	N %	Sand	P205 mg/100	Gas	Salt	Clay	Field capac- city
0-30	8.2	8.6	0.35	8.1	1.26	0.061	66.0	0.065	3.00	16.8	17.2	28.4
30-60	8.6	8.8	0.30	9.3	0.75		53.8	0.125	2.20	20.2	26.0	29.2
60-90	8.2	8.6	0.30	21.5	1.02		36.0	0.025	2.40	30.0	34.0	31.1
0-30	8.4	8.7	0.29	8.3	1.43	0.078	58.0	0.135	3.00	22.0	20.6	30.1
30-90	8.5	8.5	0.35	7.2	1.09		49.6	0.100	3.00	27.2	23.2	31.3
60-90	8.6	8.7	0.32	9.7	0.68		57.6	0.190	2.40	21.2	21.2	38.7
0-30	8.5	8.7	0.30	18.0	0.99	0.046	34.8	0.125	2.40	35.2	30.0	31.3
30-90	8.3	8.7	0.38	21.0	0.85		40.0	-	1.80	47.2	12.8	28.5
60-90	8.5	8.8	0.30	7.8	0.92		54.8	-	1.80	23.2	22.0	28.4

Table of Contents

Afghanistan Projections in 7-Year Plan 1355-1362 (1975/76-1982/83)

Annex 2 contains the following production and trade tables upon which 7-year projections in Chapter 2 are based.

Table 1 Production of Important Agricultural Products According to
Proposed 7-Year Plan, 1355-1361

Table 2 Commercial Exports During the 7-Year Plan, 1355-1361

Table 3 Commercial Imports During the 7-Year Plan, 1355-1361

AFGHANISTAN HORTICULTURAL SUBSECTOR SURVEY

PRODUCTION OF IMPORTANT AGRICULTURAL PRODUCTS ACCORDING TO PROPOSED 7-YEAR PLAN

1355 -1361												
1	2	3	4	5	6	7	8	9	10	11	12	13
	Units	1347	1354	Proposed Draft Seven-Year Plan							% of 1354 Compared	% of 1361 Compared
				1355	1356	1357	1358	1359	1360	1361	with 1347	with 1354
A. Agricultural Products												
1. Cereals												
-Wheat area	'000 ha	2,346	2,350	2,350	2,345	2,345	2,345	2,345	2,345	2,345	100.2	99.8
Yield/ha	kg	1,003	1,213	1,249	1,290	1,328	1,368	1,409	1,451	1,492	121.3	123.2
Tot. Prod.	'000 t.	2,354	2,850	2,936	3,024	3,114	3,208	3,304	3,403	3,500	121.1	123
-Corn area	'000 ha	500	484	482	480.5	473	455	440	435.2	420.6	96.8	86.9
Yield/ha	kg	1,546	1,612	1,649	1,700	1,778	1,925	2,027	2,112	2,258	104.3	139.6
Tot.Prod.	'000 t.	773	780	795	817	841	876	892	919	950	100.9	121.8
-Parley area	'000 ha	350	320	310.3	310.3	300.1	300	289	270	254	91.4	79.4
Yield/ha	kg	1,031	1,200	1,276	1,312	1,399	1,440	1,539	1,700	1,850	116.4	154.8
Tot.Prod.	'000 t.	361	384	396	407	420	432	445	459	470	106.4	122.4
-Rice Area	'000 ha	206	210	210	210	210	210	205	205	205	101.9	97.6
Yield/ha	kg	1,951	2,071	2,132	2,195	2,262	2,333	2,458	2,532	2,585	106.2	125.8
Tot.Prod.	'000 t.	402	435	448	461	475	490	504	519	530	108.2	121.1
Other Cereals												
Area	'000 ha	37	40	42	43	46	48	50	52	53	108.1	132.5
Yield/ha	kg	730	800	857	953	1,000	1,080	1,180	1,288	1,320	109.6	177.5
Tot.Prod.	'000 t.	27	32	36	41	46	52	59	67	70	118.5	234
Total Cereals												
Area	'000 ha	3,439	3,404	3,394.3	3,388.8	3,374.1	3,358	3,329	3,307.2	3,277.6	99	96.3
Prod./ha	kg	1,139	1,316	1,358	1,401	1,451	1,506	1,563	1,623	1,684	115.5	128.3
Tot.Prod.	'000 t.	3,917	4,481	4,611	4,750	4,896	5,058	5,204	5,367	5,530	114.4	133.3

		1	2	3	4	5	6	7	8	9	10	11	12	13
2.	<u>Industrial Crops</u>													
	Area			105	171	179.7	187.7	201.1	219.5	224.6	238.6	258	162.9	150.9
	From which:													
	-Cotton													
	Area	'000 ha		55	112	120.7	128.7	141.6	152.8	161.5	172.8	188.7	203.6	168.5
	Yield/ha	kg		1,290	1,429	1,491	1,554	1,589	1,669	1,734	1,794	1,855	110.8	129.8
	Tot.Prod.	'000 t.		71	160	180	200	225	225	280	310	350	225.3	219
	-Sugar Beet													
	Area	'000 ha		5	5	5	5	5.5	6.7	8.8	10.8	14.0	100	350
	Yield/ha	kg		12,400	20,000	22,000	22,800	23,273	23,880	24,773	25,000	25,000	112.9	142.8
	Tot.Prod.	'000 t.		62	100	110	114	128	160	218	270	350	112.9	500
	-Sugar Cane													
	Area	'000 ha		4	4	4	4	4	4	4.3	5	5.3	100	130.5
	Yield/ha	kg		14,250	15,000	17,000	19,500	22,250	22,250	26,047	28,600	30,000	105.3	200
	Tot.Prod.	'000 t.		57	60	68	78	89	101	112	143	160	105.3	267
3.	<u>Oil Seeds</u>													
	Area	'000 ha		41	50	50	50	50	50	50	50	50	122	100
	Yield/ha	kg		878	800	820	840	900	940	1,040	1,100	1,200	61.1	145
	Tot.Prod.	'000 t.		36	40	41	42	45	47	52	55	60	111.1	150
4.	<u>Vegetables</u>													
	Area	'000 ha		91	92	92	95	100	105	110	115	120	101.1	130.4
	Yield/ha	kg		7,187	7,830	8,000	9,000	9,200	9,300	9,400	9,500	9,600	108.9	123.6
	Tot.Prod.	'000 t.		654	720	736	855	920	977	1,034	1,092	1,152	110.1	160
	From which:													
	-Potatoes													
	Area	'000 ha		15	17	18	19	20	21	22	22	23	113.3	135
	Yield/ha	kg		10,000	11,441	11,500	12,000	12,580	13,619	14,000	15,182	16,000	115	139
	Tot.Prod.	'000 tons		150	194.5	207	228	2516	286	308	334	368	130.3	188
5.	<u>Fruits</u>													
	Area	'000 ha		135.3	140.3	141.3	141	142	145	147	150	153	105.7	145.5
	Yield/ha	kg		6,164	6,272	6,401	6,504	6,697	6,800	7,000	7,500	7,647	116.7	122.2
	Tot.Prod.	'000 t.		834	880	898	917	951	986	1,029	1,125	1,170	105.5	133.4

	1	2	3	4	5	6	7	8	9	10	11	12	13
From which:													
-Grape													
Area	'000 ha	70	70	70	70.1	70.5	71.5	73	75	76	100	114	
Yield/ha	kg	5,500	6,000	6,100	6,219	6,524	6,657	6,835	7,400	7,631	109.1	167	
Tot.Prod.	'000 t.	385	420	427	436	460	476	499	555	580	109.1	133.1	
-Citrus & Olive													
Area	'000 ha	-	3.3	3.3	3.9	4.3	4.6	5	5.2	5.6	-	170	
Yield/ha	kg	-	632	1,088	1,176	1,279	1,608	2,000	2,212	2,321	-	253	
Tot.Prod.	'000 t.	-	3.29	3.7	4.6	5.5	7.4	10	11.5	13	-	401	
6. Other Crops													
Area	'000 ha	66	75	76	76.5	81.5	85.1	105.1	117.0	127.5	113.6	170	
Yield/ha	kg	-	5,000	5,400	5,400	5,800	6,300	6,800	7,400	7,920	-	158	
Tot.Prod.	'000 t.	-	375	410	413	473	750	911	1,073	1,315	-	351	
TOTAL AREA	'000 ha	3,836.3	3,358.3	3,882.3	3,889	3,998.7	3,906.6	3,915.7	3,927.8	3,936.1	101.2	100	
B. Livestock													
1. Number of Animals in '000													
Total cow	'000	3,600	3,604	3,700	3,800	3,900	4,000	4,100	4,200	4,300	100.1	119.3	
From which:													
Milk Prod.	'000	1,080	1,081	1,100	1,140	1,170	1,200	1,260	1,320	1,350	100.1	124.9	
Sheep tot.	'000	21,400	20,471	21,200	21,510	22,070	22,810	23,770	25,110	25,900	95	126.8	
From which:													
Karakul	'000	6,400	6,000	6,198	6,300	6,456	6,696	6,954	7,398	7,572	94	126.2	
Total Goat	'000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	100	100	
2. Livestock Products													
Av. Milk/cow	kg	540	540	545	550	560	570	580	590	600	100	111.1	
Av. Wool/sheep	kg	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	100	100	
Total Meat	'000 t.	193.1	161.6	186.3	189.7	192.2	197.2	221.2	255.5	270	84	167.1	
From which:													
Cow Meat	'000 t.	71	61	62.3	64.5	66.2	68.2	91.5	98.6	106.7	86	174.9	
Sheep Meat	'000 t.	91	69	92.2	93.1	93.6	96.3	96.3	122.8	128.5	76	186.2	

	1	2	3	4	5	6	7	8	9	10	11	12	13
Goat Meat	'000 t.	25	25	25	25	25	25	25	25	25	25	100	100
Other Meats	'000 t.	6.1	6.6	6.8	7.1	7.4	7.7	8.3	9.1	9.8	108	148.5	
Milk Total	'000 t.	847	839	861	891	925	965	1,025	1,086	1,128	99	134	
From which:													
Goat, Sheep M.	'000 t.	264	255	261	264	270	281	294	307	318	96	124.7	
Cow Milk	'000 t.	583	584	600	627	655	684	731	779	810	100.2	119.5	
Karakul skin	'000 pelts	1,682	1,577	1,584	1,610	1,649	1,726	1,828	1,998	2,072	94	131.4	
Camel Leather	'000 pelts	648	553	566	586	602	620	832	896	970	85	175.4	
Sheep, Goat L.	'000 pelts	6,865	6,157	6,931	6,971	7,000	7,152	7,142	8,620	9,053	89.7	122.7	
Animal Casings	'000 C.	4,119	3,694	4,636	4,690	4,780	4,938	4,982	6,099	6,512	89.7	176.4	
Sheep wool	'000 t.	26	25	25.4	25.8	26.5	27.4	28.5	30.4	31.1	96	124.4	

Source: Afghanistan Ministry of Agriculture

AFGHANISTAN HORTICULTURAL SUBSECTOR SURVEY

PROJECTED COMMERCIAL EXPORTS DURING THE SEVEN-YEAR PLAN

1355 - 1361
(1976 - 1982)

V = US\$ million

No.	Commodities		1355	1356	1357	1358	1359	1360	1361	Total
1	Natural gas	'000 mil.M ³	2.5	2.4	2.1	2.1	2.6	3.3	3.1	18.1
		V:	40.250	38.640	33.810	33.810	41.860	53.130	49.910	291.410
2	Citrus	'000 tons	2.63	3.19	3.86	4.77	5.84	6.50	7.52	34.31
		V:	0.579	0.702	0.849	1.049	1.285	1.430	1.654	7.548
3	Lapis lazuli	'000 tons	2	2	2	2	2	2	2	14
		V:	0.800	0.800	0.800	0.800	0.800	0.800	0.800	5.600
4	Byrite	'000 tons	10	15	20	25	25	30	30	155
		V:	0.250	0.375	0.500	0.625	0.625	0.750	0.750	3.875
5	Fertilizer	'000 tons	10	14	-	-	-	-	-	24
		V:	1.170	1.638	-	-	-	-	-	2.808
6	Talk	'000 tons	6	9	12	15	15	17	18	92
		V:	0.240	0.360	0.480	0.600	0.600	0.680	0.720	3.680
7	Casings	'000 coils	2,200	2,250	2,300	2,350	2,400	2,450	2,500	16,450
		V:	2.002	2.047	2.093	2.138	2.184	2.230	2.275	14.969
8	Fresh fruits	'000 tons	152	156	162	168	175	191	195	1,199
		V:	34,200	35.100	36.450	37.800	39.375	42.975	43.875	269,775
9	Dried fruits	'000 tons	60	62	64	66	68	70	72	462
		V:	48.000	49.600	51.200	52.800	54.400	56.000	57.000	369.600
10	Oil seeds	'000 tons	11	11	11	11	11	11	11	77
		V:	4.500	4.500	4.500	4.500	4.500	4.500	4.500	31.500

Source: Afghanistan Ministry of Commerce

AFGHANISTAN HORTICULTURAL SUBSECTOR SURVEY

No.	Commodities		1355	1356	1357	1358	1359	1360	1361	Total
11	Leathers	1,000 pcs.	2,500	2,500	2,500	2,600	2,600	2,800	2,800	18,300
		V:	6.250	6.250	6.250	6.500	6.500	7.000	7.000	45.750
12	Karakul	1,000 pcs.	1,100	1,150	1,150	1,200	1,200	1,250	1,300	8,350
		V:	13.750	14.375	14.375	14.375	15.000	15.625	16.250	104.375
13	Wool	'000 tons	4.1	4.2	4.3	4.4	4.5	4.5	4.6	30.6
		V:	6.970	7.140	7.310	7.480	7.650	7.650	7.820	52.020
14	Gin cotton	'000 tons	40.1	44.7	50.5	56.1	60.8	65.5	76.3	394.0
		V:	52.130	58.110	65.650	72.930	79.040	85.150	99.190	512.200
15	Medicinal herbs	'000 tons	14.0	15.0	16.0	17.0	18.0	19.0	20.0	119.0
		V:	7.000	7.500	8.000	8.500	9.000	9.500	10.000	59.500
16	Carpet	1,000 m ²	560.0	580.0	600.0	630.0	650.0	650.0	680.0	4,350.0
		V:	20.720	21.460	22.200	23.310	24.050	24.050	25.160	160.950
17	Pustin & pustincha	1,000	70.0	75.0	80.0	85.0	90.0	95.0	100.0	595.0
		V:	0.770	0.825	0.880	0.935	0.990	1.045	1.100	6.545
18	Meat	'000 tons	-	0.5	2.00	3.00	4.00	5.00	6.00	20.500
		V:	-	1.00	4.00	6.00	8.00	10.00	12.00	41.000
19	Olive	'000 tons	0.50	0.71	0.850	2.4	4.2	5.58	5.9	20.140
		V:	0.400	0.568	0.680	1.920	3.360	4.464	4.720	16.112
20	Other commodities	V:	<u>6.000</u>	<u>6.500</u>	<u>7.000</u>	<u>7.500</u>	<u>8.000</u>	<u>8.500</u>	<u>9.000</u>	<u>52.500</u>
	TOTAL EXPORTS	V:	245.981	257.490	267.027	284.197	307.219	335.479	354.324	2,051.717

AFGHANISTAN HORTICULTURAL SUBSECTOR SURVEY

PROJECTED COMMERCIAL IMPORTS DURING THE SEVEN-YEAR PLAN

1355 - 1361
(1976 - 1982)

Q = 1,000 tons
V = US\$ million

No.	Commodity		1355	1356	1357	1358	1359	1360	1361	Total
1	Sugar	Q:	56.1	40.7	41.6	41.0	20.6	18.2	23.1	241.3
		V:	28.1	20.3	20.8	20.5	10.3	9.1	11.5	120.6
2	Tea	Q:	14.3	14.5	14.8	15.1	15.4	15.7	16.1	105.9
		V:	17.16	17.40	17.76	18.12	18.48	18.84	19.32	127.08
3	Vegetable Oil	Q:	7.6	3.3	4.9	3.5	2.3	2.1	2.8	26.5
		V:	5.32	2.31	3.43	2.45	1.61	1.47	1.96	18.55
4	Tobacco & its products	Q:								
		V:	1.0	2.0	2.0	2.0	2.5	2.5	2.5	15.5
5	Medicines	V:	8.0	8.0	8.5	8.5	9.0	9.5	10.0	61.5
6	Petroleum	Q:	215.7	84.9	9.5	23.8	148.2	163.7	320.0	965.8
		V:	28.7	11.3	1.3	3.2	19.7	21.8	42.6	128.6
7	Chemicals	V:	2.3	2.4	2.5	2.6	2.7	2.8	3.0	18.3
8	Tyres and tubes	V:	12.0	13.0	14.0	15.0	16.0	17.0	18.0	105.0
9	Textile	Mill.m	58.0	51.0	47.0	24.0	8.0	5.0	5.0	198.0
		V:	26.1	23.0	21.2	10.8	3.6	2.3	2.3	89.3
10	Building steel	V:	3.0	3.5	4.0	4.5	5.0	6.0	7.0	33.0
11	Stationery	V:	1.4	1.5	1.6	1.7	1.8	1.9	2.0	11.9

Source: Afghanistan Ministry of Commerce

AFGHANISTAN HORTICULTURAL SUBSECTOR SURVEY

No.	Commodity		1355	1356	1357	1358	1359	1360	1361	Total
12	Metals & their products	V:	5.0	6.0	7.0	8.0	9.0	10.0	11.0	56.0
13	Vehicles & machines	V:	26.28	25.75	29.61	32.16	39.80	29.08	29.02	201.70
14	Bicycle	V:	0.6	0.6	0.7	0.7	0.8	0.9	1.0	5.3
15	Used textiles	V:	4.7	4.9	5.1	5.3	5.5	5.7	6.0	37.2
16	Footwear	V:	1.5	1.8	2.0	2.2	2.4	2.6	3.0	15.5
17	Silk & woolen textiles	V:	1.0	1.0	1.0	0.5	0.5	0.5	0.5	5.0
18	Rayon	V:	13.0	13.5	14.0	14.0	15.0	15.5	16.0	101.0
19	Spares	V:	9.0	9.8	9.7	10.4	12.6	13.0	13.7	78.2
20	Soap	V:	4.0	4.0	3.7	3.7	3.5	3.5	3.5	25.9
21	Leather	V:	0.2	0.2	0.2	0.3	0.3	0.3	0.3	1.8
22	Fertilizer	Q:	-	41.8	58.8	95.8	138.8	189.8	242.8	767.8
		V:	-	12.6	16.3	23.4	31.5	41.5	51.6	176.9
23	Other commodities	V:	<u>60.0</u>	<u>62.0</u>	<u>64.0</u>	<u>66.0</u>	<u>68.0</u>	<u>70.0</u>	<u>70.0</u>	<u>460.0</u>
TOTAL IMPORTS			259.36	246.86	250.4	256.03	269.59	285.79	325.80	1,893.83

ANNEX 3

Trade

Table of Contents

Appendix 1	Direction of Afghanistan Exports to Principal Regions
Appendix 2	Afghanistan Export Duties and Customs Structure
Appendix 3	Custom House and Border Station Locations
Appendix 4	Afghanistan Horticultural Export Trade Data
Table 1	Direction of Afghanistan Horticultural Exports by Country and Commodity; 1972-1976
Table 2	Foreign Market Shares of Afghanistan Horticultural Exports by Country and Commodity; 1972-1976
Table 3	Regional Distribution of Afghanistan Horticultural Exports; 1972-1976
Table 4	Regional Distribution of Afghanistan Fresh and Dried Fruit and Nut Exports; 1972-1976
Table 5	Direction of Afghanistan Horticultural Exports by Commodity Group; 1972-1976
Table 6	Afghanistan Commercial Imports; 1968-1975
Table 7	Afghanistan Commercial Exports; 1968-1975

Direction of Afghanistan Exports to Principal Regions

India and Pakistan. India and Pakistan are by far the most important outlets for Afghanistan's fresh, dried and nut exports. The region accounts for about 70% of the volume and value of Afghan horticultural exports.

Table 1
Significance of India and Pakistan for Afghanistan Horticultural Exports
(000 Afs)

<u>Commodity Group</u>	<u>Destination</u>	<u>India</u>	<u>Pakistan</u>	<u>Region</u>	<u>Region as Percentage of Commodity Group Exports</u>
<u>Fresh Fruit</u>					
1972/73		485,273	322,282	807,555	99.5
1973/74		274,376	869,063	1,143,439	97.1
1974/75		628,945	897,917	1,526,862	84
1975/76		NA	NA	NA	NA
					Annual Av. 90
<u>Nuts</u>					
1972/73		665,943	3,720	669,663	57
1973/74		382,019	143,860	528,879	52
1974/75		628,001	159,126	787,127	55
1975/76		NA	NA	NA	NA
					Annual Av. 55
<u>Dried Fruit</u>					
1972/73		974,091	35,096	1,009,187	71
1973/74		747,821	168,331	916,152	47
1974/75		846,194	230,639	1,076,833	47
1975/76		NA		NA	NA
					Annual Av. 55

As Table 1 indicates, the region annually imports about 90% of the value of Afghanistan's fresh fruits; 55% of nuts, (mostly almonds and pistachios), and 55% of dried fruits in the last four years. Of the two markets, Pakistan is the larger importer of fresh fruit, but India is the larger importer of nuts and dried fruit.

The region also accounts for a sizeable share of Afghanistan lico-rice root exports, although it has ranked third behind U.S. and Japan in terms of total volume since 1972/73. Horticultural prices in both markets, but especially India, are generally the highest among the different regions.

Despite the importance of the Indian market, volume and value of Afghan exports to India have fluctuated considerably, particularly nuts. While there has been steady growth in the volume and value of Pakistan's grape and raisin imports from Afghanistan, volume and value of other fresh fruit exports to Afghanistan have fluctuated. Despite large increases in melon and pomegranate exports to Pakistan between 1972 and 1973, the later trend has been declining and unstable. Among the drief fruit, the volume and value of sales to Pakistan have grown, but to date there have been sharp declines in volume and values to India.

Eastern Europe and China - Barter Zone. The USSR, Czechoslovakia, Poland, Bulgaria, Yugoslavia and Mainland China comprise the barter zone with which Afghanistan trades. Major agricultural exports to these countries have consisted of cotton, wool, dried fruits and nuts, hides and oilseeds. Sugar and cotton fabrics, along with industrial and other manufactured goods, have been among the more significant imports from this zone.

Table 2
Significance of Barter Zone for Afghanistan Horticultural Exports
(000 Afs)

<u>Com-</u> <u>modity</u> <u>Group</u>	<u>Desti-</u> <u>nation</u>	<u>Russia</u>	<u>China</u>	<u>Yugo-</u> <u>slavia</u>	<u>Czecho-</u> <u>slovakia</u>	<u>Barter</u> <u>Region</u> <u>Total</u>	<u>Region as %</u> <u>of Total</u> <u>Commodity</u> <u>Group Exports</u>
<u>Fresh</u>							
<u>Fruit</u>							
1972/73		2,389	-	-	-	2,389	= /1
1973/74		33,183	-	-	288	33,471	2.8
1974/75		46,268	-	-	-	46,268	2.5
1975/76		NA	-	-	-	NA	NA
							Annual Av. 2.5
<u>Nut</u>							
1972/73		175,965	73	-	34,264	210,302	18
1973/74		293,616	-	-	5,411	299,027	30
1974/75		304,332	129	-	15,272	319,733	22
1975/76		NA	-	-	NA	NA	NA
							Annual Av. 23
<u>Dried</u>							
<u>Fruit</u>							
1972/73		204,403	77,289	-	10,190	291,882	21
1973/74		639,708	210,852	-	13,086	863,646	44
1974/75		700,116	172,112	-	9,803	882,031	38
1975/76		NA	NA	NA	NA	NA	NA
							Annual Av. 34

/1 = (less than 1%).

As Table 2 indicates, the barter region accounts for 2 percent of the value of Afghanistan fresh fruit exports, 23% of the value of nut exports, and 34% of the value of dried fruit exports. Prices in barter zone countries (notably Russia, Czechoslovakia and China) are generally lower than in India and Pakistan but so are quality standards. While barter zone share of Afghanistan nut exports has been relatively constant in the last four years (1972/73-1975/76), the volume of raisin and dried apricot exports to Russia doubled from 1972/73 to 1973/74 while raisin prices also increased about 68%. Since 1973/74, value and volume of Afghan raisin exports to Russia have been constant or declining.

Czechoslovakia and China are the two other major dried fruit importers in the barter zone. Although Czechoslovakia imports both raisins and apricot kernels, the total value of dried fruit imports from Afghanistan has been relatively constant. Volume of raisin imports from Afghanistan has steadily fallen while raisin prices have almost doubled over the four year period. Apricot nut volume and prices have fluctuated. China imports only raisins from the dried fruit category. Volume of raisin imports, slightly lower than quota levels, has been rather constant but prices, and therefore value, have fluctuated considerably.

Table 3
Significance of Middle East for Afghan Horticultural Exports
(000 Afs)

Com- modity Group	Desti- nation	Saudi Arabia	Iran	Syria	Iraq	Kuwait	Lebanon	Barter Region Total	Region as % of Total Commod- ity Group Exports
<u>Fresh</u>									
<u>Fruit</u>									
1972/73		-	9	-	-	710	166	885	= /1
1973/74		-	59	-	-	-	128	187	=
1974/75		-	243,737	-	-	-	-	243,737	13
1975/76		NA	NA	NA	NA	NA	NA	NA	=
								Annual Av.	=
<u>Nuts</u>									
1972/73		1,045	-	1,727	4,208	-	128,663	135,643	12
1973/74		-	4,673	3,147	-	-	124,550	132,380	13
1974/75		2,937	7,376	6,960	1,747	346	199,325	218,691	15
1975/76		NA	NA	NA	NA	NA	NA	NA	NA
								Annual Av.	11
<u>Dried</u>									
<u>Fruit</u>									
1972/73		82	-	-	9,979	79	1,138	11,278	1
1973/74		-	-	-	333	63	-	22,156	1
1974/75		-	213	-	-	87	6,801	7,434	=
1975/76		NA	NA	NA	NA	NA	NA	NA	NA
								Annual Av.	1.0

/1 = (less than 1%).

As shown in Table 3, the region accounts for 11% of Afghanistan's nut exports, 1% of dried fruit exports and less than 1% of Afghanistan's fresh fruit exports. Iran is the largest market for fresh fruit received through a government negotiated goodwill offer while Lebanon is the large nut and dried fruit market with more than 90% of the regions nut imports from Afghanistan.

Prices of Afghan horticultural commodities in this region tend to be lower for dried fruits than in barter zone or India and Pakistan; nut prices are lower than in Indian markets, but competitive with the other import markets.

The fresh fruit prices in Iran are also competitive. Given the sizeable increase in oil-based revenues to many of these countries there appears to be ample scope for increased Afghan exports to the region (excluding Lebanon) if transportation and market contact barriers can be overcome.

EEC

The EEC is significant as a market for Afghanistan exports in terms of only one commodity group - dried fruit.

Table 4
Significance of EEC Zone for Afghan Horticultural Exports
(000 Afs)

<u>Commodity Group</u>	<u>Destination</u>	<u>EEC</u>	<u>Region as % of Total Commodity Group Exports</u>
<u>Fresh Fruit</u>			
1972/73		-	-
1973/74		3	= /1
1974/75		3	=
1975/76		-	-
			Annual Av. =
<u>Nuts</u>			
1972/73		90,389	8
1973/74		27,763	3
1974/75		9,777	=
1975/76		NA	NA
			Annual Av. 5
<u>Dried Fruit</u>			
1972/73		96,048	7
1973/74		111,932	6
1974/75		342,879	15
1975/76		NA	NA
			Annual Av. 9

/1 - (Less than 1%).

It has a 9% share of the value of Afghanistan dried fruit exports, and 5% of Afghan nut exports. It is too far, distance wise, to be of any significance for fresh fruit. However, Afghanistan has about 3% of the volume of EEC's dried fruit (principally raisin) imports and 2% of EEC's nut

imports. 1/ Its trade with the EEC appears to be stagnant or declining because it must compete with Turkey, Greece and Iran, also major sources of EEC imports who all have tariff concessions and are closer geographic locations to these markets. Prices of Afghan produce in these markets, however, appear to be competitive with the other regions.

Other Regions. Afghanistan exports sizeable quantities of licorice roots to US and Japan which account annually for about 46% and 15% of the share of the volume of Afghanistan's licorice root exports respectively. Other horticultural exports to these countries are negligible. Afghanistan also exports raisins to other Western European countries, but their share of Afghanistan exports is not determined.

Summary Trends in Afghanistan Exports to Major Markets. In summary, there is a marked contrast in recent trends of Afghanistan horticultural exports to principal import markets. Volumes and values of fresh and dried fruit and nuts to India have all experienced considerable fluctuations which merit further investigation. However, there has been a steady growth of exports to Pakistan despite political problems between it and Afghanistan and the absence of a bilateral trade agreement. Exports to Russia increased considerably from 1972/73 to 1973/74 stimulated by higher quotas in the 1974 agreement, but have stabilized thereafter. The volume of raisins, the principle export to China, has stabilized around the quota levels, but value has fluctuated considerably. Exports of nuts and dried fruit to the EEC have also fluctuated or declined. Sales to the Middle East have exhibited sharp variations. With the problems in Lebanon no doubt further declines will be experienced this year which could hurt revenues from Afghanistan nut exports.

The mission examined the question of whether changes in domestic production and consumption might have contributed to fluctuations in exports to India and Russia.

1/ 1% of Belgian imports, 5% of Netherlands, and 5% of United Kingdom as reported in 1973 EEC trade statistics.

Table 5
Afghanistan Fruit and Vegetable Production, Exports and Consumption

<u>Fruits</u>	<u>Production</u> 000 tons	<u>Net Exports</u> 000 tons	<u>Consumption</u> 000 tons
1966/67	872	98	774
1967/68	826	103	723
1968/69	834	NA	NA
1969/70	842	98	744
1970/71	809	108	701
1971/72	850	110	740
1972/73	820	119	701
1973/74	840	146	694
1974/75	865	189	676

<u>Vegetables</u>	<u>Production</u> 000 tons	<u>Net Exports</u> 000 tons	<u>Consumption</u> 000 tons
1966/67	590	.4	589.6
1967/68	638	.3	637.7
1968/69	654	NA	NA
1969/70	671	2.8	668.2
1970/71	826	.6	625.4
1971/72	725	.5	724.5
1972/73	658	1.5	656.5
1973/74	680	2.4	677.6
1974/75	700	-	700.0

However, as Table 5 indicates, on the basis of aggregated data which are available, domestic production has been relatively constant in the last nine years, while total exports have increased and domestic consumption has fallen. Given Afghanistan's rate of population growth (2.5% per annum), and increasing consumer demand, it might not be unreasonable to assume that some exports may be diverted onto the domestic market. However, since Indian import prices are the highest and they are well above domestic prices, it is unlikely that this market would suffer from such changes.

EXPORT DUTY AND CUSTOMS STRUCTURE

Virtually all commodities exported from Afghanistan are subject to an export duty. This nominal tax is assessed on the basis of a percentage rate applied to a fixed value per unit (kg) exported. As Table 4.2 indicates, average tariff rates among fresh and dried fruits, vegetables, and nuts range from lower duties on dried fruits and nuts to higher rates on fresh fruit.

Table 1
Table 4.2 - Export Duties on Horticultural Commodities

	<u>Rate %</u>	<u>Unit Price in Afs</u>
<u>Fresh Fruits</u>		
1. Grapes (All types)	25	1
2. Apples	25	1
3. Apricots	20	1
4. Pomegranates	35	1
5. Melons	20	1.5
6. Watermelons	20	
<u>Dried Fruits</u>		
1. Dried Apricots	25	34
2. Dried Apricots	25	1.5
3. Green Raisins (uncleaned)	25	7
4. Green Raisins (cleaned)	25	5
5. Red Raisins (cleaned)	25	5
6. Red Raisins (cleaned)	25	3
7. Black Raisins (uncleaned)	25	5
8. Black Raisins (cleaned)	25	3
<u>Nuts</u>		
1. Almonds, Soft shell, unshelled	25	25
2. Almonds, hard shell, unshelled	25	15
3. Almonds, shelled	25	8
4. Walnuts, unshelled	25	7
5. Walnuts, shelled	25	20
6. Pistachios, unshelled, opened and closed	25	8
7. Pistachios, shelled	25	15
8. Apricots kernels, unshelled	25	7
9. Apricot kernels, shelled	25	10
<u>Medicinal Herbs</u>		
1. Licorice Roots	15	3
2. Medicinal Roots	15	4
3. Asafoetida	15	30

In addition to these duties, Afghanistan has several other taxes. Along with the export duty there is a further service charge of two percent. This levy is based on the unit price for export purposes plus the duty itself. Both this tax and duty are intended to generate public revenue, and they average together about 3-4% of f.o.b. value of Afghan exports (excluding natural gas).

Other taxes applicable to some or all exports are the red crescent tax, which is one percent of the customs duty and one percent of the service charge; monopoly and luxury taxes applied on a compound basis to above taxes successively and an income tax which is four percent on the value of the duty and other assessed taxes. Most businesses, including trading concerns, are exempt from the income tax for the first ten years. A transit fee through Iran of \$2.00 per ton is also authorized where applicable. The lower the duty rate, the greater the importance of these other taxes. Example of tariff structure:

Table 2

Grapes

Ex. A. Value ~ 100,000 Afs (assuming 1 Af per kg and that good weighs 1000 Kg)
100 tons are being shipped:
1000 Afs/ton x 100 tons = 100,000 Afs
Fob value is 10,000 Afs per ton or 1,000,000 Afs

B. Duty - 25%

1.	25,000 Afs	<u>Duty</u>
2.	500 Afs	<u>Service Charge</u>
3.	250 Afs	<u>Red Crescent Tax</u>
	5 Afs	
4.	4,000	<u>Income Tax</u>
	1,000	
	20	
	<u>10.2</u>	

Total 30,185.2

Combined rate is 30.2%. Duty share as a percentage of total rate is 82.8%.
Tax rate as percentage of total is 18.2%. Total duties comprise 3% of fob value.

Exporting from Afghanistan involves several steps and types of control. Commodities destined for export must be taken physically to a customs house for clearance. There are eight main custom houses and ten border stations in Afghanistan including a central office in Kabul and major branches in Kandahar and Herat. There are 1 main custom house and 3 small stations on the

Russian border alone. 1/ Two trade agencies, in Pashawar and Quetta represent Afghan exporters in Pakistan. The Da Afghanistan Bank has branches at custom houses to expedite the assessment and payment of duties and other taxes. Goods are also inspected and assessment forms are prepared to identify goods and document duty and other taxes, offsetting some of the inconvenience in bringing consignments to the houses. For goods destined to USSR, Iran, or Pakistan, a transit permit is obtained at the customs houses. Traders pay taxes when goods pass the Afghan border. Payment must be made within fifteen days or a one percent per month storage charge is assessed (demurrage). After ten days, storage fees double and triple after twenty days. On the import side, traders must receive goods within three months, or they will be confiscated.

Foreign exchange surrender regulations impose a tax on gross income earned for exporting certain goods. Exporters are required by law to sell their foreign exchange earning to the Da Afghanistan Bank or other banks by signing an agreement when goods are brought to customs houses. Despite this regulation, however, there is little control of currency flows. Proceeds are sold at free market rates to local banks, or used by exporters or a third party to cover imports.

1/ See Annex 3, Appendix 3 for list of custom house locations.

Custom Houses and Border Station Locations

Custom Houses (8)

Kabul
Kandahar
Herat
Jalalabad
Mazar-i-Sharif
Paktya
Kunduz
Eslamqal'a

Other Stations

Kabul (2); 1 at airport and one in parcels dept.
Spin Boldak
Segham
Klift
Khwahan

DIRECTION OF AFGHANISTAN HORTICULTURAL EXPORTS

MARKETS Commodity	India		Pakistan		USSR		China		Czechoslovakia		Saudi Arabia		Iran		Lebanon		Kuwait		Iraq		Syria		EEC		Total	Total	
	Quantity (Tons)	Value (000 Af\$)	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value	
(Tons) (000 Af\$)																											

Source: Central Statistics Office, Foreign Trade Statistics, Annual Editions 1972-1974, 1975-1976 Figures Unpublished

= less than one ton

FOREIGN MARKETS SHARE OF AFGHANISTAN HORTICULTURAL EXPORTS

		India		Pakistan		USSR		China		Czechoslovakia		Saudi Arabia		Iran		Lebanon		Kuwait		Iraq		Syria		FEC	
		Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based	Quantity Based	Value Based
Fresh Fruit	Grapes	1972/1973	71	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	29	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	44	66	-	-	-	-	-	-	-	-	-	3	5	-	-	-	-	-	-	-	-	-	-
		1975/1976	40	78	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
		Annual Average	46	65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apricots	Apricots	1972/1973	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pomegranates	Pomegranates	1972/1973	88	9	6	3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	57	63	25	20	18	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	51	55	18	10	20	14	-	-	-	-	-	21	21	-	-	-	-	-	-	-	-	-	-
		1975/1976	54	61	15	17	24	22	-	-	-	-	-	6	6	-	-	-	-	-	-	-	-	-	-
		Annual Average	60	66	17	14	16	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Melons	Melons	1972/1973	-	99	98.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	-	99	98.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	-	99	98.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	99	98.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	-	99.8	99.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Citrus	Citrus	1972/1973	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	-	-	-	10	56	-	-	-	-	-	-	90	96	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	-	-	67	33	43	-	-	-	-	-	61	70	-	-	-	-	-	-	-	-	-	-
		Annual Average	-	-	-	39	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apples	Apples	1972/1973	-	99.6	99.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	-	99.9	99.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	-	100	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	-	99.8	99.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dried Fruit	Raisins	1972/1973	46	68	3	2	14	6	-	1	.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	49	90	10	8	34	11	-	1	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	24	37	10	9	40	10	-	1	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	25	44	15	15	45	12	-	1	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	25	44	10	9	38	11	-	1	.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dried Apricots	Dried Apricots	1972/1973	42	74	18	7	21	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	13	45	36	31	41	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	9	24	52	41	37	29	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	21	48	35	24	33	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Almonds	Almonds	1972/1973	73	79	-	17	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	13	63	39	21	34	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	36	63	46	19	31	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	16	43	62	39	22	17	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	35	62	37	20	26	13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pistachios	Pistachios	1972/1973	94	67	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	16	30	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	19	32	7	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	16	32	14	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	26	42	7	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Walnut	Walnut	1972/1973	-	-	-	79	80	-	-	15	15	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	-	-	-	94	98	-	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1974/1975	-	-	-	93	88	-	-	3	3	-	-	1	4	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	-	-	82	74	-	-	3	3	-	-	1	5	-	-	-	-	-	-	-	-	-	-
		Annual Average	-	-	-	85	85	-	-	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apricot Nuts & Kernels	Apricot Nuts & Kernels	1972/1973	20	29	3	1.5	-	-	-	2	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1973/1974	12	31	23	26	3	-	-	3	3	-	-	22	2	-	-	-	-	-	-	-	-	-	-
		1974/1975	22	30	10	3	29	10	-	3	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		1975/1976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Annual Average	18	30	12	10	11	3	-	3	2	-	-	7	-	-	-	-	-	-	-	-	-	-	-

= less than 1%

REGIONAL DISTRIBUTION OF AFGHANISTAN HORTICULTURAL EXPORTS

		India-Pakistan				Barter Zone				Middle-East				EEC				Total Exports	
		Quantity	Value	Share of Total Exports(%) (Quantity Based)	(Value Based)	Quantity	Value	Share of Total Exports(%) (Quantity Based)	(Value Based)	Quantity	Value	Share of Total Exports(%) (Quantity Based)	(Value Based)	Quantity	Value	Share of Total Exports(%) (Quantity Based)	(Value Based)	Quantity	Value
<u>Fresh Fruit</u>																			
Grapes	1972-1973	36,916	618,496	99.9	99	--	--	--	--	13	166	=	=	--	--	--	--	36,929	618,663
	1973-1974	32,987	497,238	100	100	--	--	--	--	--	--	--	--	--	--	--	--	32,987	497,238
	1974-1975	54,782	1,011,582	96.4	94	65	831	=	=	1,934	54,176	3	5	--	--	--	--	56,781	1,066,590
	1975-1976	62,220	977,413	99.8	99	--	--	--	--	96	1,408	=	=	--	--	--	--	62,316	978,821
Apricots	1972-1973	916	6,422	100	100	--	--	--	--	--	--	--	--	--	--	--	--	915	6,422
	1973-1974	1,622	19,722	100	100	--	--	--	--	--	--	--	--	--	--	--	--	1,622	19,722
	1974-1975	2,583	54,731	100	100	--	--	--	--	--	--	--	--	--	--	--	--	2,385	54,731
	1975-1976																		
Pomegranates	1972-1973	7,031	47,582	96	92	200	2,309	2	54	709	=	1	--	--	--	--	--	7,286	51,285
	1973-1974	10,037	169,552	82	83	2,246	33,471	17	16	--	--	--	--	=	3	=	=	12,553	203,027
	1974-1975	7,836	191,141	59	64	2,576	40,574	19	13	2,795	62,533	21	21	=	3	=	=	13,208	294,281
	1975-1976	10,492	187,320	76	78	3,256	51,860	24	21	1	16	=	=	--	--	--	--	13,749	239,197
Melons	1972-1973	20,083	72,646	100	100	--	--	--	--	--	--	--	--	--	--	--	--	20,083	72,646
	1973-1974	39,620	411,908	99	99	--	--	--	--	14	128	=	=	--	--	--	--	39,635	412,036
	1974-1975	36,146	149,673	100	100	--	--	--	--	--	--	--	--	--	--	--	--	36,146	149,673
	1975-1976	38,286	133,876	99	99	--	--	--	--	46	573	=	=	.4	--	--	--	38,331	134,449
Citrus	1972-1973	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1973-1974	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	1974-1975	2	33	=	=	552	4,863	9	3	5,074	127,028	90	96	--	--	--	--	5,673	131,924
	1975-1976	--	--	--	--	2,175	34,335	67	57	1,067	26,171	32	43	--	--	--	--	3,242	60,506
Apples	1972-1973	5,672	62,409	99	99	--	--	--	--	=	10	=	=	--	--	--	--	5,673	62,419
	1973-1974	4,035	45,019	99	99	--	--	--	--	3	59	=	=	--	--	--	--	4,038	45,078
	1974-1975	5,517	119,702	100	100	--	--	--	--	--	--	--	--	--	--	--	--	5,517	119,702
	1975-1976																		
<u>Dried Fruit</u>																			
Raisins	1972-1973	17,212	893,125	49	70	12,841	271,410	37	21	204	4,172	1.0	=	4,551	95,763	13	8	35,167	1,272,115
	1973-1974	10,509	845,860	27	45	21,535	844,472	56	45	604	18,823	2.0	1.0	4,819	111,872	13	6.0	38,608	1,870,546
	1974-1975	14,358	1,010,835	34	46	21,354	852,764	51	39	23	835	=0.05	.03	6,247	342,353	15	16	42,106	2,211,621
	1975-1976	9,905	696,467	27	46	20,871	638,009	57	42	31	1,135	=0.1	0.1	4,790	135,696	13	9.0	36,403	1,504,665
Dried Apricots	1972-1973	2,436	116,062	64	80	788	20,472	21	14	557	7,106	15	5	16	285	= .4	= .2	3,827	144,425
	1973-1974	1,411	70,292	49	76	1,168	19,174	41	21	290	3,333	10	4	6	60	= .2	= .1	2,878	92,872
	1974-1975	2,290	65,998	61	65	1,378	29,267	31	29	47	6,599	1	6	19	526	= .5	= .5	3,735	102,390
	1975-1976																		
<u>Nuts</u>																			
Almonds	1972-1973	3,316	422,149	73	80	781	14,129	17	3	135	20,325	3.0	4	291	42,449	6	8	4,528	52,293
	1973-1974	1,930	367,028	52	84	1,277	70,150	34	16	--	--	--	--	6	69	=	=	3,722	437,641
	1974-1975	4,133	566,968	71	82	1,805	120,029	28	17	25	3,630	= .4	= .5	2	269	=	= .03	5,766	690,957
	1975-1976	4,949	287,607	78	61	1,376	80,518	22	17	34	3,591	0.5	0.8	17	2,139	.3	.5	6,384	473,947
Pistachios	1972-1973	804	209,958	54	66	5	73	=	=	610	97,774	41	31	39	5,513	3	2	1,481	319,067
	1973-1974	284	81,509	24	39	--	--	--	--	863	123,678	72	59	51	3,146	4	1.5	1,203	208,823
	1974-1975	422	151,196	25	44	26	6,254	2	2	1,259	184,986	74	54	2	348	= .1	= .1	1,710	342,784
	1975-1976	212	65,324	30	47	--	--	--	--	133	30,861	19	19	6	1,391	.8	.9	708	160,034
Walnuts	1972-1973	--	--	--	--	5,561	192,675	95	95	41	2,961	1	1.5	2	142	=	=	5,879	201,904
	1973-1974	--	1	=	=	6,026	220,917	99	99	27	1,468	0.4	1	8	216	=	=	6,061	222,603
	1974-1975	--	--	--	--	4,722	169,612	96	91	178	16,961	3.6	9	2	65	=	=	4,902	186,639
	1975-1976	11	185	=	=	3,755	136,260	91	79	369	35,274	8.9	21	=	=	=	=	4,133	171,796
Apricot nuts/kernels	1972-1973	315	37,556	23	31	30	3,425	2	3	238	14,583	18	12	519	42,285	38	35	1,363	122,257
	1973-1974	520	77,341	35	51	85	7,472	6	6	395	7,234	27	5	275	24,332	18	18	1,491	135,407
	1974-1975	227	68,963	32	33	239	23,838	33	11	63	13,114	9	6	124	9,095	17	4	716	208,281
	1975-1976																		

= less than 1% or 10 tons

REGIONAL DISTRIBUTION OF AFGHANISTAN FRESH AND DRIED FRUIT AND NUT EXPORTS

Commodity Groups	<u>India & Pakistan</u>				<u>Barter Zone</u>				<u>Middle-East</u>				<u>EEC</u>				<u>Total Exports</u>	
	<u>Quantity</u>	<u>Value</u>	<u>Percentage</u> (Quantity Base)	<u>Percentage</u> (Value Base)	<u>Quantity</u>	<u>Value</u>	<u>Percentage</u> (Quantity Base)	<u>Percentage</u> (Value Base)	<u>Quantity</u>	<u>Value</u>	<u>Percentage</u> (Quantity Base)	<u>Percentage</u> (Value Base)	<u>Quantity</u>	<u>Value</u>	<u>Percentage</u> (Quantity Base)	<u>Percentage</u> (Value Base)	<u>Quantity</u>	<u>Value</u>
1. Fresh Fruit																		
1972-73	70,618	807,555	99.6	99.5	200	2,339	=	=	67	885	=	=	-	-	-	-	70,887	811,435
73-74	88,511	1,143,439	97.5	97.1	2,246	33,471	2.5	2.8	17	187	=	=	=	3	=	=	90,835	1,177,101
74-75	106,866	1,526,862	89.1	84	3,193	46,268	2.7	2.5	9,803	243,737	8.2	13.4	=	3	=	=	119,863	1,816,871
75-76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2. Dried Fruit																		
1972-73	19,648	1,009,187	50.4	71.2	13,629	291,882	35	20.6	761	11,278	2	1	4,567	96,048	12	6.8	38,994	1,416,567
73-74	11,920	916,152	28.7	47.1	22,703	863,646	54.7	44.4	894	22,156	2.2	1.1	4,825	111,932	11.6	5.8	41,486	1,943,418
74-75	16,648	1,076,833	36.3	46.5	22,732	882,031	49.6	38.1	70	7,434	=	=	6,266	342,879	13.7	14.8	45,841	2,314,011
75-76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3. Nuts																		
1972-73	4,435	669,663	33.5	57.1	6,377	210,302	48.1	18	1,024	135,643	7.7	11.6	851	90,389	2.6	7.7	13,257	1,473,521
73-74	2,734	525,879	21.9	52.3	7,393	299,027	59	29.7	1,285	132,380	10.3	13.2	340	27,763	2.7	2.8	12,477	1,004,474
74-75	4,782	787,127	36.5	55.1	6,592	319,733	50	22	1,525	218,691	12	15	130	9,777	=	=	13,094	1,428,661
75-76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
4. Total Fruits & Nuts																		
1972-73	94,701	2,486,405	76.9	73.1	20,206	504,573	16.4	14.8	1,852	147,806	1.5	4.3	5,418	186,437	4.4	5.5	213,135	3,401,523
73-74	103,225	2,585,470	71.3	60.7	32,342	1,196,144	22.3	28.1	2,196	154,723	1.5	3.6	5,165	139,698	3.6	3.3	144,738	4,124,993
74-75	128,296	3,390,822	71.8	61	32,517	1,248,032	18.2	22.3	11,398	469,862	6.4	8.5	6,396	352,659	3.6	6.3	178,798	5,559,543
75-76	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA not available

DIRECTION OF AFGHANISTAN HORTICULTURAL EXPORTS BY COMMODITY GROUP

Commodity		India		Pakistan		USSR		China		Czechoslovakia		Saudi Arabia		Iran		Lebanon		Kuwait		Iraq		Syria		BEC		Total Exports	
		Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)	Quantity (tons)	Value (000 Afr)
A. Quantity and Value of Exports																											
1. Total Fresh Fruits	1972-73	25,315	439,273	44,803	322,282	200	2,389	---	---	---	---	---	---	6	9	13	166	54.04	709.6	---	---	---	---	---	---	70,887	811,435
	73-74	17,747	274,376	70,826	869,063	2,226	33,183	---	---	20	288	---	---	3	59	14	128	---	---	---	---	---	---	---	3	90,835	1,177,131
	74-75	22,573	628,945	34,193	897,917	1,193	46,268	---	---	---	---	---	---	9,803	243,737	---	---	---	---	---	---	---	---	---	3	119,863	1,816,871
	75-76	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
2. Total Dried Fruits	1972-73	17,992	974,091	1,656	---	9,228	204,403	3,912	77,289	489	10,193	---	4	02	---	85	1,138	4	79	688	9,979	---	---	4,567	96,048	38,994	1,416,567
	73-74	7,785	747,821	4,135	---	17,992	439,708	4,230	210,852	483	13,076	---	---	---	---	---	---	4	63	890	22,093	---	---	4,825	111,932	41,486	1,943,418
	74-75	10,528	846,194	6,120	---	18,298	700,116	4,240	172,112	234	9,803	---	---	9	213	41	6,871	5	87	15	333	---	---	6,246	342,879	45,841	2,314,011
	75-76	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
3. Total Nuts	1972-73	4,379	669,343	56	3,720	5,449	---	5	73	993	34,264	13	1,045	---	---	---	128,663	---	---	34	4,208	12	1,727	851	90,389	13,257	1,173,521
	73-74	891	332,019	1,883	143,860	7,259	---	---	---	134	5,411	---	---	343	4,673	4,673	124,560	---	---	---	---	31	3,147	340	27,763	12,477	1,004,474
	74-75	2,393	628,001	2,389	159,126	6,383	---	1	129	208	15,278	33	2,937	67	7,376	7,376	199,325	4	346	12	1,747	47	6,950	130	9,777	13,094	1,428,661
	75-76	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
4. Total Fruits & Nuts	1972-73	48,186	2,125,307	46,515	364,998	14,877	---	3,917	77,362	1,412	44,454	17	1,127	6	9	1,063	129,967	58	7,886	702	14,187	12	1,727	5,418	186,437	123,138	3,401,523
	73-74	26,383	1,404,216	76,842	1,181,254	27,475	---	4,230	210,852	617	18,785	---	---	346	4,732	925	124,688	4	63	890	22,093	31	3,147	5,166	139,698	144,738	4,124,993
	74-75	35,594	2,103,140	92,702	1,287,682	27,834	---	4,241	172,241	442	25,075	33	2,937	9,879	251,326	1,433	206,126	9	433	26,7	2,080	47	6,960	6,396	352,659	178,198	5,559,343
	75-76	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
B. Shares of Total Exports (%)																											
1. Fresh Fruits	1972-73	36.4	99.8	63.2	39.7	00.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	73-74	14.8	23.3	77.9	73.8	02.4	2.8	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
	74-75	18.9	34.6	70.2	49.4	02.6	2.5	---	---	---	---	---	---	8.2	13.4	---	---	---	---	---	---	---	---	---	---	---	---
2. Dried Fruits	1972-73	46.1	68.8	04.2	2.5	23.6	14.2	10.0	5.5	01.2	1	---	---	---	---	---	---	---	---	1.7	1	---	---	---	11.7	6.4	
	73-74	18.7	38.5	09.9	8.7	43.3	32.9	10.1	10.9	01.1	1	---	---	---	---	---	---	---	---	2.1	1.1	---	---	---	11.6	5.8	
	74-75	22.9	36.6	13.3	10	39.8	30.1	09.2	7.4	00.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13.7	14.8	
3. Nuts	1972-73	33.0	56.7	00.4	---	41.1	15	---	---	06.9	2.9	---	---	---	---	7	---	---	---	---	---	---	---	---	6.4	7.7	
	73-74	06.8	38.0	15.0	14.3	58.1	26.2	---	---	01.0	---	---	---	2.7	---	7.3	---	---	---	---	---	---	---	---	2.7	2.3	
	74-75	13.2	44	18.2	11.1	48.7	21.3	---	---	01.3	4	---	---	---	---	10.6	---	---	---	---	---	---	---	---	1	---	
4. Total Fruits & Nuts	1972-73	39.1	62.5	37.8	10.6	12.1	11.3	03.2	2.3	01.1	1.3	---	---	---	---	1,063	3.8	---	---	1	---	---	---	---	4.4	5.5	
	73-74	18.2	34	53.0	---	18.6	24.4	02.9	5.1	00.4	---	---	---	---	---	925	3.1	---	---	1	1	---	---	---	3.6	3.4	
	74-75	19.9	37.8	51.5	---	15.5	18.9	02.3	3.1	00.2	---	---	---	5.5	4.4	1,403	3.6	---	---	---	---	---	---	---	3.6	6.3	

* less than 1% or 10 tons

ANNEX 4

Marketing - Domestic and Foreign

Table of Contents

Appendix 1	Afghanistan Market Distribution Systems for Vegetables, Fresh and Dried Fruit and Nuts
Chart 1	Typical Domestic Marketing System
Chart 2	Fresh Fruit Product Flow Chart
Chart 3	Dried Fruit Product Flow Chart
Chart 4	Nut Product Flow Chart
Appendix 2	Three Principal Export Marketing Systems
Appendix 3	Raisin Institute
Table 1	Export Raisin Production, Processing and Marketing Costs in Afghanistan (May, 1976)
Table 2	Annual Raisin Prices of Selected Exporters in the U.K. Market (1973)
Appendix 4	
Table 1	World Competitive Position of Afghan Producer Prices
Appendix 5	Cooperative Development in Afghanistan
Appendix 6	Market Prospects for Individual Commodities

Afghanistan Market Distribution Systems

Vegetables

1. Given the ban on vegetable exports, all production is geared to domestic consumption. Even prior to the ban only small quantities of eggplant, parsely, potatoes, dried beans, mushroom, garlic and onions were exported mostly to Pakistan and Iran. Some of these commodities such as potatoes have as recently as 10 years ago been introduced into the Afghan diet, and the Government has been principally most interested in protecting domestic consumption. However, its ban ignores the supply response to increased demand, and serves as a disincentive for increased production necessary to keep prices from rising even if exports also increased. The ban also serves as an encouragement for smuggling and loss of revenue. Export quotas have been suggested as a preferable policy proposal to the present system.

Major vegetables in the Afghan diet are spinach, cucumbers, artichokes, asparagus, lettuce (romaine and local varieties), radishes, potatoes, tomatoes, onions, carrots, and eggplant. The last five are important enough to be included in the consumer price index. Vegetables have a weight of 10% in its compilation. Vegetable production and consumption is seasonal and generally appears on the market between June and December when prices are relatively lower. Prices on the average during the three year period (1972/73-1974/75) increased 35% between the first two years but fell slightly between 1973/74 and 1974/75. 1/

2. Vegetable production is concentrated among specialized growers near major urban centers - Kabul, Jallalabad, Kandahar, and Herat. A form of absentee landownership and sharecropping characterizes the production system (especially in Jallalabad), and there are specialized merchant middlemen operating on the wholesale level who handle vegetables. This is consistent with the structure of the Afghan wholesale system characterized by individual markets or bazaars specialized for the handling of different commodities. In addition, for some large (in Afghan terms) urban areas such as Kabul, one frequently finds private vendors along the roads selling their produce.

3. Fresh Fruit. Production and marketing systems vary among the fresh fruits. Melons are produced under similar conditions to fresh vegetables in that there is basically an absentee landlord ownership and sharecropping system. Melons are transported from Kohdaman valley to Kabul where a large wholesale market exists because their large size creates transport problems. Large landowners may own their own trucks with which goods can be moved. Grapes, particularly in the Kohdaman valley which has many farmers and a few cooperatives, are produced under family operated systems. Thus there are likely

1/ 1975/76 price indices were not available at the time of the mission.

to be more merchants or middlemen in the grape distribution channel in this region than in Kandahar where large farmers may provide their own transport or possibly export as well. Grapes are a buyers market because of their perishability. Pomegranates, after harvest, are brought in boxes called Kajawas to collection centers along the highway. Dealers buy the fruit from growers directly and ship them to local or foreign markets. There is a large profit in handling.

4. Apart from the above-named fruits Afghanistan produces peaches, plums, strawberries (in the North), oranges (most of which are exported), apples, pears, and apricots. Fruit prices rose substantially between 1972/73 and 1973/74 with some levelling off the following year.

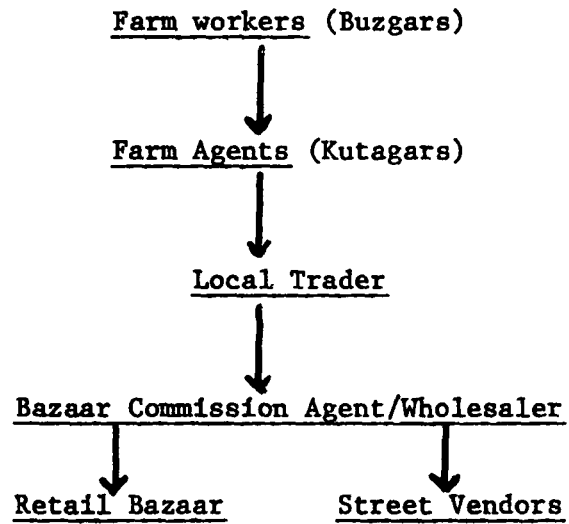
5. The fresh fruit marketing season is between July and October when prices are lower. The marketing season needs to be extended but lack of cold storage prohibits this.

6. Dried Fruit. Afghanistan produces principally raisins and dried apricots among the dried fruit category and both are major export commodities. Domestic consumption of raisins is estimated at 20,000 tons which is about 35% of total production. Farmers prefer to sell their grapes fresh but if prices offered are too low due to saturated markets, then they will often sell the commodity later for raisin processing. The marketing season for dried fruit is November to March during which time the raisins are sold in one of four ways: (1) either sold directly to processing plants at the farm gate price or on an ad hoc basis; or (2) direct contract; or (3) locally in bazaars; or (4) sold to wholesalers. Steps 2 and 3 are rare and not widespread. More often than not raisins are brought by agents of processors to the plants and then processed. In some areas coops are also involved in the distribution of the commodity by selling on behalf (but not taking full ownership) of small farmers unable to enter the markets individually even if they could get their produce to markets. Raisin prices have experienced the same trend as fresh fruit prices in the last three years.

7. Nuts. There are two distinct distribution systems for nuts based on different production systems. Pistachios are grown wild on state-owned land. The Government announces when they are ripe and private individuals from all over then go and harvest them. The nuts are then sold to middlemen often hired by big merchants. There are thus more middlemen in this distribution channel than for other commodities.

8. Almonds and walnuts are sold by farmers to middlemen who pick, shell, and dry the nuts and then transport them to large merchants. Few of the middlemen are acting independently since most are hired by the larger merchants. There is high spoilage or wastage for walnuts which do not keep well, and thus are more difficult to transport and distribute.

Typical Domestic Marketing System



FRESH FRUIT FLOW CHARTS

Model 1. (Grapes (Kohdaman Valley) and Apricots (Kandahar))

Transaction level & functions

Produce bought on farm

Provides transport to
wholesale market

Wholesale market level

Retail Bazaars Level

Participants

Farm Producer (Small)

Middleman (hired by
big merchant)

Wholesale Merchant/Trader

Domestic Consumer

Foreign Markets (India
and Pakistan primarily)

Model 2. Grapes (Kandahar)

Production and Transport
provided by farmer and/or
cooperative

Wholesale level

Retail level (Bazaars)

Foreign Export Level

Farm Producer (Large or
Cooperative)

Merchant/Trader

Domestic Consumer

Foreign Markets (India
and Pakistan)

DRIED FRUIT FLOW CHARTS

Model 1.

Transactions Levels & Functions

Produces and Transports

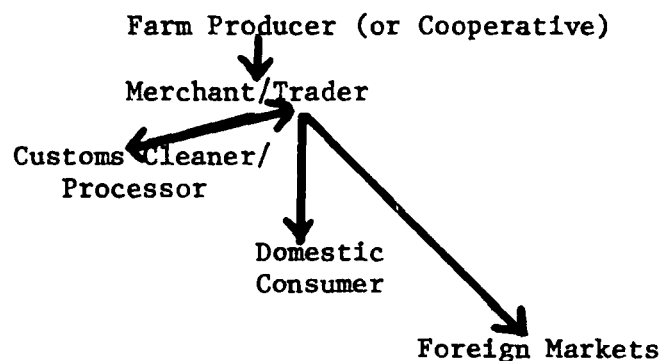
Wholesale level

Processing and Cleaning

Retail level (Bazaars)

Foreign Export Level

Participants



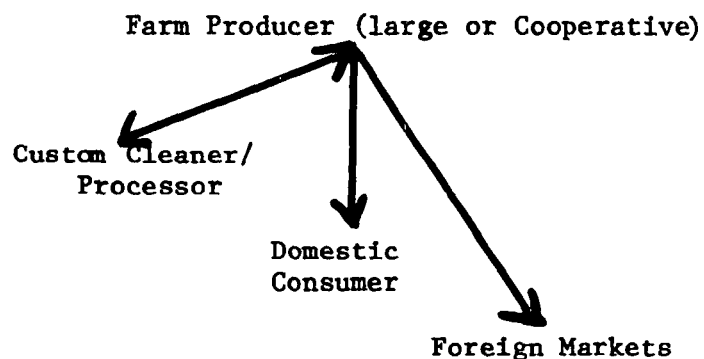
Model 2.

Produces, Transports
(obtain processing prior
to sale)

Processing Level

Retail Level

Foreign Export Level



Model 3.

Transaction Level & Functions

Produces

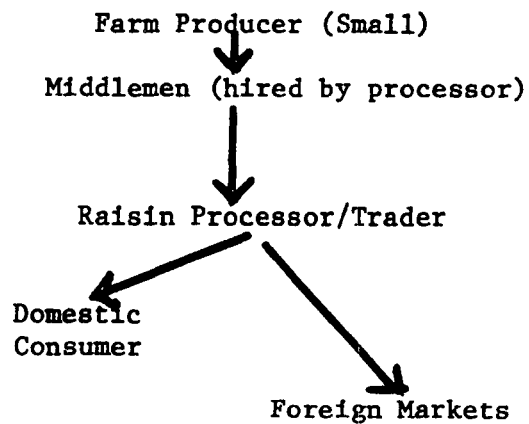
Buys and Packs produces
on farm
Provides transport

Wholesale Level and
Processing

Retail Level

Foreign Export Level

Participants



NUT PRODUCT FLOW CHARTS

Model 1. Pistachios (Herat)

Transaction Levels & Functions

Production & harvesting on
state-owned land

Pick nuts and sell to
middlemen

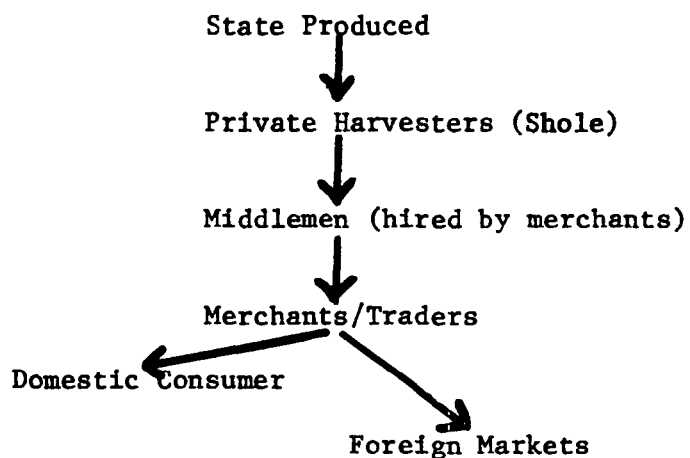
Located along highways
Transport to merchants

Wholesale Level

Retail Level

Foreign Export Level

Participants



Model 2. Almonds and Walnuts

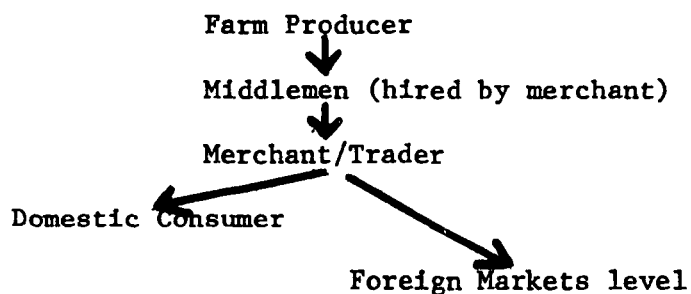
Produce bought on farm

Packs and Transports

Wholesale Level

Retail Level

Foreign Export Level



Export Marketing Systems

There are three basic exporting systems depending on the region to which Afghan exports are directed.

Trade with barter zone countries (USSR, Mainland China and Czechoslovakia) is conducted between private Afghan traders and designated official organizations in the partner countries. Trade with Russia is handled by private Afghan traders either selected by the Afghan Government from a list submitted by the Chamber of Commerce or chosen by the Russian Resident Trade Mission. Private Czechoslovakian organizations act as authorized independent juridical persons and handle trade on behalf of their government.

Volume of Afghan exports are allocated among the selected traders who then negotiate an equivalently valued import list. Lists can be modified depending on the class of traders. Goods are taken to customs house for payment of duty and taxes and then shipped to barter zone destinations. Financial institutions in the partner countries report prices to the Da Afghan Bank - agent of Afghan Government which then pays the traders. Final payments may deviate from international prices depending on the quality of varied produce. Payments are made in clearing currency although China does allow for payment in convertible currency as well. In the aggregate, if balances are greater than debts after a certain specified period (six months to a year) settlements are required by restricting imports or delivery of added goods. Excesses are allowed to build up to a specified maximum, without interest charged. For trade with China, when net imports from Afghanistan exceed a specified level the excess is subject to a 2-5% overdraft charge.

A second major system applies to trade with India and Pakistan. It has been termed a "liberalized barter system". All transactions are handled on a consignment basis. Goods are valued in rupees in the Indian customs houses. The State Bank of India, upon receipt of a certificate from Indian customs, credits the account of Afghan traders or local agents working on their behalf for the net value of the shipment. Rupees so credited are available for purchase of Indian products within one year. Trading associates charge a 1% commission fee for their service. There are two such agencies in Pakistan.

There is an important defect in this system. In each transaction, the exporter determines the quantity of goods involved in the consignment but value is determined by Indian customs such that price is ultimately based on an Indian offer usually subject to Afghan acceptance after the fact. Prices are then reported back to Da Afghan Bank. The system is generally slow and complicated by lack of Afghan presence in the Indian customs.

Trade with other regions is conducted on a private/to private basis with most terms of sale and purchase agreed upon prior to shipment. There are long lags in payments to traders extending to as much as 6 months for dried fruit destined for more distant EEC markets. Trade payments are made in convertible currency.

Raisin Institute

1. The Raisin Institute is a relatively young organization, founded in 1975 by the Afghanistan Government (Ministry of Commerce) to:

- act as a trade organization
- adopt and implement grades and standards
- promote and expand exports

Many of the Ministries are represented on the Board as well as traders, processors and coops. The Managing Director is Mr. M.E. Aslamy who is also owner and President of Bagram Raisin Company, a raisin processor.

2. The Institute is currently in the process of adopting a set of standards and establishing a laboratory for conducting tests. Technical assistance in raisin grading will be required to assist in training, operating the laboratory and establishing procedures. It is also understood that the name will be changed to the "Dried Fruit Institute" and the Organization will supervise all dried fruit exports.

3. The Institute is financed by a mandatory 50 Afs per ton levy on raisin exports. The 1976 budget is 1,750,000 Afs (US\$33,650). Most of the 1976 budget will be used to buy straw mats for the growers to use in drying raisins. This will be an important step in improving raw material quality. It is doubtful that the Institute will have sufficient funds to provide promotion or marketing support for raisins. In comparison, the Raisin Growers of California voted in 1975 to increase their promotion budget from \$5 to \$20 per ton, providing a promotion budget of close to \$4,000,000.

Export Raisin Production, Processing and Marketing Costs
(May, 1976)

		<u>US\$/Ton</u>
Farmgate		240
Transportation, Bags, etc.	20	
Processing, Cleaning and Packaging	90	
Trading Margin	70	
Freight (London)	<u>100</u>	
Total FOB London		500
UK Duty	15.50	
Discharge from steamer, haul to warehouse, in-out charge	16.20	
Storage at \$2.16/month	6.48	
Sales Commission at 2%	<u>10.00</u>	
Total C and F London		548

Raisins: Annual Prices (1973) \$/ton

Duty Paid/London, UK

<u>Exporting Country</u>	<u>Annual UK Market Share</u>	<u>Price (per ton)</u>
Turkey	31%	\$655
Australia	17%	\$710
Greece	16%	\$754
Iran	15%	\$629
Afghanistan	6%	\$581
U.S. (California)	4%	\$960

World Competitive Position of Afghan Producer Prices

AVERAGE FARM PRICE LEVELS: 1974-1975

<u>Fruits and Nuts</u>	<u>Afghanistan</u>		^{/2} <u>Greece</u>	<u>California</u>
	<u>AFS/Kilo</u>	<u>US\$/Ton</u>	<u>US\$/Ton</u>	<u>US\$/Ton</u> ^{/3}
Apples, Delicious varieties	15	288	143	147
Grapes, Fresh	7	134	177	177
Grapes, Red Raisin	12	231	595	550
Apricot, Fresh	6	115	137	261
Pomegranate	8	154	190	225 (estimate)
Almonds, in Shell ^{/1}	30	577	-	812
<u>Vegetables</u>				
Tomatoes	2.5	48	177	376 (fresh) 63 (process)
Onions, Dry	3.5	260	102	107
Potatoes	3.5	67	103	133
Carrot	1.0	19	147	141
Spinach	1.5	29	121	42
Cucumber	2.0	38	180	212
<u>Melons</u>				
Melon, Sweet	2	38	134	204
Water Melon	1.5	29	79	115

/1 Varieties grown in Afghanistan and California vary considerably in shell-out yield.

/2 1974 data from World Bank Fruit and Vegetable Export Marketing Reconnaissance Mission, June 28, 1976.

/3 Cooperative Extension Service, University of California, A.D. Reed, 1976.

Cooperative Development in Afghanistan

Background

1. About 1964 the Ministry of Agriculture decided farmer associations needed to be organized in rural areas and therefore took steps to establish silkworm and Karakul coops. Between 1964 and 1968, 13 coops were established mostly in the North, but basically they behaved as joint stock companies in accordance with commercial laws since at the time there was no cooperative law. Landlords were members in addition to farmers and the Ministry of Agriculture had no special organization to guide and supervise these societies. There were also no professional cooperative personnel and most coops were self financing in the absence of government shares. Ultimately they all dissolved after shortages of irrigation and bad climate led to large animal losses such that the farmers could no longer compete worldwide.

2. In 1968 an FAO mission was sent to Afghanistan to study the situation and future of a cooperative movement. They undertook two surveys - one in Kohdaman area and one in Baglan province and then decided to establish a pilot project in the Ministry of Agriculture & Irrigation (MAI). A Cooperative Training Institute was also founded in Kabul. The purpose of the program was to train government employees to provide technical cooperative services and then spread the idea and practice of cooperatives throughout the provinces. An Agricultural Development Center was also founded in Kohdaman wherein cooperative practices were taught to area farmers.

3. Between 1968 and 1973 a government project was financed by Swedish International Development Agency (SIDA) through FAO with MAI as executing agent. Functional literacy programs were included for members of the project. Trainees were deemed to be sufficiently knowledgeable in an evaluation by FAO, SIDA, and MAI in 1971/72 such that they began establishing actual cooperative organizations, and steps were taken to establish a cooperative law which was enacted in 1974. A special cooperative department in MAI was organized to apply the law.

Geographic Distribution

4. The early coops begun about 1969 were located in Baghlan Province in the North and involved farmers engaged in vegetable (onions and potatoes), cotton, sugar, rice, and sugarbeet production. The program was gradually extended to other provinces including Kandahar, Logar, and Balkh. ILO had already established 4-5 coops in the Logar province so that the PACCA project could take advantage of this early experience. Coops in Logar are oriented around grape, tobacco, wheat, barley, and vegetables (tomatoes and potatoes) while in Kandahar the emphasis is on grape, almond, and apricot production. In addition to the expansion of coops in the above provinces, coops were introduced in the Kohdaman valley area oriented around grape, and raisin,

vegetable, animal husbandry, poultry, and beekeeping; Baghlan (around sugar-beets, cotton, and silkowrm production; Balkh (cotton and sesame production) and Helmand Valley around fruit such as pomegranates, almonds, and cotton production. In 1975 coops were extended to the Nangahar and Juzjan provinces and plans were underway to establish cooperatives in Kunduz, Samangan, and Herat in 1976.

Current Situation

5. There are currently 59 production and marketing cooperatives in Afghanistan but most have been only recently organized such that they remain in their infant stage on an operational level. As of 1973 there were only 3 coops in existence. Twenty-one were established in 1974 and 35 were established in 1975. All coops are registered in Kabul. Table 1 provides a breakdown of the number of coops and members by province.

Table 1

<u>Province</u>	<u>Number of Coop</u>	<u>Number of Members</u>	<u>Working Capital</u> <u>AFS</u>	<u>Admission Fee</u> <u>AFS</u>
Kabul	23	2,273	1,432,100	186,550
Logar	7	538	280,500	28,750
Kandahar	6	353	254,900	22,650
Balkh	11	1,028	1,660,500	94,950
Juzjan	4	429	975,000	94,000
Baghlan	5	338	166,800	29,200
Nangahar	2	74	44,400	3,700
Helmand	1	109	99,000	10,900

The average size of coops is less than 100 members. Only farmers resident in area and directly involved in agriculture are eligible for membership. Based on MAI's interpretation, share croppers and tenant farmers are excluded from participation despite no such restriction in the Cooperative Law of 1974. Dues of 200 Afs for each share owned are generally required, 1/ and a 1% commission charge to cover coop costs of getting credit but this is insufficient for building a proper working capital base.

Organization Structure

6. Farmers interested in joining apply for membership to the Managing Committee made of 7 members elected by the General Meeting. The latter meets once a year with provisions for extra meetings as are necessary. All members of the coop are members of the General Meeting, and each person has only one vote. Above the Managing Committee is the Supervisory Committee elected also

1/ Members can own more than one share

by the General Meeting. This committee, of which there are three members, has responsibility for overseeing operations. Finally a manager, who currently is more often than not a government official, works under and provides advice to the Managing Committee. He may also have recruitment and extension responsibilities as well. As the coops become more established in the future, the character and role of this position will change. There is also usually a second government officer assigned to take care of all bookkeeping activities in each coop.

7. In the Kohdaman valley where some of the older grape coops exist, steps have already been taken to create cooperation among the cooperative societies. Each coop selects a representative as temporary managing committee member for secondary level cooperative. Those selected are the most experienced.

General Description of Cooperatives

8. Primary agricultural coops in Afghanistan are multipurpose. Cooperatives in Afghanistan are designed to fulfill four basic functions: (1) provide agricultural credit; (2) provide technical advice and extension services; (3) find suitable domestic and foreign markets for members produce; and (4) provide literacy programs. The early coops provided supervised credit in kind rather than cash as well as provided inputs, but recent negotiations with AG Bank have led to the extension of some cash credit to pay labor wages (for pruning, dusting, and harvesting of grapes), extension, and technical marketing services.

Facilitating Credit

9. Plans for credit needs of each cooperative are prepared by the manager, approved by General Meeting, and then sent through the Managing Committee to the MAI where the application is analyzed. It is then sent to the AG Bank for approval, and the Bank then transfers the approved amount to the cooperative account and the Managing Committee allocates it among various members. There are generally two types of credit requested; Seasonal (in kind), and Marketing (in cash). Most borrowing for grape and raisin coops covers transportation and processing needs since the coop collects the raisins for the members, processes them through representatives, and rents trucks to get them to market. Some coops also have their own storage facilities, but they are generally inadequate. For these purposes, they borrow approximately 50% of the total price of the good at interest rates of 8% per annum. A major problem, however, is the long 3-6 month lag before money is received due to bureaucratic red tape requirements.

10. Ag Bank is basically the only official institution designated to provide credit, and the vast majority of its loans are not directed to small farmers. The problem appears to be the inability of the farmers to establish collateral because of the land ownership system. Land ownership is passed on from family to family such that an individual farmer cannot use his one major asset as collateral for bank credit.

11. Ag Bank also provides mainly long-term credit while small farmers need seasonal and medium-term credit for production purposes. Therefore, most farmers are reliant on the money bazaars for critical investment financing. A continuous shortage of working capital is maintained. Suggested ways to improve the situation are better borrowing terms, increased shares of current members, improved processing and storage facilities, and greater recruitment efforts to increase membership. The coops lack sufficient capital because of their self-financing status and low incomes of members. Staff is not able to resolve these difficulties as the coops are presently organized.

Cooperative Marketing

12. Coops do not actually buy members' produce. Rather, consistent with the individualistic style of Afghan economic life, coops merely sell produce on behalf of members, hoping such joint efforts will enable them to have a more favorable impact on price negotiations by eliminating other middlemen roles. A marketing section under the cooperative department of the MAI is also supposed to assist the coops in finding national and international markets for their produce. For domestic marketing the cooperatives, in the absence of professional full-time staff, are unable to provide the necessary market information which would improve farmer bargaining power vis-a-vis the dominant merchant groups. Coops generally include no more than five percent of farmers in an area such that their joint efforts often have little impact on local economic negotiations.

13. Farmers complain that one of their major problems in marketing their produce is the absence of storage and transport facilities. This forces them to be dependent on middlemen both for the receipt of inputs and the distribution of their products. For example, it takes two to three days for farmers in Kohdaman valley to obtain fertilizer and the transport cost is often more than the final price of the goods. Although a few cooperatives have storage and transport services (trucks), this has to date not been a sufficient area of focus.

14. On the export side, the cooperatives are at an even greater disadvantage than the experienced traders and their participation in export sales to date has come mostly from government initiatives. The basic constraint appears to be the lack of cold stores to collect the produce such that they can take advantage of increases in foreign demand at higher prices.

15. Among the positive aspects of the cooperative movement has been the introduction of improved technical methods allowing farmers to increase the quantity of produce and receive better prices. Greater efforts are now required, however, to increase quality of produce. In some cases, particularly in Kohdaman Valley area which is one of the more advanced areas for cooperative development, they have been able to market directly to buyers or big merchant at prices sometimes two to three times higher than sales prior to joining. Yields in the area have also increased, but these increases are probably non-existent in lesser developed provinces.

Market Prospects for Individual Commodities

Fresh Fruit

1.01 Grapes. Afghanistan has annually exported between 30,000 and 60,000 tons of grapes in the last four years. Grapes are a principal export, accounting for 60% of the value of Afghan fresh fruit exports. The export season is between July and October with those produced in Kandahar having an earlier ripening season than those produced in Kohdaman valley.

1.02 Neighboring Indian and Pakistan markets account for about all of the exports (34% and 65% respectively) because lack of storage does not enable fresh produce to reach more distant markets. The Pakistan market has continued to absorb larger quantities while exports to India have exhibited extreme fluctuations. Further development of existing markets will depend on reducing spoilage through improved handling (including refrigeration where feasible). To improve opportunities in the Indian market, negotiations are required for transit rights through Pakistan and India for Afghan trucks.

1.03 Distant markets are unlikely to be tapped because of high transport costs, but there appear to be ample prospects for exports to Russia, where Afghan grapes would enjoy a small seasonal advantage vis a vis those from Bulgaria, if refrigerated storage and transport were introduced. Although the Kishmishi variety dominates Afghan exports, it does not store well, and experiments should be tried with the Shindahami variety, which does offer storage potential.

1.04 Pomegranates. The pomegranate is an exotic fruit little known in world markets, but it is the second most valuable Afghan fresh fruit export. The commodity has one of the highest growth of sales among Afghanistan fresh fruit exports but quality standards need to be improved. Afghanistan exports about 13,000 tons annually; principally to India, Pakistan and USSR. For the period between 1972-1975 these markets accounted for 60%, 17% and 16% of volume and of Afghan pomegranate exports. Indian import prices are slightly higher than prices in other markets and Afghan prices are well below its major competitors.

1.05 Further export expansion is facilitated by the disease free character of the Afghan variety. Although Afghanistan exports a large share of its domestic production, there is incentive to increase production and export of this profitable fruit, especially if processing outlets are developed for supply fruits. Sales to Pakistan and India could be expanded by lengthening the market season two to four months through the introduction of cold storage facilities.

1.06 Apples. Apples are a relatively new export crop with production concentrated on the Golden Delicious and Red Delicious varieties which have been highly regarded in major European import markets.

1.07 With production estimated to triple in the next 7-10 years, the foreign market potential needs to be assessed. To date Pakistan is the only market, importing annually about 5,000 tons or almost 100% of Afghanistan's apples. Pakistan import prices are sufficiently attractive to provide an incentive for increased export supplies. Fortunately, apples store well and should find favorable market opportunities in the early spring in nearby export markets. With production already well organized the primary elements for increased exports are improved grading and cold storage facilities to prolong the marketing period.

1.08 Oranges. Approximately 2,800 tons of oranges are produced each year with most being exported. Exports are negotiated on a Government-to-Government contract basis to Iran through a good will gesture. The few traders involved buy the oranges from farmers using agents or import from Pakistan and then sell directly to Iran. These same traders have dealers operating in the Pakistan market who work on their behalf.

1.09 Melons. Afghanistan exports about 35,000 tons of melons annually, 99% of which go to Pakistan. Melons have exhibited one of the highest fresh fruit growth rates since 1972. Were appropriate storage facilities in existence, prospects in other markets would be quite favorable because the quality of varieties unique to Afghanistan is quite excellent. Afghan production and export costs are relatively low so that its melons are price competitive. Tests should be made on storage duration and market opportunities for off-season melons in December and January.

1.10 Apricots. Annual Afghan exports of fresh apricots average about 1,500 tons. All apricot exports go to Pakistan where market opportunities have been good because of ease in reaching market and satisfactory varieties. Further export expansion will be constrained by lack of cold storage packing and refrigerated transport facilities to increase the shelf life and market season. Lack of a domestic canning system which is a normal market outlet in most countries is due to high transport costs and a limited domestic demand.

Dried Fruit

1.11 Raisins. Afghanistan accounts for about 15% of world raisin exports - approximately 40,000 tons out of 260,000 tons. Major world exporters are Greece, Turkey, US, Iran, Australia and Afghanistan. Afghanistan exports red, green and black raisins of which red and green account for similar revenues (\$16 million) even though volume of green raisin exports is less than red (14,000 tons compared to 23,000 tons). However, the higher price of the green raisins is offset by higher production costs for drying sheds. Green raisins, which represent 30% of value of raisin exports, are exported principally to India, USSR and Pakistan while red raisin (56% of raisin exports) to to EEC, USSR, China, India and Pakistan.

1.12 Afghan raisins are price competitive. India and Pakistan offer the highest prices of Afghan raisins (\$700 to \$800) followed by the EEC and then the barter zone countries. In the U.K. market (as Annex 4, Table 6 indicates), despite long uncertain travelling distances through Russia, its raisins sell significantly below its principal competitors. This is due to lack of uniform quality and grades, unguaranteed delivery and less aggressive marketing of the Afghan produce.

1.13 Production costs in Afghanistan, about 45% of London cif price, are below costs in competing countries, but expansion of raisins exports from Afghanistan can only be done within a framework of improved quality standard enforcement and better market organization. To this end in 1975, Afghanistan created a Raisin Institute to (i) act as a trade organization; and (ii) adopt and implement grades and standards with the ultimate aim of promoting and expanding exports. Many of the ministries are represented on the Board as well as traders, processors and coops. Eventually, the scope of the Institute will be extended to cover the supervision of all dried fruit exports. But, currently it is in the process of adopting a set of standards and establishing a laboratory for conducting tests.

1.14 The Institute is now financed by a mandatory 50 Afs per ton levy on raisin exports and is operating with a \$37,000 budget most of which will be used to buy straw mats necessary for improving the quality of raw material in the raisin drying process. It is doubtful that current funds are sufficient to cover promotion or marketing efforts.

1.15 Dried Apricots. Afghanistan accounts for about 20% of world dried apricot exports with neighbor Iran being the leading world exporter. Chakapara is the principal Afghan export variety. It has a light yellow color and is allowed to dry on the tree. The major markets are Pakistan, USSR and India. Afghan production costs and prices are low relative to its competitors but quality in terms of color and taste are not acceptable in European markets; sulphur treatment would remedy this condition.

Nuts

1.16 Almonds. Afghanistan annually exports about 5,000 tons of almonds representing about 8% of world exports. Leading world almond exporters are USA and Spain. Major import markets are West Germany, France, Japan and the U.K. but Afghanistan exports go principally to India, Pakistan and USSR. Afghan thin shelled almonds go almost exclusively to USSR while India imports only the hard shelled varieties and Pakistan imports both hard shell and un-shelled varieties.

1.17 One of the major impediments to expanded Afghan exports is the existence of strong international competition in a world market where exports have not shown any significant growth in the last 10 years. Almond production in the US, the largest world producer has been profitable and expanding

while Spain has increased its production significantly as well. Iran and Turkey are also major sources of EEC almond exports. Thus, for the European market, competition for Afghanistan is likely to be intense and successful exports would require an active marketing program.

1.18 Afghanistan does have good markets in the closer Indian, Pakistan, USSR and Persian Gulf areas, but it still must compete with Iran and Turkey. However, Afghanistan has the advantage of being able to develop barter sales arrangements and receive higher prices for premium almond varieties (long kernel types) prized in these countries. Further investigation of future market prospects is required before additional plantings are warranted but economic analysis indicates that given low production costs, promotion of almond exports could be a highly profitable venture. Export prospects for almond do seem to be more favorable than for other nuts.

1.19 Pistachios. Afghanistan has a small share of world pistachio exports compared to neighbors Turkey and Iran. It exports about 1,200 tons annually most of which go to Lebanon and India. Iran exports about 15,000 tons mostly to US and Europe but also to Asian markets. There is thus strong competition in existing pistachio import markets. Because pistachios require 10-14 years to come into full production and given non-commercial production methods now utilized in Afghanistan, there are serious constraints to expanded exports even if markets prospects were more favorable.

1.20 Walnuts. World walnut exports averaged about 55,000 tons a year between 1962-1971 and then rose to 71,000 tons in 1973 and 1974. Afghanistan exports about 5,000 tons annually or about 7% of world exports. Leading world exporters are US, China, France and Italy while leading importers are West Germany, U.K. and Canada. Most of Afghanistan's exports go to USSR (70%), Czechoslovakia (6%) and Lebanon (2%). Constraints on expanded Afghan walnut exports are similar to those for pistachios.

1.21 Apricot Nuts and Kernels. Afghanistan annually exports about 1,000 tons of apricot nuts and kernels with principal markets being Sweden, India, Pakistan, USSR and Lebanon. It faces stiff competition however from China, Turkey, Australia, South Africa and Spain in the major West European markets where demand is said to be growing.

Fresh Vegetables

1.22 The production and trade in fresh vegetables is oriented to supplying urban domestic markets such as Kabul, Kandahar, Herat, and Jalalabad. A ban on the export of vegetables has prevailed for the past five years. It is reported that vegetables were exported, prior to the law, particularly from Herat to Iran. Many vegetables are too perishable for export, but crops such as potatoes, onions, cucumbers, okra and tomatoes, could be exported to markets in neighboring countries. The Iranian Army is buying onions and

potatoes in Northern India during the off season and hauling the raw produce, without a back haul, to Iran in 20-ton trucks. The Ministry of Commerce indicated that Iran would like to purchase in Afghanistan, particularly in the Herat region to reduce transport costs.

1.23 In addition to low labor costs, Afghanistan's diverse climates provide opportunities for long production seasons for vegetables, although most of the different climatic areas are too dispersed for central processing. Indications are that for most vegetables, a combination of perishability and local competition will restrict immediate vegetable export opportunities. Exceptions are less perishable products such as:

- Onions
- Garlic
- Potatoes
- Dry beans

ANNEX 5

PROCESSING

Table of Contents

Appendix 1	-	General Observations on Raisin Processing in Afghanistan
Table 1	-	Raisin Processing Plant Visits
Table 2	-	Raisin Processing Costs (1974 estimates)
Appendix 2	-	Marketing Margins: Apricot Dehydration
Appendix 3	-	Kandahar Canning Factory
Appendix 4	-	Juice Concentrate Plant
Appendix 5	-	Other Processing
Appendix 6	-	Cost of Labor

General Observations on Raisin Processing in Afghanistan

Processing operations consist of removing stems and other foreign matter, sizing, washing, sorting, inspecting and packaging. Uneven quality, poor storage conditions, both at the farm and at the processing plant, plus an abnormal amount of field trash, dirt and dust limit what can be accomplished at the processing plant to produce a quality pack. Raisins destined to USSR require very little hand grading, but raisins for Europe and the United Kingdom require separate hand grading. Several hand grading operations were observed that required approximately 200 additional man hours per ton to pick out off-color, off-size and trash. The additional hand grading increased processing costs by 1,040 Afs (US\$20) per ton, but as the product sells for an additional US\$50-100 per ton in European markets, the extra cost of final grading is considered worth the effort.

Raisin Plant Visits

Bagram Raisin Company. Located in Charakar, it is owned and operated by the manager of the Raisin Institute. The plant is oriented to sell into the UK market, and plant modernization and additional storage facilities were under construction. The plant follows the practice of a two-stage grading for export to London.

Afghan Processing Company. Located in Kandahar in a rented building, it appears to be working well below its annual capacity of 2,000-3,000 tons. In 1975 it processed less than 1,000 tons. Plant hygiene was poor and quality of the raw material was below average. Approximately 20 hand graders earning 30-35 Afs per day were grading 10 tons per day.

The plant has raisin cleaning equipment imported from California costing 7,500,000 Afs. No storage facilities were available and raisins were stacked outside the building. Many of the raisins were observed to be in poor condition due to water damage during farm storage.

All the business is contract processing, the major customers being five traders and one cooperative.

Wahid Raisin Company. Located in Kandahar, all sales are to USSR. The plant has complete line of California raisin grading equipment capable of 24 tons/8 hour shift; the plant was currently utilizing two shifts. Plant hygiene was poor.

Last year it processed 1,300 tons; considerably below capacity. Grading losses can range from 7-25 percent, but average 12 percent. The raisin sales to USSR present a problem; payment is in barter dollars, and management claims the \$80 per ton profit on sales to USSR is reduced to \$40 per ton net income due to a loss sustained in the sale of barter goods.

Samoan Company. Located in Kabul, Samoan is managed by Mr. Abdul Hadi. This is the largest raisin processing and best equipped raisin plant in Afghanistan. The plant also has facilities for almond and walnut processing at the rate of one ton per hour, and a fruit dehydrator. The nut line and dehydrator were not operating.

The original capital structure was:

	<u>Afs.</u>
Fixed assets	32,000,000
Working capital	<u>8,000,000</u>
Total:	<u>40,000,000</u>

Ownership is 48 percent Ministry of Finance and 52 percent private. Most of the working capital is currently tied up in inventory or barter goods from the USSR. The Agricultural Credit Bank has extended an Afs.20 million revolving line of credit to finance inventory, but shortage of working capital limits expansion.

The plant is equipped with two complete Elliott (California) processing lines. The plant has storage facilities for bags but bin storage would be the best system. Samoan was the only plant observed to have a fork lift truck. Also the plant had a continuous quality control program.

The firm has long-term relationships with foreign buyers in Canada and London and, if strengthened with additional marketing, management and financing, could expand operations.

SUMMARY: RAISIN PROCESSING PLANT VISITS

<u>Plant</u>	<u>Location</u>	<u>Age</u>	<u>Daily Capacity</u>		<u>No. of Workers</u>		<u>Grading equipment</u>	<u>Days Operated</u>	<u>Fixed Investment (Afs.)</u>
			<u>Europe</u>	<u>Russia/1</u>	<u>Perma- nent.</u>	<u>Part- time</u>			
Bagram Raisin Company	Charaka	6	4/ton	12 tons	20	90	Four grades separated	N/A	N/A.
Afghan Processing Co.	Kandahar	6	-	10-20	10	24	Two Grades	45-60	7,500,000
Wahid Raisin Company	Kandahar	4	-	20-30 2 shifts				60-80	N/A
Samoan Company	Kabul	12	20-40	30-40	60	130	Four Grades, two complete lines.	120+	32,000,000
Pashtoon Fruit Company	Kabul	N/A	12	20	30	300	Four grades	N/A	N/A

/1 Does not correspond to actual shipments.

/2 The apparent discrepancy between the work force at Samoan and Pashtoon is due to work load at the time of visit to the plant.

RAISIN PROCESSING COST (1974 Estimates)

35 Tons/Day
4,000 Tons/Year

	Af AFs/Ton	US\$/Ton	California US\$/Ton
<u>Packaging</u>			
Cartons, 80 @ 26 Afs	2,080		
Carton Waste, 5%	106		
Plastic Lines	9		
Glue and Label	40		
Methyl Bromide Fumigate	15		
	<u>2,410</u>	<u>46.34</u>	<u>120</u>
<u>Labor</u>			
Women (80)	70		
Men (60)	58		
	<u>128</u>	<u>2.46</u>	<u>30</u>
<u>Materials</u>			
Petrol	8.5		
Electricity	18.0		
Oil	80.0		
Chemicals	110.0		
	<u>216.5</u>	<u>4.16</u>	<u>10</u>
<u>Overhead</u>			
Salaries and Accounting	542		
Parts and Repair	125		
Storage and Depreciation @ 2%/Year	50		
Machine and Vehicle Depreciation	255		
Interest on Working Capital @ 10%	275		
	<u>1,247</u>	<u>23.98</u>	<u>76</u>
Operating Cost (for London Market)	4,001.5	76.94	236
Profit @ 4,700 Afs/Ton	698.5	13.43	
Total Processing Charge	4,700	90.37	236

Bank estimates. California costs reflect information received from Sun Maid Growers, a large raisin coop that processed and sold 78,000 tons in 1975. Note that coop does not earn a profit but returns all proceeds less expenses to the members.

Marketing Margins: Apricot Dehydration

Farm

	<u>US\$</u>
10.0 tons/hectare @ \$120 per ton	1,200

Processing

	<u>US\$ Cost/Dry Ton</u>	<u>US\$ Sale/Ton</u>
Raw material (6 to 1 ratio) \$120 x 6	720	
Materials, labor, etc.	<u>30</u>	
Cost/dry ton	750	
Sale FOB Kabul		900
Sale of kernels <u>/1</u> @ \$288/6 tons		<u>300</u>
Gross Processing Margin		450

/1 1 ton of apricots yields 50 kg. of kernels, valued at approximately \$1.00/kg.

Kandahar Canning Factory

1. Facilities

A tour of the plant indicated the following available facilities and problem areas:

a. Cold Storage

Four meter by approximately 30 meter cold storage (32°F) rooms exist but the mechanical equipment is not operating. Rated cooling capacity is 100 tons per 24 hours.

b. Receiving

A large area exists but no provision is made to handle the produce. All sorting, washing, grading and peeling operations are by hand. This is possible with the low wages, but the lack of equipment reduces product uniformity which makes the product unacceptable in export markets.

c. Juice Line

A hammer mill, basket press and 10 steel holding tanks for extracting and handling juice exist. Also a centrifuge is available for clarification but apparently it is not utilized. Clarification is achieved by adding chemicals to precipitate the small particles. Brass fittings were observed which in combination with the metal tanks and chemicals, could give the product (pomegranate juice) a distinct metallic flavor. Overall, the fruit juice line is not suitable in speed or product quality for export grade. Also the 1/2 and 1 kilo cans are not popular sizes for juice in export markets.

d. Fruit (Compote) Lines

Two fruit peeling, grading and filling lines exist. The cans are filled by hand and moved to one of six sealing machines. No provision is made for exhausting air from the filled container, resulting in trapped oxygen and poor quality.

Ten hot water tanks are available for pasteurization of juice and fruits at 90°C for 20 to 30 minutes in a batch system. No provision is made for rapid cooling of the heated cans, resulting in loss of quality.

In general the processing lines are not integrated resulting in considerable hand labor, loss of quality, and low production, i.e., 10 tons per day and high fixed and operating costs. The current prices tend to indicate high operating costs.

Six 170 liter steam kettles are used to prepare jams and jellies. Generally, the juice and fruit lines are not suitable for export production and new equipment would be required to improve speed, quality and reliability.

e. Can Manufacturing

A well maintained FMI (Italian) can manufacturing line capable of 5-6,000 cans/hour is integrated into the facility. The capacity of this equipment is considerably above the processing plant and cans could be sold to other countries, possibly Iran.

Consideration is being given to manufacture an A-10 can for catering packs. Cost to produce cans from imported tin plate was reported to be:

3 Afs	1/2 Kilo
4 Afs	1 Kilo

f. Dehydration Line

A tunnel dehydration and sulfur chamber capable of 10 tons per 24 hours is operational. It is used for apricots and more importantly the large seeded adjoushi grape. The resulting raisin were observed to be of very good quality.

The dehydrator will hold 50 metal carts; one cart has twenty 24" x 34" trays. The equipment is reported to be in good working order, the primary constraint being economic. The operating cost of the diesel fuel dehydrator will be considerably above sun dehydration. Mechanical dehydration for fruits has been tried previously by Samoan Raisin Company in Kabul, and to date have not been able to compete with the sun-dried product. The large, golden raisins should be well received in special masrkets and be able to pass on the added processing cost. Dehydrated onions and garlic could be attractive new products for dehydration.

g. Utilities

Water is supplied from 2 wells, 110 and 95 meters deep respectively, at 75 liters per hour. Electric power cost is 3 Afs per KWH, but will be reduced to 1 KWH when the new power line is completed. Steam is generated in two 1.6 ton/hour boilers. The operating cost of the boilers is 960 Afs per hour (120 liters/hour for two boilers).

h. Case Storage

Excellent, cement floor, high ceiling storage facilities exist for canned cased goods.

i. Box Manufacture

A well equipped wood working facility exists for repair and manufacture of wooden boxes.

j. Raw Material

Availability of raw material in large quantity at competitive prices may present one of the largest barriers to successful operation. Careful analysis of the availability and ability to contract raw produce in advance should be investigated.

2. Production

Production and prices were indicated to be:

<u>Production Run (Days)</u>	<u>Product</u>	<u>Quantity</u>	<u>1/2 Kilo Wholesale Price (Afs)</u>	<u>1 kilo Wholesale Price (Afs)</u>
15	Pomegranate Jelly	70,000	35	66
8	Apple Juice	29,000	35	65
5	Quince Juice	22,000	36	67
4	Apple Jelly	25,000		
4	Pomegranate Juice	7,000	20	
	Grape Jelly		32	
	Apricot Juice		32	
	Apricot Compote		27	
	Mixed Vegetable Salad		20	
	Tomato Sauce		25	
		<u>153,000</u>		
	Dried			
	Raisin (seeded)			50
	Dried Onions			32
	Apricot			50

Cans are packed 36 to a 1/2 kilo case and 24 to a 1 kilo case.
The total labor force at the plant is:

permanent	100
seasonal	<u>500</u>
	600

Wages ranges from 60 to 30 Afs per day. The normal operating period is late August through October.

3. Management

The management has little prior experience in food processing and marketing. A new production manager with a B.S. in Food Technology from Cairo University was hired in late 1975. He should be most useful in developing improved production and quality systems.

4. Quality

Samples of several products were observed -

Dried raisin - excellent uniform golden color, seeded and good flavor.

Pomegranate Juice - good color, but metallic flavor.

Quince Jelly - grannular in texture, not attractive.

Apple Jelly - good quality.

5. Marketing

Sales have always presented a problem to the company. The local economy can not afford a processed product costing 30-50 Afs per unit. Also the Afghan taste preference is definitely to a fresh product.

The sales problem has been partially solved as it is reported that 90-95 percent of sales are to the Ministry of Defense for use in troop feeding and to the government hotels. Very little product was observed in the small food shops in Kabul.

6. Future Development

The Bulgarian Government is providing up to US\$10 million in financial aid to Afghanistan and a delegation from Bulgaria conducted a feasibility study of the canning plant in April 1976. A complete report was expected in July 1976. It is planned that Bulgaria will provide technical assistance, improved, modern equipment and guarantee a market for the production through a bilateral aid agreement.

Juice Concentrate Plant

The plant would be expected to operate 125 days from June through December. The production schedule would be:

<u>Tons</u>		<u>Products</u>
500	June - July	Apricots and Peaches
1,100	July - October	Grapes
1,500	September - December	Pomegranates

Assuming juice and concentrate yields of:

	<u>Juice</u>	<u>Concentrate Yield</u>
Apricots and Peaches	60%	13%
Grapes	80%	18%
Pomegranates	50%	11%

The plant would produce annually:

	<u>Concentrate Tons</u>
Apricots and Peaches	65
Grapes	170
Pomegranates	<u>165</u>
Tons, concentrate	400

Sale of concentrates to India on a fixed price basis would likely yield the highest price.

Grape concentrate is the lowest value of fruit concentrate, having a value of US\$0.70 per kilo. Apricot, peach and pomegranate should command a price two and a half fold above this level. Potential customers are:

Fruit juice reconstituters
Wineries
Refrigerated fruit drink manufacturers

JUICE CONCENTRATE PLANT

	<u>US\$</u>
Site	15,000
Buildings (3,000 Afs/meter ²)	200,000
Preparation equipment	30,000
Juice extracters	30,000
Two phase concentrator	60,000
Filling and closing equipment	60,000
Boiler (1 ton)	30,000
Installation	15,000
Miscellaneous	<u>50,000</u>
Total Investment	490,000
Working capital	<u>300,000</u>
	<u><u>790,000</u></u>

Source: Consultant Estimate.

A typical size for a small juice plant is 8 to 10/ton day of natural juice or 1 ton of concentrated juice. Equipment is standard, including water purification, pasteurization, centrifuging, vacuum concentrating, and canning. The extraction equipment varies with the product to be processed.

Small Scale Canning Equipment for Fruit Juice

Packing season	4 months
Production	even
Output	(100 tons/month) (32,000 x 7 lb. cans/month)
Production rate	200 cans/hour
Equipment	
1 reformer, 2 seamers, and 2 hand flanges	\$85,000
Cost of cans	\$ 160/thousand
Cost of ends	\$ 44/thousand

Source: Metal Box Limited, London, England.
(Costs are FOB UK port)

Other Processing

Wine Making

The one winery in Afghanistan, Castellino Wine Company in Kabul, has been operating since 1970. The company is a joint venture between Afghan and Italian interests. The principal products are table wines, distilled spirits and champagne.

A local market for wine does not exist and the Company has to depend primarily on sale to tourists (through the 12-15 hotels catering to foreign tourists) and export.

Table Wines. The red wines are made from table grape varieties, primarily from the Kandahar region. No true European wine grapes are grown in Afghanistan although the Khodoman Valley should be a good area for wine grapes. Wine is de-stemmed and crushed with imported machinery and fermented in eighteen 37-60,000 liter cement tanks. A basket press is used to separate the pomace from the wine. Italian bottling equipment is utilized, the bottles being imported from Pakistan. The bottle cost is 17 Afs, but 10-25 percent breakage during transport from Pakistan is not unknown.

Brandy. Brandy and a clear distillate, "Grappa" are produced from distilled wine or from low grade raisins which are soaked, fermented and distilled. The raisins are purchased from the raisin processor at 2 or 3 Afs per kilo, essentially for the sugar value. Apparently, it is difficult to obtain good, low grade raisins, the lower grades having excessive foreign matter. One ton of raisins produces 70 liters of 96 percent alcohol. Four pot stills are used.

The plant is working at one-third capacity due to the limited market. Total capacity is 1,500 tons of fresh grapes/year or 10,000 hectoliters. The plant employs 2 foreigners, 25 regular and 15 seasonal employees.

Product Line

<u>Product</u>	<u>Price/Liter</u>
Vinegar	35 Afs
Castellino White Wine	80
Castellino Red Wine	80
Vino Turin (red)	90
Champagne	140
Distilled Spirits	
Grappa	160
Brandy	280

A limited market exists for industrial alcohol in Afghanistan and the export potential was reported to be limited.

Sample export shipments of the table wines have been tried through Karachi to Japan, Hong Kong and the USA, but the results have been poor due to delays and heat damage at the port. The firm is optimistic over the potential to export wine through Russia in order to avoid high transit temperatures. The wines were clean, well filtered but only of average quality.

It is doubtful that the local wine market will show significant growth and the export market will be restricted by quality, high transportation costs and economic considerations.

Olive Packing

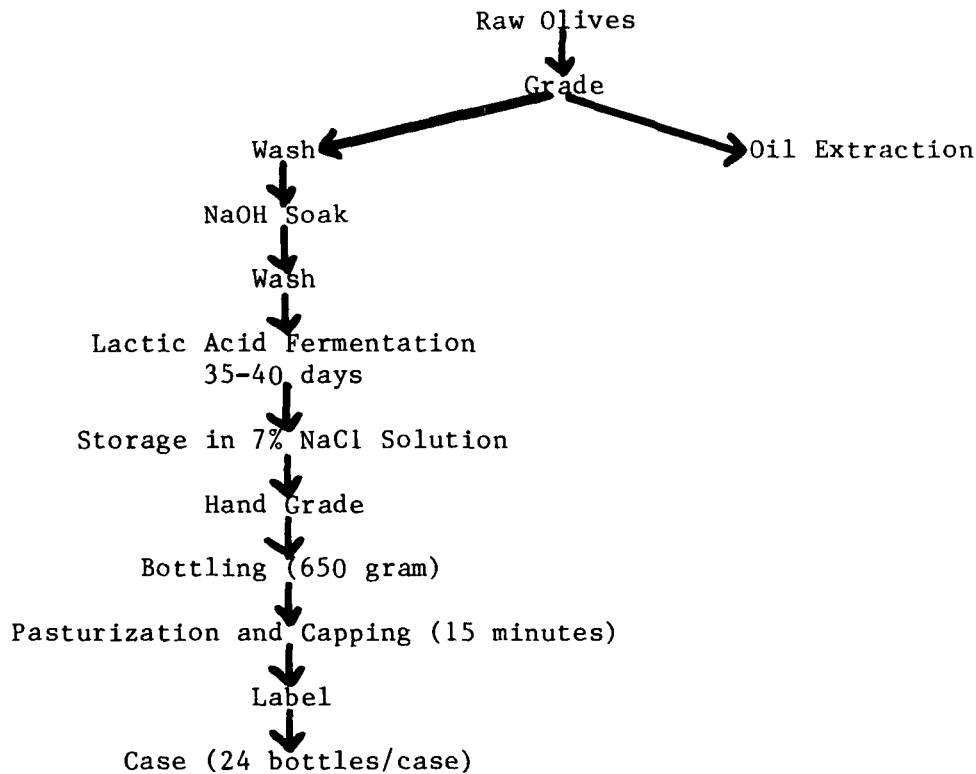
The curing and processing of olives into a Spanish style product as well as olive oil extraction are being actively developed by the Nangahar Mechanized Farm Project as an outlet for the irrigated olive orchard development that was initiated in 1966 along with the citrus plantings.

The olive trees appeared to be growing well and were better adapted to the area than citrus. Planting to date and expected production is:

	Planted Area (hectares)	Tons	
1966	6.3		
1967	6.3		
1968	73.4		
1969	399.8		
1970	584.6		
1971	8883.9	4.7	
1972	1,132.6	18.0	
1973	1,135.3	80.0	
1974	1,135.3	318.0	
1975	1,288.1	680.0	540 processed 140 crushed (oil)
1982 (expected)	3,726.0	3,726	

Spacing is 55 trees per jerib. It is expected that at full production around 1990, the 3,726 hectares will yield 4 tons per hectare, or 15,000 tons, an average yield for irrigated olives.

An old sugar cane mill is in the process of being converted to an olive processing plant with 250 ton capacity. A second plant 15 km from Jalalabad is being expanded to 750 ton capacity. The sugar mill has sixty-five 2.5 ton cement tanks and the other facility 174 tanks for fermenting olives. The basic process for the olives is:



Two pasturization processes were in use; autoclave and cooking uncapped on an electric stove. It was reported that the autoclave cook under pressure was superior, the plant experiencing spoilage problems with the other method. Bottle breakage is also a problem, at times being up to 10 percent.

The product was sampled and found to be uniform in size, a slightly light green color and a typical Spanish olive flavor, but with a slight bitterness, probably due to insufficient NaOH treatment. The olive harvest season is from August to December. The farm managers reported that at 600-700 tons per year they had sufficient harvest labor, but at 3,000 tons and over could require added outside labor.

Cost of Labor

Unskilled labor is generally available, although the 5-6 fold higher wages in neighboring Iran have stimulated movement from Western Afghanistan into Iran. This situation could reduce seasonal labor availability.

Unskilled

Unskilled labor is usually paid cash on a daily basis, or in some cases with a portion of the crop. There is little evidence of working women even at jobs normally performed by women requiring a high degree of finger dexterity. Kabul was an exception, and one raisin plant utilized up to 300 women for raisin grading. The unskilled wage rates paid and wages in other countries that produce similar fruits and vegetable exports are:

<u>Country</u>	<u>Afs/day</u>	<u>US\$/day</u>
Afghanistan	35-50	0.67- 0.96
Turkey		3.50- 4.50
Greece		7.00-10.00
California		20.00-25.00

Benefits are usually only provided to monthly, salaried workers, the fringe benefits accounting for an additional 30-35 percent cost in industrial companies.

The 4 to 30 fold labor cost advantage enjoyed in Afghanistan is a major resource and competitive advantage which should be maximized by conducting a maximum amount of hand process and packing in Afghanistan.

Skilled labor

As in many developing countries, trained and experienced skilled labor is in short supply, but available through a combination of in-plant training and the offer of higher wages to experienced personnel.

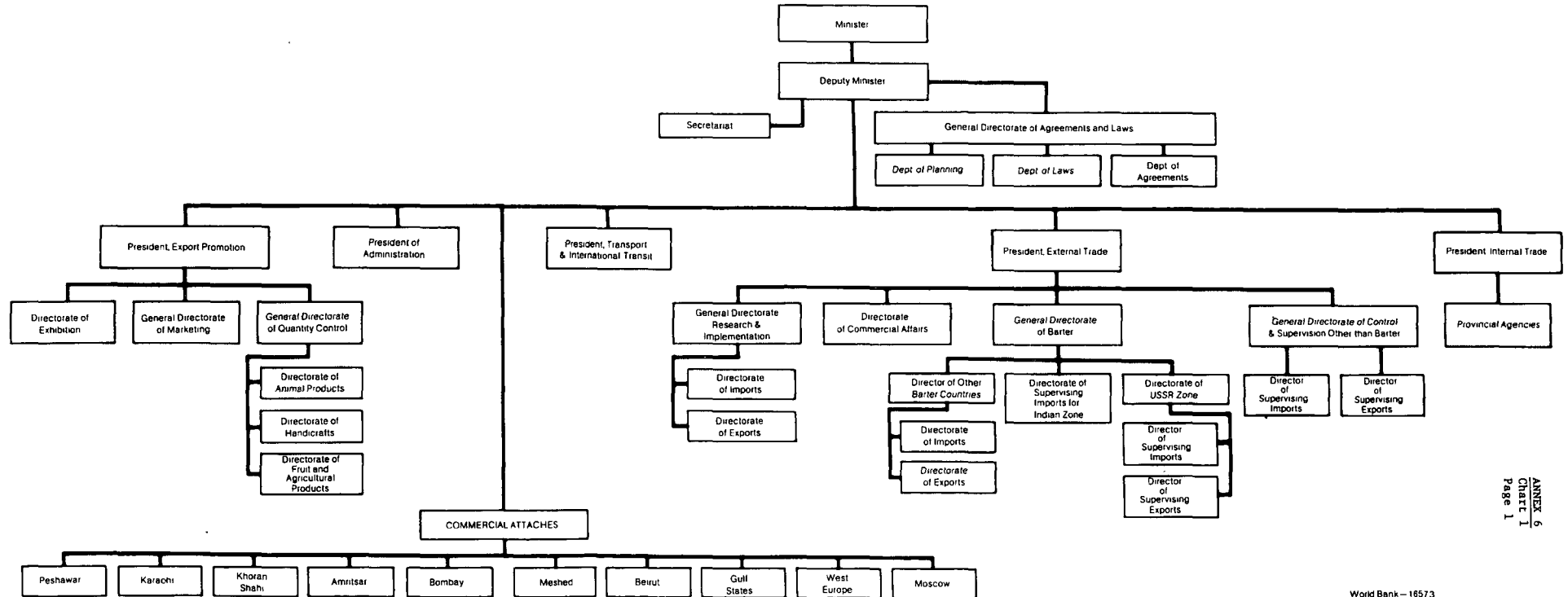
ANNEX 6

GOVERNMENT ORGANIZATION

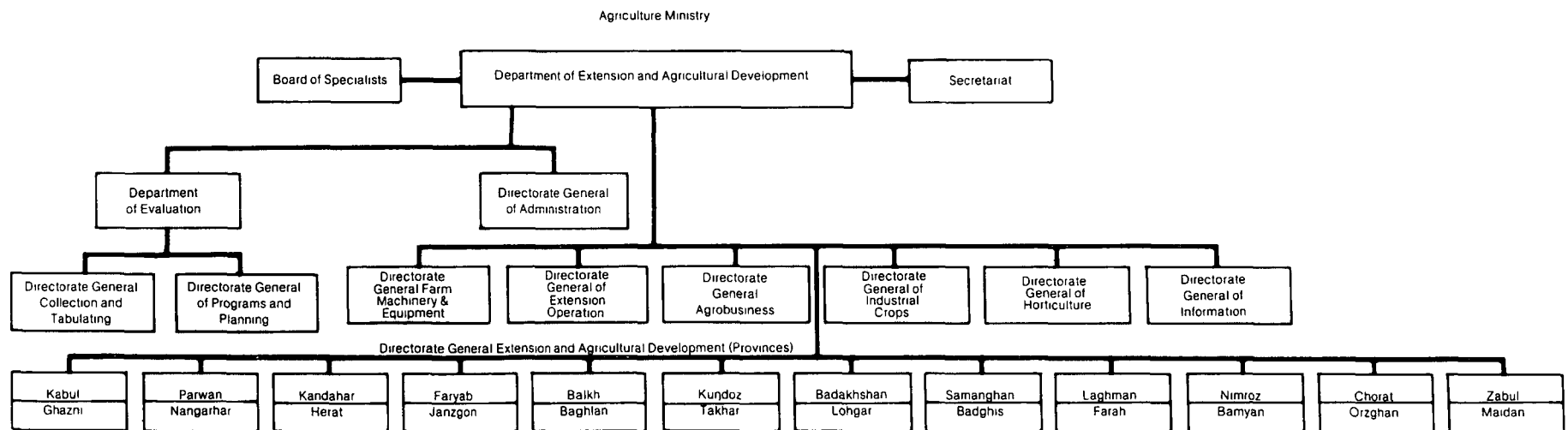
Table of Contents

- Chart 1 - Afghanistan - Organization Chart for the
Ministry of Commerce
- Chart 2 - Afghanistan - Organization Chart for the
Ministry of Agriculture

**AFGHANISTAN
ORGANIZATION CHART FOR THE MINISTRY OF COMMERCE**



AFGHANISTAN ORGANIZATION CHART FOR THE MINISTRY OF AGRICULTURE



Source: Translation of a Ministry of Agriculture Chart in Farsi