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Food Security

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- Opinions and judgments expressed are the authors' only. FAO proposes the text as basis for starting the discussion among scholars and policy makers on the issues related to the subject of the study.

THE IMPACT OF POLICY REFORMS
ON CONSUMERS AND FOOD SECURITY IN SYRIA

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THE IMPACT OF POLICY REFORMS ON CONSUMERS AND FOOD SECURITY IN SYRIA

INTRODUCTION

Starting from the second half of the 1980s, Syria began to implement, on a step-by-step approach, a national Program for Economic Policy Reform that gives due consideration to social aspects. This policy of gradualism and social orientation has characterized the Syrian development exercise during the last three decades. A number of institutional changes took place, and various developmental projects, financed solely by the government, or jointly by the government and donor countries or organizations, were implemented during this period. The present study is sponsored by one of these projects; the Institutional Support for Agricultural Policies project, which is financed by the Italian Government and implemented by the Food and Agriculture Organization.

The Project undertakes a multiple of activities. Some of these activities are concerned with the establishment of databases for agricultural economics and related activities. Others are concerned with the design and implementation of intensive training programs to upgrade the technical capabilities of the staff of the Ministry of Agriculture and Agrarian Reform and its affiliate organizations. Fields of training include policy analysis, formulation, implementation, monitoring and evaluation. Project activities also include carrying out a number of studies, each year, to follow up and evaluate developments in the various fields within the agricultural economy, with a view to reaching pragmatic policy recommendations.

The project Plan for 1999 included the preparation of a study on the effect of policy reforms on consumers and food security in Syria. An international consultant was selected to undertake the study, in cooperation with a team of national experts and a number of assistants that were enrolled in the Project's training programs. Preparations for the study were completed during December 1999; the study plan was prepared, data and information needed were identified, and different assignments were given to the team members and their assistants. The study was completed and the final draft report was presented in March 2000. Four annexes were attached to the main report. The first and second annexes analyzed recent developments in the natural resources, agricultural production, agricultural supporting services, agricultural investment policies, and other related activities. The third annex covered domestic marketing and foreign trade in agricultural products, including marketing and trade infrastructure, services, institutions, and policies. Finally, the fourth annex reviewed and analyzed developments in food consumption and related policies such as food subsidies and food distribution policies.

The organization of the main report has followed the formal definition adopted by FAO for food security, i.e., production of adequate food supplies, i.e., maximizing stability of supplies, and securing access to available supplies on the part of those who need them[1]. According to this definition, food security has three dimensions, availability, stability, and acquisition. The report closely analyzes the different factors affecting developments within these three dimensions, with a view to reaching specific policy recommendations, and suggesting a number of projects that would ensure sustainability of food security over time.

Availability of food supplies is the concern of Chapter II. It analyzes developments in the production of winter and summer crops (field and vegetable crops), fruit crops, as well as livestock, poultry and fish products, identifying achievements realized during the study period (1986-98). Factors affecting food and agricultural production, giving due consideration to the impact of the reforms in agricultural development and related policies that started in the mid-eighties, are also analyzed. Achievements and problems were identified Undertaken policy analysis covered management and organization of the agricultural sector, water resources management, and production support policies.

Chapter III discusses four main issues affecting the stability of food supplies. Issues discussed include the development of the ability to import food products as a means to support food self-reliance. After reviewing the developments in foreign trade during the period of study, the analysis concentrates on regional and international environment affecting foreign trade in agricultural products. Bilateral, multilateral and international agreements as means for promoting foreign trade are discussed, identifying pros and cons of joining the International Trade Organization. Adopted policies for the promotion of foreign trade are reviewed and assessed, identifying points of weaknesses. The analysis, then, concentrates on developing market infrastructure and promoting the effectiveness of food marketing and distribution systems, analyzing food marketing distribution policies. Finally, Chapter III discusses promotion of the quality of marketed food commodities as one of the factors affecting food security.

Chapter IV is concerned with the third dimension of food security, i.e., acquisition of food supplies. It discusses food price policies, and means to enhance the ability of unprivileged and low-income groups to acquire their food needs. The analysis covers food price policies, poverty status, and policies for ensuring food acquisition by unprivileged and low-income groups in Syria during the study period.

Chapter V reviewed the developments in the state of food security in Syria during the period 1986-98. The analysis covers developments in food demand, supply, and consumption. Developments of per capita consumption of food items, calorie intake, and expenditure on various food commodities, as well as developments in food self-sufficiency rates in Syria are also discussed.

[1] FAO (1993), "Director-General's Report on Food Security: A Review of the Concepts and Approaches". Committee on World Food Security, Eighth Session, Rome, 13-20 April 1993.

Chapter VI concentrates on the prospects of food security for Syria in the years 2010 and 2020. In this respect, projections are estimated for agricultural resources, and crop and livestock productivity. Expected production of various agricultural outputs is calculated for the years 2010 and 2020. In light of population and income projections, along with income elasticity of demand for food items, prospects of food security are analyzed under different scenarios.

Chapter VII recommends policies and programs for food security in Syria, including policies for production of adequate food supplies, stabilization of food supplies, and enabling acquisition of food for those who need it.

Finally, Chapter VIII gives profiles for a number of projects for promoting food security. These projects range from developing water resources, improving irrigation efficiency, and promoting supplementary irrigation in rainfed areas, to promoting sustainable rainfed farming, establishing integrated pest management, and establishing market information and analysis system.

AVAILABILITY OF FOOD SUPPLIES

The objective of any economic system may be summarized in achieving economic plentiness for all people through the efficient utilization, conservation, and development of the societies resources on a sustainable basis. The development objectives of the agricultural sector originate from and contribute to this main objective. Achieving these objectives necessitates that agricultural and food products are of the quality that satisfies the requirements of domestic and foreign markets and meet the food needs of the population without violating efficiency requirements.

Syrian policy and planning efforts were not far from this framework. Aforementioned objectives were on the top priority of successive economic development plans for the last three decades; however, with different means and ways in different periods to suit prevailing social and economic conditions in different times. This chapter reviewed achievements in this respect, identified points of weaknesses and possibilities of future developments with a view to identify policies, plans and programs ensuring the realization of these developments.

Syria has achieved substantive agricultural development during the last three decades. These achievements were made possible only through the substantive reforms implemented since the late 1980s, through the 1990s and until the present time. These reforms have enabled the design and implementation of more conducive policies that significantly improved the performance of the agricultural sector, and increased the rate of its development. The analysis concentrated on this period to assess the effectiveness of the reform polices and identify possibilities of future developments. The analysis was based on the comparison between two three-year periods of time, 1986-88 and 1996-98. The three-year average was meant to avoid any erratic factors that might be embodied when comparing single years, especially within the prevalence of rain-fed agriculture.

1.1 Developments in Agricultural Resources

2.1.1 Land Resources

The major developments in land use between the two periods 1986-88 and 1996-98 may be summarized in the following two major factors:

- The increase in the cropped area from an average of 4.08 to 4.77 m. ha, at 1.6% annual rate of growth; and
- The high average annual growth rate in irrigated agriculture, amounting to 6.01%, that resulted in almost 180% rate of overall growth in agricultural production. The realized growth in rain-fed agriculture, on the other hand, was insignificant (0.05% annually).

The main obstacles/problems facing the development of land resources may be summarized in the following factors:

- More than 75% of the cropped area depends on rainfall as the main source of water, resulting in high annual production fluctuations;
- Irrigated agriculture suffers from the prevalence of smallholdings at different degrees. The average size of holding in the governorates of Damascus, Tartous, Lattakia, and Deerezour is less than 5 ha., and ranges

between 5 and 10 ha. in Suwayda, Der'a, Konaytera, Homs, Idleb, and Hama governorates; and

- Soil deterioration and decreasing soil fertility caused by increasing intensification of agriculture and bad soil management, along with the limited use of fertilizers. The use of large size tractors and other agricultural machinery, repeated deep ploughing, and lack of applying appropriate agricultural rotation have exacerbated the problem. Soil deterioration has been more serious in marginal areas that receive small and erratic rainfall.

The Ministry of Agriculture and Agrarian Reform (MAAR) has implemented 8 projects for fruit trees planting and land development in areas suffering from soil deterioration. Implementation started in 1977 for two projects and in 1986 for the other six projects.

2.1.2 Water Resources

Water resources constitute the main constraint for agricultural development in Syria. Amount of water resources is limited and its use efficiency is low. Moreover, some of the Syrian water resources are shared with neighboring countries, where water negotiations have not yet been finalized. The agricultural sector consumes about 90% of the utilized water. The period 1986-98 witnessed large increases in the utilization of water resources, resulting in lowering the level of groundwater and increasing pumping costs, in addition to the dry up of some wells and increasing salt content in some areas.

The low efficiency of irrigation systems in Syria has been reported in a number of studies. This is mainly attributed to the prevalence of traditional irrigation techniques. The area utilizing modern irrigation systems amounts to only 86 thousand ha. The low efficiency of irrigation network adds to the problem. However, Syria witnessed some development in the management of water use. This is indicated by the fact that irrigation water increased about 60% during the 1986-98 period, while the irrigated area increased about 79%, along with the fact that only 7% of the irrigated area witnessed development in their irrigation systems

Problems and obstacles related to water resources and their use may be summarized in:

- The high fluctuations in rainfall that negatively affect rainfed farming and the recharge of groundwater; and
- The low efficiency of irrigation infrastructure and on farm water use that are mainly caused by the prevalence of traditional irrigation systems in large areas of irrigated agriculture.

2.2 Developments in Agricultural Production

2.2.1 Winter Crops

Agricultural production in Syria witnessed a number of developments during the last three decades. A number of programs and projects have been implemented through a series of development plans to gradually develop the use of modern techniques in agriculture. The results of this development may be witnessed through analyzing the

figures of Table 2.1 that gives the annual average area, yield, and production of winter crops in the above-mentioned two periods (1986-88 and 1996-98), and table 2.2 that explains the reason behind production changes between the two periods. Analysis of these figures indicates the following:

- Production of 10 crops, constituting about 55% of the cropped area, increased at different rates between the two periods, while the same for other crops stabilized or decreased. These 10 crops are wheat, lentils, chickpeas, cumin, lupines, grazing barley, aniseed, dry peas, chard, and other grazing crops. Only four of these crops realized high production increases between the two periods, most important of which is wheat, for which production increased by 97%, at an annual rate of 7.02%.
- The high increase in wheat production was mainly due to the increase in the area of irrigated wheat, which reached 83%. The 31% increase in wheat yield also contributed to the production increase.

Table 2.1: Development of the production and productivity of winter crops between the two period 1986-88 and 1996-98

(area in 1000 ha., production in 1000 ton, and yield in ton per ha.)

Item	1986-88 (Irrigated + rain-fed)			1996-98 (Irrigated + rain-fed)			Rate of change (%)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Wheat	1,127.4	1,897.5	1.68	1,700.4	3,741.0	2.2	51	97	31
Barley	1,654	1,509.3	0.91	1,554.9	1,168.2	0.75	-6	-23	-18
Lentils	96.2	101.8	1.06	134.6	1,311	0.97	40	29	-8
Chick peas	68.6	42	0.61	89.6	63.1	0.7	31	50	15
Dry brand beans	9.9	17.3	1.74	7.8	14.2	1.84	-22	-18	5
Vetch	26.5	18.4	0.7	14.7	9.7	0.66	-44	-47	-5
Pecan	12.8	10	0.78	11.4	9.3	0.82	-11	-7	5
Vetch beans	13	5.6	0.43	11	5.5	0.5	-15	-1	17
Peas (dry)	0.7	0.7	0.95	0.5	0.5	1.07	-36	-28	12
Cumin	5	2.5	0.5	23.3	12.8	0.55	367	415	10
Oats	0.7	0.8	1.06	0.2	0.2	1.02	-68	-69	-3
Lupines	0.05	0.05	1.02	0,1	0.2	1.54	114	223	51
Grazing pecan	24.6	164.9	6.7	9.3	145.8	15.71	-62	-12	134
Grazing barley	39	316.1	8.1	45.6	459.6	10.07	17	45	24

Table 2.1: (Continued)

Crop	1986-88 (Irrigated + rainfed)			1996-98 (Irrigated + rainfed)			% Change		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Alfalfa	0.8	23.7	29.8	0.3	6	22.33	-66	-75	-25
Aniseed	0.7	0.8	1.16	0.8	0.8	0.99	25	7	-14
Green peas	1.7	9	5.23	1.8	9.7	5.55	2	8	6
Broad beans	9.6	72.2	7.55	5.3	37	7.03	-45	-49	-7

Cabbage	3.5	84.9	23.94	3.2	77.6	2.93	-9	-9	0
Cauliflower	3.1	75.1	23.99	2.6	64.7	2.45	-16	-14	2
Chard	1	15.2	15.29	1.1	16.05	14.96	8	6	2
Green onions	3.8	57.6	15.03	2.85	40.9	13.34	-26	-29	-5
Lettuce	2.7	59.2	22.04	2.7	55.6	20.58	1	-6	-7
Other vegetables	5.2	95.5	18.24	3.8	64.7	16.98	-27	-32	-7
O. grazing crops	0.4	6	17.11	1.3	20.4	15.72	270	240	-8
Fennel flower	-	-	-	0.09	0.6	0.72	-	-	0

Source: Compiled and calculated from: Ministry of Agriculture and Agrarian Reform, Annual Statistical Group for the years 1986-1998.

- Lentils realized a 29% increase between the two periods, at an annual rate of 2.6%. This increase was attributed both to the 43% increase in rain-fed area, and the 2.1% increase in the yields of irrigated lentils that compensated for the decrease in the area planted;
- Chickpeas, which is the third most important winter crop, realized a production increase of 50%, at an annual rate of 4.1%, between the two periods. This was made possible through the 31% area increase and the 2.8% increase in the yields of irrigated chickpeas; and
- Barley is one of the main crops experiencing a decline in production. Its production decreased by 23%, at an annual rate of -2.5%. This production decline was due to the 72% decline in the area of irrigated barley and the 17% yield decline in the rain-fed areas.

Table 2.2: Causes of changes in the production of major[1] winter crops between the periods 1986-88 and 1996-98

Major winter crops realizing production increases						Winter crops realizing production decreases					
Crop	Percent change in					Crop	Percent change in				
	Production	Irrigated area	Yield (irrigation)	Rainfed area	Yield (rainfed)		Production	Irrigated area	Yield (irrigation)	Rainfed area	Yield (rainfed)
Wheat	97	-183	10	16	9	Barley	-23	-27	33	-5	-17
Lentils	29	-96	23	43	-8	Vetch	-47	198	49	-45	-7
Chickpeas	50	4	32	31	15	Pecan	-7	-57	7	-0.02	12
Grazing barley	45	78	-	38	-13	Vetch beans	-1	0	0	-15	17
						Range pecan	-12	14	62	-81	42

1. Major crops are defined, for the purpose of the present study, as crops that are planted on 10,000 ha. or more on the average during the period 1986-88.

Source: Collected and computed from Tables 2/1, 2/2, and 2/3 of Annex number 2.

2.2.2 Summer Crops

Table 2.3 gives changes in the area, production, and yield of main summer crops between the two periods 1986-88 and 1996-98, and Table 2.4 gives the reasons behind these changes. Analysis of the figures of the two tables indicates the following:

- Ten crops, covering about 75% of the summer cropped area, realized production increases at different rates between the two periods. These crops are yellow corn, cotton, tobacco, sugar beets, groundnuts, broom millet, potatoes, gourd, garlic, and sunflower. Production of the other 23 summer crops, which occupy only 25% of the summer cropped area, either stabilized or decreased between the two periods;
- Three of the above-mentioned ten crops realized an increase of more than 130%. These crops are yellow corn (234%), sugar beets (195%), cotton (127%), and sunflower (130%). These four crops occupy, on the average about 60% of the summer cropped area;
- The main reasons causing the increase in the production of corn, cotton, tobacco, sugar beets, and groundnuts are the respective increases in the area under irrigation allocated for them, along with yield increases. With respect to potatoes, the yield increase compensated for the decrease in the planted rain-fed and irrigated areas; and
- Production of seven crops (white corn, sesame, tomatoes, watermelon, sweet melon, and cucumbers) decreased between the two periods. These production decreases were caused by corresponding decreases in the area allocated for these crops, irrespective of the fact that most of these crops realized yield increases at different rates.

Table 2.3: Development of the production and productivity of summer crops between the two period 1986-88 and 1996-98

(Area in 1,000 ha., production in 1000 ton, and yield in ton per ha.)

Crop	1986-88 (Irrigated + rainfed)			1996-98 (Irrigated + rainfed)			Rate of change (%)		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Corn	44.08	73.79	1.67	73.51	246.09	3.345	67	234	101
White maize	11.41	7.37	0.65	5.41	4.27	0.78	-53	-42	21
Cotton	148.00	414.05	2.80	248.23	941.72	3.78	68	127	35
Beans	5.47	8.65	1.57	2.09	3.54	1.69	-62	-59	8
Cow peas	0.04	0.06	1.33	-	-	-	-	-	-
g. cow peas	2.74	10.51	3.82	2.03	7.82	3.86	-26	-26	1
Tobacco	14.48	16.25	1.12	14.73	22.72	1.54	2	40	37

Table 2.3: (Continued)

Crop	1986-88 (Irrigated + rainfed)			1996-98 (Irrigated + rainfed)			% Change		
	Area	Prod.	Yield	Area	Prod.	Yield	Area	Prod.	Yield
Sesame	28.68	11.91	0.42	15.71	6.49	0,46	-45	-45	8
Sugar beet	13.68	373.20	27.05	26.91	1,100.9	42.55	89	195	57
Groundnuts	10.59	21.85	2.06	13.56	28.32	2.13	28	30	3
Sunflower	14.29	13.14	0.91	3.59	6.63	1.84	-75	-50	101
Broom millet	1.31	1.70	1.28	1.64	1.81	1.09	25	7	-15
Clover	5.98	203.24	34.33	4.28	114.57	26.74	-28	-44	-22
Millet	5.82	117.68	20.56	5.76	92.35	15.71	-1	-22	-24
Tomatoes	34.3	602.20	17.57	18.91	457.1	24.26	-45	-24	38
Watermelons	73.20	541.85	7.41	24.30	291.92	12.12	-67	-46	63
Sweet melons	18.00	118.95	6.58	7.16	55.69	7.81	-60	-53	19
Potatoes	22.04	359.88	16.39	20.97	398.97	18.91	-6	11	15
Green beans	5.98	53.55	8.97	3.68	32.89	8.95	-39	-39	0
Gourd	5.62	27.39	4.89	4.02	30.7	7.55	-28	12	66
Egg plant	8.84	197.23	22.34	6.21	141.64	22.85	-30	-28	2
Dry onions	6.81	125.94	18.34	5.80	113.12	19.48	-15	-10	6
Garlic	1.90	13.92	7.31	2.17	19.08	8.81	14	37	20
Okra	6.94	21.93	3.16	5.14	13.72	2.69	-26	-37	-15
Veg., marrow	9.95	136.89	13.77	6.03	100.43	16.66	-39	-27	21
Cucumbers	20.80	248.13	11.91	9.64	119.29	12.39	-54	-52	4
Pepper	4.15	58.27	14.04	2.69	38	14.18	-35	-35	1
Other veget.	1.00	12.06	12.52	1.90	25.27	13.31	91	110	6

Source: Calculated from, MAAR, Annual Statistical Bulletin for the years 1986-1998.

Table 2.4: Causes of changes in the production of major[1] summer crops between the two periods 1986-88 and 1996-98

Major summer crops realizing production increases						Major summer crops realizing production decreases					
Crop	Percent change in					Crop	Percent change in				
	Production	Irrigated area	Yield (irrigation)	Rainfed area	Yield (rainfed)		Production	Irrigated area	Yield (irrigation)	Rainfed area	Yield (rainfed)
Corn	234	69	100	0	0	Wheat corn	-42	-88	51	-48	27
Cotton	127	68	35	0	0	Sesame	-45	-67	10	-29	88
Tobacco	40	9	35	-1	33	Sunflower	-50	-55	53	-85	108
Sugar beets	195	93	56	0	0	Tomatoes	-24	-53	58	-21	23
Groundnuts	30	28	3	0	0	Watermelon	-46	-46	111	-69	21
Potatoes	11	-3	14	-54	-7	Sweet melon	-53	-49	4	-63	4
						Cucumbers	-52	-56	10	-50	-9

2. Major crops are defined, for the purpose of the present study, as crops that are planted on 10,000 ha. or more on the average during the period 1986-88.

Source: Collected and computed from Tables 2/1, 2/2, and 2/3 of Annex number 2.

2.2.3 Fruit Crops

Table 2.5 exhibits the changes in fruit production and their causes between the above-mentioned two periods. Analysis of these figures indicates the following:

- Fruit production increased at different rates, except for 4 fruits. These are janarek, which decreased by 50%, plums, which decreased by 26%, peaches, which decreased by 11% and walnuts, which decreased by 2%;
- Production of seven fruits (olives, apples, cherries, almonds, pistachios, oranges, and lemon) was either doubled or more than doubled. Area under these crops represents about 83% of the total area under fruits.
- The increase in olives production at the annual rate of 5.1% was due to the 28% increase in the number of productive trees, and to the 2% annual increase in yield;
- Doubling apples production was due to the increase in the number of productive trees in rain-fed and irrigated areas by 72% and 46%, respectively, and to yield per tree increase of 3.3% and 2.7% under rain-fed and irrigation conditions, respectively;
- The increase in the number of productive trees and yield per tree was doubled for cherries production;
- In spite of the decrease in the yield per tree for almonds and pistachios of 2% and 12% respectively, large increases in the number of productive trees more than compensated, resulting in increasing their production by 5% and 7.2% respectively;
- Causes of the increase in oranges and lemon production by 12.5% and 11.5% respectively include the increase in their rain-fed areas and in their yield per productive tree.

Table 2.5: Average annual production and productivity for fruit crops and percentage changes between the two periods 1986-88 and 1996-98

Fruit	Annual production in thousand tons			# Of productive trees under rainfed conditions			Tree productivity under rainfed conditions in kg.			# Of productive trees under irrigation			Tree productivity under irrigation (kilograms)		
	86-86	96-98	% Change	86-88	96-98	% Change	86-88	96-98	% Change	86-88	96-98	% Change	86-88	96-98	% Change
Olives	372.5	611.9	64	25,404	32,576	28	14	17	25	574	2,060	259	33	23	-31
Grapes	501.4	527.3	5	53,913	39,175	-27	8	10	25	6,666	6,681	0	13	22	76
Figs	44.7	46	3	2,765	2,119	-23	15	19	26	192	261	36	20	25	26
Apricot	59.3	61.7	4	350	325	-10	18	13	-26	2,109	2,023	-4	25	29	16
Apples	161	340	111	2,835	4,886	72	26	36	39	2,841	4,136	46	30	39	30
Cherries	22.9	45.8	100	995	2,231	124	17	15	-13	255	501	96	22	24	11
Almonds	30.4	49.5	63	5,339	8,871	66	6	5	-17	123	142	15	13	12	-7
Pistachios	14.9	29.8	100	1,708	3,635	113	8	7	-12	38	201	433	10	13	31
Oranges	107.5	349.2	225	0	0	0	0	0	0	1,312	3,518	168	81	99	23
Lemon	21.3	63.1	196	0	12	-	0	-	-	447	733	64	47	87	84
Janarek	22	11	-50	69	45	-35	15	9	-42	829	541	-35	25	20	-21
0. Citrus	76.5	249.8	226	0	0	0	0	0	-	1,053	2,879	173	73	87	20
Walnuts	13.4	13.2	-2	80	98	23	24	18	-24	298	404	35	39	29	-26
Pears	17.1	25.5	49	290	383	32	18	17	-6	500	841	68	23	23	0
Peaches	31.7	23.5	-26	470	287	-39	24	25	5	843	672	-20	24	25	5
Pomegranates	66.8	79	18	688	441	-36	17	20	18	2,638	2,692	2	21	26	25
Peaches	41	36.4	-11	156	206	32	15	17	10	1,524	1,580	4	25	21	15
Quince	1.7	6.8	291	28	60	115	28	28	0	54	260	382	18	20	12
Loquat	0.3	0.8	200	6	14	149	14	18	21	6	26	196	22	21	-3
Dates	0.2	2.5	1043	0	6	-	0	247	-	5	58	1133	16	39	150

Source: Collected and calculated from tables of Annex 2.

2.2.4 Livestock, Poultry, and Fish Production

Tables 2.6 and 2.7 give the average annual livestock, poultry and fish production along with their percentage change between the above-mentioned two periods (1986-88 and 1996-98). Analysis of the figures of the two tables indicate the following:

- Numbers of improved cattle stock increased by 279%, while numbers of Shami, foreign, and local cattle decreased by 64%, 36%, and 1 respectively;
- Sheep numbers increased by 14%, from 12.3 m. head to 12.1 m. head, while goat numbers increased by 8%, from 1.02 to 1.09 m. head;
- Red and white meat and milk production realized significant increases between the two periods. Red meat increased at an annual rate of 4.1%, while milk increased at the rate of 3.3% to reach about 1.6 m. ton;
- Poultry products realized a sustained increase at the annual rate of 2.9% for white meat and 3.6% for eggs;
- Fish production was more than doubled, increasing from 5,300 to 11,900 ton; and
- Honey production was also more than doubled, increasing form 600 tons to 1,400 tons between the two periods.

Table 2.6: Numbers of livestock and percentage change between 1986-88 and 1996-98

Type of animal	Average 1986-88	Average 1996-98	% Change
Improved cattle	124,000	469,100	279
Foreign cattle	189,500	187,200	-1
Shami cattle	43500	15,600	-64
Local cattle	304,300	194,600	-36
Buffalo	1500	1,500	0
Goats	1,018,000	1,094,000	8
Sheep	12,342,800	14,124,500	14

Source: Ministry of Agriculture and Agrarian Reform, Annual Agricultural Statistical Bulletin, the years 1986-88, and 1996-98.

Table 2.7: Changes in livestock, poultry, fish, and bee production between 1986-88 and 1996-98

Product	Unit	1986-88	1996-98	% Change
Red meat	Ton	131,200	196,500	50
White meat	Ton	67,800	90,600	34
Milk	Ton	1,177,400	1,632,900	39
Eggs	Million	1,576,100	2,243,600	42
Honey	Ton	600	1,400	112
Fish	Ton	5,300	11,900	122

Source: Ministry of Agriculture and Agrarian Reform, Annual Agricultural Statistical Bulletin, the years 1986-88, and 1996-98.

2.3 Reforms in Agricultural Development and Related Polices

Macroeconomic and agricultural polices are considered the major means for achieving objectives of agricultural development planning, irrespective of whether it is central or indicative. Syria adopted central planning before 1986, when the government started to gradually implement some liberal measures. Before 1986, the Syrian economy was characterized by the prevalence of the following main holistic policies:

- Public ownership of major means of production;
- State monopoly of foreign trade;
- Limited role for the private sector in foreign trade and related services;
- Guaranteed employment for labor force;
- Realization of high level of price stability; and
- Income redistribution to the benefit of laborers and peasants;

Means utilized to realize the objectives of these holistic policies included:

- Central planning and control of economic activities;
- Central prior determination of input and output prices; and
- Subsidizing agricultural production to sustain price stability while controlling prices of agricultural products.

While five-year planning was adopted for the whole economy, it used to be implemented in agriculture through annual production plans. Once the Supreme Agricultural Council approves these annual plans, they become mandatory. Plans

normally specify cropped areas, crops to be planted, and agricultural rotations to be applied for different regions. Farmers and investors become responsible for the management of their farms and making every possible effort to increase their production and combat plant pests.

The Government started implementing gradual agricultural economic reform measures as of 1986. Law No. 10 for 1986 allowed the establishment of joint (private-public) agricultural companies. The Law was followed by a number of measures to liberalize production of some agricultural commodities and trading in agricultural inputs. Within this atmosphere, agricultural policies started to be changed. Because of their important effects on agricultural and food production and productivity, the following sections will review and analyze the development of the agricultural and related polices during the period 1986-98[2]. These policies could be classified, for the purpose of the present study, into three major groups; management and organization policies, agri-supports polices, and technical development policies.

2.3.1 Management and Organization Policies for the Agricultural Sector

This group of polices may further be classified into agricultural investment, production support, tax, water, and crop structure policies.

2.3.1.1 Investment Policies

Agricultural investment policies witnessed major developments since the issuance of Law No. 10 for 1986. Investment Promotion Law No.10 for 1991 was issued, and later amended by Decree no. 7 of 2000. Law No. 20 was issued in 1991to allow non-resident Syrians to get the benefits included in 1990 Law. A number of orders followed to give additional benefits for projects exporting 50% or more of their production and/or implemented outside Damascus and Aleppo governorates. The most important changes introduced by Law No. 10 for 1991 are stated below:

- Allowing the private sector to import all machinery, implements, raw materials, production prerequisites, cars and buses serving projects, along with tourist service cars;
- Provision of a 5-year tax and custom duties holiday for private investment projects, and 7-year for State joint projects;
- Permitting the transfer of profits, revenues, and loan installments out of the country;
- Granting private sector projects the right to open foreign exchange accounts;
- Giving investors the option to get credit from local banks in local currency against appropriate collaterals;
- Allowing investors to insure their investments with the Arab Organization for Investment Assurance or any other institution;

[2] For more detailed information refer to Appendix No. 2.

- Granting Arab and foreign laborers, technicians, and professionals working in investment projects implemented under provisions of this Law to transfer 50% of their net salaries, and 100% of their bonuses and incentives to their countries; and
- Granting projects implemented before the issuance of this Law the same benefits upon the approval of the Supreme Investment Council.

2.3.1.2 Input Provision Policies

The Government used to implement intensive production support policies before 1986, with a view to promote agricultural development. This support covered a wide spectrum, most important within which are agricultural prerequisites such as fertilizers, pesticides, seeds, improved seedlings, animal feed, fuel, and lubricants. However, these polices led, in many cases, to the over use of some inputs, lowering the level of allocative efficiency within the agricultural sector, and overburdening the government budget.

These policies were amended as of 1986, when a number of consecutive orders were issued to abandon subsidizing locally produced seeds and imported agricultural inputs such as fertilizers, pesticides, and agricultural machinery. Support to agricultural production is presently confined to the partial subsidization of irrigation water and agricultural finance.

2.3.1.3 Production Policies

A number of amendments have been effected as of 1987 on agricultural production policies. Accordingly, the role of the Government in the design and approval of the production plan was confined to the following:

- Setting general indicators for the production of strategic crops sub as wheat, barley, cotton, sugar beets, tobacco, chickpeas, and lentils, in light of the demand for them, taking into consideration their comparative advantage;
- Determining the agricultural rotations and crop structure in accordance with soil capabilities and water availability, taking into consideration all aspects of resource conservation;
- Determining appropriate times for starting and ending agricultural production activities for different seasons in different regions, taking into consideration the recommendations of agricultural research;
- Provision of production prerequisites at appropriate times;
- Provision of agricultural extension services; and
- Provision of prerequisites to combat disease outbreaks.

Hence, state intervention in the crop structure became confined to strategic crops such as major food and industrial crops. Farmers have full options to produce any of the other crops. Moreover, smallholdings of less than half a hectare are not bound by the crop structure implemented in their neighborhood. The Ministry of Agriculture and Agrarian Reform prepares annual agricultural production plans, specifying the main features of crop structure according to the following:

- Applying a rotation of 80% and 20% intensity for winter and summer seasons in irrigated areas utilizing pumped groundwater;
- Abolishing summer crops in irrigated areas falling within the fourth and fifth settlement areas, with a view to optimize the use of water resources;
- Applying intensity rates of 100%, 865%, and 60% in the first, second, and third settlement areas respectively; and
- Abolishing summer cropping in raifed areas within the 5th settlement area.

2.3.1.4 Tax Policies

Agricultural taxes before 1986 comprised the following:

- Tax levied on livestock vide Law No. 794 for 1928, amended by Law No.25 for 1957, which fixed the tax rate at SP2.25 per head for sheep and goats, SP4 per head for cattle, and SP 7 per head for Camels. This rate is still applicable at the present time.
- Agricultural production tax, which ranges between 9% and 12% of the value of products (according the Law No. 384 of 1957). This tax covers cotton, sugar beets, and tobacco upon being processed, and grains, olives, vegetables and fruits, when exported. Sesame is exempted from this tax. In 1962 vegetables and fruits were exempted, and lately cotton was also exempted from this tax;
- Tax on agricultural imports, especially agricultural prerequisites., at the rate of 7% of their value.

The economic reform period witnessed the exemption of a number of products form taxes. Products exempted included olives, olive oil, cotton and its products. With respect to vegetables and fruits, they were exempted as of 1957.

2.3.2 Water Resources Management Policies

As aforementioned, the Government has always been deeply involved in water resources development activities, with a view to improve water use efficiency. A number of researches have been carried out and a number of projects have been implemented to develop and improve efficient irrigation techniques. The government has also designed, implemented, and managed main irrigation networks, with a view to increasing water availability for irrigation. The government policy in this respect is to have the beneficiaries cover part of the cost of establishing, managing and running such projects.

At the beginning, irrigation fees specified by Law No.46 for 1972 were set at SP70 per hectare per year to cover part of the design and implementation cost, and SP5 to cover part of the operating and maintenance costs. These fees were increased to SP1,075 and SP200 for establishment and operation-maintenance costs respectively, vide Law No. 19 for 1989. Furthermore, Legislative Order No. 128 for 1989 was issued to allow for increasing irrigation fees to be in accordance with the operation and maintenance cost increase. According to this Law, irrigation fees were increased to SP2,500. Again, these fees were increased to SP3,500 per hectare in the year 2000.

2.3.3 Production-Support Policies

Production support includes a wide range of services, including agricultural finance, agricultural research, agricultural extension, and veterinary and pest control services of emergency nature. Government policies in this field aim at ensuring and improving these services with a view to help achieving sustainable development. The Government has been adopting intensive subsidy-inclined policies in providing these services to the farmers. Most of these services have been provided completely free of charge, or at highly subsidized prices. However, starting from 1986, the Government gradually started to adopt less subsidy-inclined polices.

2.3.3.1 Agricultural Finance Policies

Agricultural finance is one of the important instruments for orienting investments as well as maximizing the benefits from other services such ass scientific research and extension. The agricultural Cooperative Bank takes the responsibility of providing financial services to the agricultural sector in Syria. Its role is not confined to provision of loans necessary for carrying out agricultural activities. It goes beyond that to provide farmers with production prerequisites. Hence, the main features of the agricultural finance policy could be detected from studying the conditions of benefiting from the available loans, and the general structure of the loans extended by the Bank.

Crops standing in the field serve as collaterals against short-term seasonal loans. However, medium and long-term loans require real state collaterals. Interest on loans, ranging between 4% for cooperative and public sectors, and 5.5% for the private sector, are subsidized by the State. However, interest rates on short-term loans of more than SP50,000 could reach 6% for cooperative and public sectors, and 7.5% for the private sector.

Loans granted by the Bank increased from an average annual amount of SP2.5 billion in 1986-88 to SP14.2 billion in 1996-98, at an annual rate of increase amounting to 19%. This high rate of increase in loans granted to the agricultural sector was needed to meet the increase in the cost of production commensurate with the economic policy reform applied during this period, which resulted in abolishing subsidies on agricultural inputs. It should also be noticed that the continuous decrease in the exchange rate in the currency added another source of cost increase, especially with respect to imported inputs. Short-term loans have increase from 72% of total loans to 82% during this period. Medium-term loans came next, increasing from 2% to 16%. Accordingly, long-term loans decreased during the same period from 7% to only 2%.

2.3.3.2 Agricultural Research Policies

Agricultural research institutions, all of which are public, comprise universities and research departments in the Ministry of Agriculture and Agrarian Reform and its affiliated specialized bureaus. Research activities have developed during study period. In spite of the good achievements realized in the agricultural sector, agricultural research needs to be activated and strengthened to meet the challenges enforced by the economic and trade developments at the international level. The structure of agricultural research needs to be changed. More financial resources need to be committed to develop research

capabilities and implement well prepared research programs. Moreover[3], an incentive policy needs to be designed and implemented to promote research activities.

In spite of the fact that agricultural researchers are in short supply within the Ministry of Agriculture and Agrarian Reform, Syrian universities do not share in research activities carried out by the Ministry. Irrespective of the reason behind this phenomenon, it resulted in lower research efficiency. It also resulted in decreasing the research capability in solving the many problems faced by farmers, especially those caused by the emerging changes on the international scene.

2.3.3.3 Agricultural Extension Policies

The Ministry of Agriculture and Agrarian Reform carries out all extension activities. These services are provided free of charge to farmers and agricultural investors in general. Extension activities have been gradually developed during the study period 1986-98. Specialized centers for qualifying and training agricultural extension workers graduating from the universities and agricultural schools have been established. Extension equipment and means have also been developed. Production of extension films and establishing extension fields has also been increased.

2.3.3.4 Agricultural Technology Development Policies

The range of policies for the development of agricultural technology is wide enough to accommodate a number of related policies. They include policies for provision of production prerequisites (chemical fertilizers, pesticides, improved seeds, etc.), for encouraging farmers to utilize modern technology (drip or sprinkler irrigation), for financing the acquisition of modern technical equipment, and for developing and/or transfer of technology. However, since most of these policies are discussed under other sections, the present section will concentrate on policies for provision of production prerequisites. Former policies in this respect were to provide these inputs to farmers at subsidized prices. However, these policies were changed as of 1986 to reduce and eventually abolish subsidies. Changes in input-specific policies are discussed below:

a. Chemical Fertilizers

The government policy in this respect may be summarized in the provision of farmers' requirement of major nutrients (nitrogen, phosphor, and potassium). The government controls import of these fertilizers, and allows the private sector to participate in their domestic marketing. On the other hand, provision of fertilizers for minor nutrients is left completely to the private sector. The government controls the quality of imported fertilizers through monitoring their compliance with the approved specifications.

Fertilizers are imported to supplement local production, which is short of meeting farmers' requirements. Prices of imported fertilizers are taken into consideration in determining prices of local production. Hence the rate of exchange for the Syrian Pound plays a major role in the marketing prices of both imported and locally produced fertilizers. This rate changed considerably during the past years. The rate of exchange for the US dollar against the Syrian Pound was raised in 1989 for fertilizer imports from

[3] For more detailed information refer to Appendix No.2.

SP11.5 to SP23. It was again raised in to SP33 in 1991, and to SP42 in 1993. Hence, prices increased at the annual rate of 17.7% for ammonium nitrate, 20.1% for urea and super phosphate, and about 25% for potassium sulphate fertilizers. It might, therefore, be stated that prices of chemical fertilizers, in general, have increased about five folds during the study period.

In spite of this high increase in fertilizer prices, their use has increased at the rate of 4.8% for nitrogenous fertilizers, 2.8% for phosphorous fertilizers, and 1.5% for potassium fertilizers during the same period.

b. Pesticides

The Permanent Committee for Pesticides predetermines annual requirements of pesticides, which are mostly provided through import. Major developments in this respect may be summarized in the following:

- In 1987, the government allowed the private sector to import up to 10% of the predetermined amount of imports. This percentage was later increased to reach more than 50% in 1996 and the following years. On the average, the private sector imported 24.5% of pesticides imports during the period 1992-98;
- As of 1989, the exchange rate for the US dollar was fixed at SP42 for pesticides' imports;
- As of 1996, the role of the State was confined to the provision of pesticides' requirements for the general and mandatory pest control activities. Examples of general pest control activities include combating forest pests, locust attacks, and wheat and cotton insects;
- The government started as of 1992 a successful program for biological pest control for a number of main crops such as citrus, cotton, olives and apples.

c. Veterinary Medication and Vaccines

The government policy regarding provision of veterinary medication and vaccines is focused on two main dimensions:

- Encouraging the private sector to manufacture and trade in veterinary medication and vaccines. This policy succeeded in having local production cover most of the requirements of poultry and a good part of veterinary medication and vaccines requirements. The balance is also provisioned by the private sector through imports; and
- Importing veterinary medication and vaccines necessary for all public activities undertaken to prevent or combat veterinary and poultry outbreaks is a government activity.

The value of veterinary medication and vaccines has increased from SP41.3 million to SP113,1 million between the two periods 1996-98 and 1996-98 in nominal value.

d. Improved Seeds

The government takes the responsibility of providing improved seeds for major crops such as wheat, cotton, sugar beets, yellow corn, and potatoes. These seeds were sold to farmers at subsidized prices until 1986, when this policy was changed. Presently, they are sold at cost. The private sector takes full responsibility for the import of vegetable seeds. The role of the government in this respect is confined to monitoring the compliance of imported seeds with the approved specifications. Appendix No. 2 gives more detailed information on production development and price increase for improved seeds. Price increases reached their maximum for potatoes and their minimum for hard wheat.

e. Seedlings for Fruits and Forestry

Syria was able to produce all its needs from fruits and forestry seedlings as of 1987. The government sells fruit seedlings to farmers at subsidized prices to encourage farmers to plant fruit trees in areas that are not suitable for seasonal crops. Wood trees seedlings, on the other hand, are sold at nominal prices[4].

f. Livestock Feed

Livestock and poultry feed are mostly locally produced in Syria. However, feed constituents that are not locally produced or short of supply are imported. Starting from 1985, the Public Feed Organization manufactured livestock feed and sells them to stockbreeders at low profit margins. Starting from 1987, the private sector was allowed to import and trade in feed constituents. However, importers should get import licenses in the name of the Public Feed Organization, without paying any commission.

g. Agricultural Machinery

The government started to allow the private sector to import agricultural machinery in 1987. Whenever importing used machinery, its year of manufacture should not exceed 3 years at the year of import. The number of tractors utilized in the Syrian agriculture increased by 73% during the period 1986-98, while the number of harvesters increased by 83% during the same period[5].

[4] For more detailed information refer to Appendix No.2.

[5] For more detailed information refer to Appendix No.2.

STABILITY OF FOOD SUPPLIES

Production of sufficient food supplies is a necessary condition for achieving food security. However, it is not by itself sufficient. Two other factors need to be considered; maximizing the stability of food supplies, and enabling all people to acquire the amount of food they need. Sustainability of a stable flow of food supplies is a function of the ability to produce food, the ability to import food to compliment local production or to provide for non-locally produced food commodities, and the existence of appropriate marketing infrastructure, and efficiency and effectiveness of food marketing and distribution systems.

3.1 Enhancing of the Import Ability of Food Supplies

Maximizing the stability of the flow of food supplies cannot be achieved through the domestic production of all amounts required for achieving food security. Even if it were possible, it would not be efficient, as it would entail lowering resource allocative efficiency within the agricultural sector. It is almost impossible for any country to enjoy comparative advantage for all food products demanded by its population. Therefore, it is important for any country to promote its ability to import whatever food its population demand to sustain the flow of food supplies. For the country to achieve self-reliance, its exports of agricultural products should be capable of financing its food imports.

3.1.1 Developing the Export Ability for Agricultural Products

The ability to increase agricultural exports expands the demand for agricultural products and consequently, helps to develop agriculture. Developing exports induces improving the production of exportable crops, promotes production technology, and develops marketing and trade, along with their related activities such as packaging, transportation, and storage. However, the ability to penetrate into international markets is a necessary condition for building the ability to export. Factors contributing to the promotion of such ability include the ability to produce good quality agricultural products at competitive cost, and promote physical and social trade infrastructure. Satisfying these conditions would enable traders to benefit from available opportunities in the international markets. That is, the interdependency of the production and trade environments governs the ability to penetrate into international markets.

3.1.1.1 Development Foreign Trade in Agricultural Products

Foreign trade in agricultural products has been under the State monopoly in Syria for a number of decades. The government used to design and implement plans for the export and import of agricultural products. The government started to gradually change this policy as part of the economic policy reform that started in 1986. A number of orders were issued to regulate agricultural trade.

Analysis of the foreign agricultural trade requires the analysis of the structure of agricultural exports and imports and related market structure under different policies. Tables 3.1 and 3.2 give the changes in the commodity structure and amounts of exports during the two periods 1986-88 and 1996-98. Analysis of the figures of the two tables indicate the following:

- The value of the average annual exports of agricultural commodities increased from SP902 to SP9,408 between the above-mentioned two

periods. However, because of the significant change in the exchange rate of the Syrian lire, these figures do not necessarily mean a real increase in agricultural exports;

- Agricultural exports are diversified. In addition to raw cotton, 10 different commodity groups were exported during the whole study period, 1986-98;
- The commodity structure of agricultural exports changed significantly between the two above-mentioned periods. The contribution of raw cotton, live animals, and vegetables to the value of total exports was more than 93% during the first period. Raw cotton, live animals, and vegetables contributed 67.2%, 18.5% and 7.7% respectively. Raw cotton, vegetables, grains, fruits and live animals shared this same percentage during the second period. Their contribution represented 27.2%, 19.6%, 18.2%, 15.3% and 7.6% respectively. While wheat dominates grain exports; tomatoes, okra, and potatoes dominate vegetables' exports; grapes, cherries, citrus, apples, pears, apricots, and peaches dominate fruits exports; and sheep dominates live animals exports; and

Table 3.1: Development of the commodity structure of agricultural exports between the two periods 1986-88 and 1996-98

Commodity groups	Average 1986-88		Average 1996-98	
	SP (million)	Percentage	SP (million)	Percentage
Raw cotton	604.7	67.2	256.1	27.2
Vegetables	69.7	7.7	1,848.1	19.6
Grains	1.1	0.1	1,714.2	18.2
Fruits	12.8	1.4	1,444.7	15.3
Live animals	167.1	18.5	718.4	7.6
Nuts	-	-	514.2	5.5
Spices	7.6	0.8	249.8	2.7
Oils	-	-	128.1	1.4
Animal products	14.9	1.7	121.5	1.3
Oil seeds	8.9	1.0	73.9	0.8
Dyes	14.7	1.6	34.4	0.4
Total	901.5	100	9,408.4	100

Source: Collected and calculated from tables of Annex 2/3.

Table 3.2: Rates of change in quantities of agricultural exports
Between the two periods 1986-88 and 1996-98

Commodity groups	Average 1986-88	Average 1996-98	% Rate of growth
Raw cotton	82,970	149,911	6.1
Vegetables	24,635	232,888	25.2
Grains	12,745	791,061	51.1
Fruits	5,600	101,769	33.6
Live animals	239	809	13.0
Nuts	-	13,537	-
Spices	1,423	18,006	28.9
Oils	1	12,601	-
Animal products	1,138	79,414	52.9
Oil seeds	839	41,005	47.5
Dyes	3,358	1,974	-5.5

Source: Collected and calculated from tables of Annex 2/3.

- Except for dies, all exports witnessed increases between the two periods at annual rates varying between 52.9% (animal production products) and 6.1% (raw cotton). Exports of grains, oilseeds, fruits, spices, and vegetables increased at the rates of 51.1%, 47.5%, 33.6%, 28.8% and 25.2% respectively;

With respect to imports, Tales 3.3 and 3.4 give the developments in their commodity structure and rates of changes between the two periods 1986-88 and 1996-98. Analysis if these figures revealed the following:

- The value of imports at current prices increased from an annual average of about SP1.9 billion to about SP5.4 billion between the two periods. This increase in the real value at current prices does not necessarily mean increases in amounts, as the exchange rate of the Syrian Pound significantly decreased between the two periods;
- The commodity structure of imports changed significantly between the two periods. The ratio of percentage of the total value of imports of animal products, vegetables, grains, wheat flour, and dyes decreased from 77.6% to 55.4%, while the value of live animals, nuts, fruits, spices, and

oilseeds and oils imports increased from 16.7% to 32.2% between the two periods; and

- Except for the value of imports of wheat flour, vegetables, animal products, and grains, which decreased at annual rates ranging between 48.8% (wheat flour) and 0.3% (grains), the value of all other imports increased at annual rates ranging between 5.7% (oils) and 33% (dyes).

Table 3.3: Development of the commodity structure of agricultural imports between the two periods 1986-88 and 1996-98

Commodity groups	Average 1986-88		Average 1996-98	
	SP (million)	Percentage	SP (million)	Percentage
Live animals	92.1	.8	450.6	8.3
Animal products	271.2	14.2	545.7	10.1
Vegetables	76.0	4.0	62.2	1.2
Nuts	1.6	0,1	172.2	3.2
Fruits	69.0	3.6	456.1	8.4
Spices	11.8	0.6	67.4	1.2
Grains	607.3	31.9	1,788.7	33.0
Wheat flour	218.6	11.5	6.8	0.1
Oilseeds	22.3	1.2	216.8	4.0
Dyes	31.0	16.0	61.4	1.1
Oils	121.2	6.4	386.7	7.1
Other fats	38.4	2.0	363.6	6.7
Other items	342.7	18.0	839.3	15.5
total	1,903.2	100	5,417.5	100

Source: Collected and calculated from tables of Annex 3.

With respect to the market structure of the Syrian foreign trade, analysis of Tales 3.5 and 3.6 give the following (the figures refer to the average during the study period 1986-98):

- There was a high degree of market concentration, except for a limited number of commodities, within the export trade of all export commodities. Countries of the Gulf Cooperation Council imported more than 99% of

sheep exports, 97% of apricots exports, more than 80% of poultry, tomatoes, and cherries exports, and more than 50% of olives, potatoes, oranges, lemon, and inedible olive oil;

- Saudi Arabia occupied a distinguished position in the market structure of the Syrian export trade. It received more than 50% of Syria's exports of tomatoes, sheep, olives, apricots, sherries, and inedible olive oil, and more than 25% of oranges and apples exports;

Table 3.4: Rates of change in quantities of agricultural imports between the two periods 1986-88 and 1996-98

Commodity groups	Average 1986-88	Average 1996-98	% Rate of growth
Live animals	353	965	10.6
Animal products	36,507	20,156	-6.1
Vegetables	28,866	8,058	-13.6
Nuts	121	2,822	37.0
Fruits	37,599	66,266	5.8
Spices	839	2,289	10.6
Wheat flour	816,652	794,077	-0.3
Oilseeds	176,450	4,051	-45.8
Dyes	6,469	46,217	21.7
Oils	1,155	1,598	3.3
Other fats	24,902	43,434	5.7
Other items	16,776	48,637	11.2
Total	33,045	80,488	9.3

Source: Collected and calculated from tables of Annex 3.

- Lebanon represented the main market for a limited number of Syrian exports. These included peeled and unpeeled pistachios (42.7% and 97.8% respectively), seed potatoes and olive oil (about 50% each), and olives (about 25%);
- Egypt was an important market for Syrian exports of apples (56%), and unpeeled pistachios (19.1%);

- North African Arab countries (Morocco, Algeria, Tunisia, and Libya imported about 67% of Syrian exports of wheat and shaylam, and about 12.2% of raw cotton;
- While Jordan imported more than 90% of Syrian barley exports, it imported only 15.1% of its oranges exports, and 4.4% of its exports of apples and eggs exports;

Table 3.5: Market structure for the main exports of Syrian agricultural commodities during the period 1986-98

Main export commodities	Main export markets for Syrian agricultural products	
	Markets	%
Sheep	Saudi Arabia, Kuwait, Qatar	99
Poultry	Emirates, Kuwait, Lebanon	95.5
Eggs	Romania, Azerbaijan, Kuwait, Armenia, Georgia, Jordan, Saudi Arabia	91.2
Olives	Saudi Arabia, Kuwait, Lebanon	91.6
Tomatoes	Saudi Arabia, Russia, Kuwait, Bulgaria, Lebanon, Romania	97.8
Table potatoes	Emirates, Lebanon, Kuwait, Bahrain, Oman, Qatar, Saudi Arabia	94.4
Seed potatoes	Lebanon, Saudi Arabia, UAE, Bahrain, Kuwait	100
Oranges	Saudi Arabia, Kuwait, UAE, Jordan, Russia, Qatar	93.3
Bitter lemon	Saudi Arabia, turkey, Kuwait, UAE, Russia, Qatar	93.6
Apples	Egypt, Saudi Arabia, Kuwait, Jordan, UAE	95.2
Apricots	Saudi Arabia, UAE, Kuwait, Bahrain, Oman	96.6
Cherries	Saudi Arabia, Kuwait, UAE, Turkey, Bahrain, Russia, Qatar	97.9
Unpeeled pistachios	Lebanon	97.8
Pealed pistachios	Lebanon, Egypt, Saudi Arabia, Bahrain, Jordan, UAE, Qatar	94.4
Wheat and oats	Algeria, Korea, Tunisia, Italy, Iraq, Libya, Turkey	94.2
Barley	Jordan, Kuwait, Morocco, Saudi Arabia, Lebanon	98.8
Inedible olive oil	Saudi Arabia, Lebanon, Kuwait	93.4

Table olive oil	Lebanon, Spain, Saudi Arabia, Italy, Turkey, Kuwait	93.2
Raw cotton	Italy, Turkey, Spain, Indonesia, Morocco, Hong Kong, Morocco, France, Portugal, Switzerland, Thailand, Formosa, Tunisia, Japan, Belgium, Germany.	91.4

Source: Collected and computed from tables of Annex 3.

- Western European market imported, 43.1% of the exports of raw cotton, 9.8% of both wheat and rye exports, 7.4% of edible olive oil exports, 5.3% of cherries exports, 21.1% of bitter lemon exports, and 2.6% of table potatoes exports; and
- Eastern Europe is the smallest trade partner for Syrian exports. Its share of Syrian exports amounted to 11.5% of oranges, 9.7% of tomatoes, 6.6% of biter lemon, 4.7% of cherries, and 2% of table potatoes exports. However, it imported about 65% of the Syria's eggs exports.

The main features of the market structure for Syrian agricultural imports during the study period, 1986-98, may be summarized in the following (based on the information of Table 3.6):

Table 3.6: Market structure for Syrian imports of main agricultural commodities during the period 1986-98

Main imported commodities	Main import markets for Syrian foreign agricultural trade	
	Markets	%
Cattle	Germany, Romania	100
Sheep	Romania, Bulgaria	99.6
Poultry	Holland, Jordan, Egypt, Germany, USA, France, Britain	96.8
Milk powder	Holland, France Belgium, Denmark	91.6
Eggs	Pakistan, Holland, USA	100
Table potatoes	France, Britain	100
Seed potatoes	Holland, Italy, Ireland, France, Germany	97.7
Oranges	Lebanon	100
Unpeeled pistachios	Iran	100
Pealed pistachios	Iran, Turkey, Afghanistan, Formosa	97.3

Barley	Finland	100
Inedible olive oil	Malaise, Turkey, Spain, Saudi Arabia	100
Edible olive oil	Malaise, UAE	100
Raw cotton	Turkey, Thailand	100

Source: Collected and computed from tables of Annex 3.

- Syrian imports of seed potatoes, milk powder, live cattle, poultry, and table potatoes were from Western European countries accounted for 97.7%, 91.6%, 97.2%, 41.2%, and 100% of the Syrian imports of these commodities, respectively; and
- Eastern European countries are the main exporters of Syrian imports from sheep. Romania, alone, exported to Syria about 85% of its sheep imports.

3.1.1.2 Agricultural Foreign Trade Environment

Political and trade relations with other countries, along with the rules and regulations governing the international trade have their effects on the flow of trade between a given country and its trade partners. Therefore, countries endeavor to develop the framework for their trade relations with neighboring countries, and to combine efforts with other countries to improve the rules and regulations of international trade. Rules and regulations governing the flow of trade between a given country and its trade partners at the bilateral, multilateral, or international levels forms what might be called the formal framework for foreign trade. These constitute trade agreements and protocols that might be agreed upon to develop a countries foreign trade in regional and international markets. These agreements normally include a number of articles giving preferential treatment for export commodities, holding periodic sessions to discuss problems and constraints facing the flow of trade, and cooperating to implement trade promotion activities and exchange trade information.

Agreements to establish any degree of economic integration among two or more different countries fall within the formal framework for foreign trade. These include agreements between two or more countries to establish free trade zones, joint markets, custom unions, or full economic unities, as well as international organizations agreements such as those of the GATT and WTO. Elements of the international trade environment for Syria are summarized in the following sections.

a. Bilateral Agreements

Existing bilateral agreements between Syria and Arab countries comprise Agreements of Cooperation signed with the Jordan, Algeria, Libya, and Egypt; and the Agreement of Cooperation in Agriculture signed with Lebanon. Bilateral agreements signed with other countries include those signed with Cyprus, Pakistan, Spain, and India. However, all of these agreements were, more or less, confined to the exchange of visits and information, study of problems of joint interest, cooperation in some areas organizing foreign trade such as agricultural quarantine arrangements. That is, these agreements did not reach any degree of economic grouping that would give exchanged commodities

preferential treatment. On the other side, many countries, including some Mediterranean countries have intensively utilized different degrees of economic grouping agreements to establish free trade zones to develop their foreign trade. Examples include bilateral agreements between Egypt and each of Tunisia, Morocco, Kuwait, and Jordan. Some of these agreements have already entered into effect and their impact has been clearly indicated in some trade fields.

b. Multilateral Agreements

These agreements normally include more than two countries belonging to the same region. The agreement to develop Arab agricultural trade with a view to establishing a free Arab Trade Zone is the most important among these agreements. Syria was among the first countries that signed this Agreement and is endeavoring to effect its implementation. However the implementation of this Agreement is still very limited. Negotiations are still going on regarding some points of important effect on agricultural foreign trade, most important among which is the agricultural agenda, and rules governing certificates of origin. The successful implementation of this Agreement entails intensive benefits for trade among Arab countries, and between them and other countries.

The Syrian-European Trade Agreement, for which negotiations have already started, represents one of the types of multilateral trade agreements that affect the organization and flow of international trade. This Agreement, when signed, would replace the trade protocol that Syria signed in 1977 with the European Union (the European Common Market). It is believed that the final version of the Agreement would be similar to agreements signed with the other Mediterranean countries. Most important characteristics of these agreements include:

- Establishing a free trade zone for industrial products between the European Union and the country entering into the agreement, through which manufactured goods are allowed to penetrate to the European market free of customs and other charges, provided that they conform to the European specifications. In return, the same would be applied to manufactured products of European origin exported to the country's markets. Normally, this arrangement is gradually implemented at a number of stages to be agreed upon within a period of 10-12 years;
- Allowing agricultural products of the country entering into the agreement to enter into European Union markets, according to the agreed upon agricultural agenda that sets types, quotas, and time for the given country's agricultural exports to be exempted from custom and other charges. Exports outside quotas and specified times would render commodities subject to the applied custom duties within the European Union. It goes without saying that agricultural exports should comply with all types of specifications set by relevant authorities within the European Union;

- The European Union provides for technical assistance to help countries entering into agreements to develop their industrial and agricultural production and increase its competitivity in international markets.

c. International Agreements

The General Agreement for Tariffs and Trade (GATT) is considered the main international agreement organizing the flow of trade. Agreements signed during the last round of the GATT negotiations (Uruguay Round) are considered by far the most important agreements. On one hand they include trade in highly sensitive commodities, such as trade in agricultural commodities and services trade. On the other hand, developing countries have shared in these negotiations for the first time. Moreover, the Uruguay Round established the International Trade Organization to monitor the implementation of agreements and prepare for forthcoming rounds of negotiations within the framework of GATT.

Syria has not yet joined this agreement and the questions of joining the International Trade Organization and consequential benefits or losses for the Syrian economy have not yet been settled. It goes without saying that taking any decision in this regard should be preceded by intensive benefit-cost assessment studies. Issues that need to be considered in such studies include the following:

- Joining WTO necessitates enforcing crucial modifications on the existing trade policies to render them compatible with WTO rules and regulations, which is a necessary condition;
- More than 75% of the volume of international trade belongs to member countries of WTO. This indicates that most of the consequences of joining WTO has already been effected on the flow of international trade. This situation is especially true with respect to changes in levels of prices for some commodities, including those of agricultural origin, as a logical result to the gradual decrease in production and export subsidies that were granted before the Agreement. Hence, increases in import bills have already been realized irrespective of whether the country concerned is a member or nonmember of WTO;
- Other burdens, related to the membership of WTO, is represented in the negative effects that might result from the implementation of the agreements on market penetration and right of intellectual property. However, a number policies could be designed to diminish these negative effects, not withstanding the positive effects that may be realized in this respect;
- Estimation of Benefits and costs of joining WTO should not be confined to trade benefits or losses, as reflected in balances of payments or effects on domestic production bases and their abilities in international competition. It should also take into consideration all effects of effecting the intensive changes in the modes of and polices for production, not only as conditions for joining WTO, but also as means for preparing national economies to maximize benefits and minimize costs of dealing within the

new trade environment. In this respect, it is important to direct large amounts of investment to improve domestic trade infrastructure and promote research and development centers, along with adopting appropriate polices and programs to increase the economy' ability to respond to changes imposed by the developments it the liberalization of international trade. A number of studies, prepared before and after the establishment of WTO, indicated the high correlation between trade benefits a country can get and the ability of its economy to respond to the imposed changes. Such responsive ability cannot be realized within developing countries without effecting economic policy changes on one hand, and improving the structure and increasing the effectiveness of governmental and non-governmental institutions on the other side. This, of course, does not negate the importance of effecting appropriate development in the elements and constituents of the basic marketing and trade infrastructure that would help achieve the quick response to the above mentioned international trade environment; and

- This Agreement has established, for the first time, an international authority that countries may recourse to in order to defend their trade advantages and contest damages resulting from the non-abidance of other countries to the agreed upon rules and regulations. This international authority is very important in enabling developing and small countries to defend themselves against larger and economically stronger countries. This authority on the trade side, unlike the corresponding authority on the political side, is independent of the sovereignty of countries of permanent membership in the Security Council;

In addition to the aforementioned subjects to be considered before taking the decision to join (or not) WTO, a number of factors should be studied. These include the agricultural agenda, as agricultural activities are very sensitive, both from the economic and social aspects, especially in developing countries. This subject has been a subject of debate for a very long time and caused major problems before reaching the Agreements of the Uruguay Round of GATT negotiations. The debate was very acute also on subsidies and intellectual property.

Moreover, levels of applied subsidies before and after the implementation of the Agreement and effects of amount of subsidies discount that the Agreement necessitates, along with their effect on the competitiveness of agricultural products should be taken into consideration. Other factors include the ability of national institutions to provide the necessary prerequisites for agricultural production, especially inputs of high technological content. This subject is especially important for agriculturally net importing countries. Agriculturally net exporting countries, with able institutions that can provide its agriculture with advanced techniques and equipment, would have extra ability to penetrate into other markets and export its surplus production. Hence, it would be in a more favorable situation regarding the implementation of policy, institutional, and infrastructure changes necessary for promoting its competitive edge in international markets.

3.1.1.3 Implemented Polices and Points of Weakness

Trade polices were among the first to undergo some degree of liberalization in the policy reform that started in 1987, as government control was the main feature of previous policies. The government, to tighten its control over the flow of trade on one side, and achieve the planned equilibrium between foreign exchange revenues and necessary import expenditure on the other side, adopted (before 1987) a number of firm rules and regulations. Most important of which are:

- Confining import and export operations to governmental and public sector institutions;
- Preplanning for amounts of exportable commodities (based on estimates of production and domestic consumption requirement) and those to be imported, within the framework of annual plans that takes into consideration requirements of productive and services sectors;
- Applying a fixed multiple rate of exchange with a view to subsidizing certain sectors, as well as supporting economic development. In this respect, food imports were subsidized through applying high exchange rates. Imports of other necessary commodities, such as medication were treated on similar basis, while other imports were charged higher rates;

The following sections will review the most important modifications in foreign trade policies, especially those related to the organization, financing, taxing, and developing foreign trade. The objective of this review is to assess the intensiveness of realized changes and identify points of strength and weaknesses, along with possibilities for future development.

a. Policies Organizing Participation in Foreign Trade Activities

The government allowed the private sector to participate in foreign trade activities, as aforementioned, only in 1987. These developments are summarized below:

- Allowing the private sector to participate in the export of vegetables and fruits, and exempting exported amounts from agricultural production tax. Foreign currency proceeds of these exports may be used to finance imports, sold to other traders or to the Syrian Commercial Bank, or kept in private accounts for future use;
- Allowing the private sector to export all other crops except wheat, cotton, sugar beets, and tobacco, which are still under the export monopoly of governmental institutions;
- Allowing the private sector to export live animals, including birds (which could be sold live or slaughtered) according to certain rules;
- Allowing the private sector to export meet and other animal products according to certain rules, most of which is represented in getting the permission of the Ministry of Agriculture and Agrarian Reform for some products;

- Allowing the private sector to undertake import activities only if they are financed from the proceeds of private sector exports. Exporters were given the right to use a given percentage of their foreign currency proceeds to finance imports. This percentage varies among different types of exported crops. For example, it is about 75% of sheep wool export proceeds, and about 100% of vegetables and fruits export proceeds; and
- All imports are subject to certain ruled and regulations including getting licenses and approvals from relevant authorities, most important of which with respect to agricultural products and prerequisites is the Ministry of Agriculture and Agrarian Reform. Other regulations include abiding by health requirements stated in the agricultural quarantine law, specifications for imported commodities, rules related to the origin of imported commodities, and other arrangements regulating prevention of imports of certain commodities.

b. Foreign Trade Regulations

Changing the policy to allow the private sector to participate in foreign trade required changing foreign trade rules and regulations, the main features of which may be summarized in the following:

- Imports of a number of commodities are prohibited to protect domestic production, for security reasons, or on religious basis;
- Imports and exports of some commodities are restricted to the public sector. Main restricted exports include cotton, wheat, sugar beets and tobacco; while main restricted imports include medication;
- Prior import license have to obtained before effecting any imports;
- Imports are financed from export proceeds. Hence, importers are required to prove the source of their foreign exchange before getting import licenses;
- Imports are restricted to countries of origin; and
- Imported and exported commodities should comply with approved specifications. Certificates of compliance from relevant authorities should be obtained before effecting exports.

However, it ought to be mentioned that these regulations need to be modified to enable the development of foreign trade. The requirement of prior import certificates sometimes creates monopolistic situations in the domestic market, which overburdens consumers with unnecessary expenses, especially within the liberalization of market prices. Multiplicity of exchange rates for imported commodities lowers the performance efficiency of foreign trade. Protecting domestic production through prevention of imports might work against its development, and hence decrease its competitive edge. Therefore, it might be more adequate to replace import prevention by custom tariffs,

applying gradually decreasing rates. This approach might help achieve the protection needed for domestic production at early stages, and at the same time urge producers to develop quality and cost effective products.

Moreover, linking imports to import proceeds, within the prevalence of a multi-tier exchange system may be biased towards imports and against exports, as it results in taxing exports by about 10% in some cases.

c. Financing Foreign Trade Polices

Financial policies have their effect on marketing performance; particularly on foreign trade as value of trade deals may, more often, be beyond the financial capacity of exporters. These situations calls for the provision of credit facilities, which will help increase the performance efficiency of the foreign trade sector. Existence of financial facilities is even more important for developing agricultural exports as they are characterized by seasonality. Seasonality of products involves dealing with large amounts of products in limited time, which would require huge financial abilities. However, problems are not confined to lack of finance. Equally important is the reduction of high rates of interest and easing up related collateral and lending conditions. High interest rates increase the cost of exported commodity and hence reduce their competitive edge in foreign markets. On the other hand restrictive collateral conditions would reduce the ability of exporters to utilize credit facilities, and/or limit them to special groups of exporters, which might create monopolistic situations that might affect the local markets on one side and the ability to export on the other side.

The following issues condition the financial market for export activities:

- Financing foreign trade is confined to the Syrian Commercial Bank (SCB). More accurately, the concept of financing imports does not really exist, as imports can only be financed up to a given percentage of export proceeds. SCB does not give loans in foreign currency to the private sector. It also does not transfer Syrian currency into foreign exchange for import purposes;
- With respect to financing exports SCB can only act within a specified framework;
    - Loans are granted within a maximum of 30-80% of the value of exported commodities, taking export contracts, letters of credit, or shipping documents as collaterals;
    - Loans provided cannot exceed the ceiling of SP30 million, which is considered to be low; and
    - Interest rates on export loans range between 17 and 20% annually, which are very high, especially when compared to interest charges of foreign banks that undertake such activities.

Hence, it might be stated that the existing system for export financing does not help achieve the formally stated objectives of export promotion. On the one hand the low ceilings put on export financing are low to allow for large deals, and on the other hand

the high financial cost cuts on the competitive edge for Syrian exports. Effects of these policies are more severe on agricultural exports for the following reasons:

- The seasonality of production shortens the export season and hence, increases the financial requirement per unit of time;
- Most of the export deals in agricultural products, specially those undertaken with importers from developing countries, do not require letters of credit and hence deprive exporters of collaterals required for obtaining credits; and
- Agricultural markets are more competitive, which decreases marketing margins to the minimum and cause the loss of deals because of small price differentials. Hence, any small increase in the cost of export finance might result in the loss of export opportunities.

For these reasons a number of countries have applied different programs to promote agricultural exports, utilizing finance as a means for achieving programs' objectives. Such programs are not presently applied in Syria.

d. Export Promotion Policies and Market Penetration

Countries apply different policies to increase their competitive edge and facilitate the penetration of their goods into foreign markets. These policies differ in their approach, financial requirement, and impact. Of these policies, three patterns are identified below:

- **Market penetration polices.** Means of these policies include carrying out series of studies on the state and severity of competition in targeted markets; undertaking market promotion and buyers missions, and organizing general and specialized fairs;
- **Market enlargement and diffusion policies**. Means of these policies include organizing marketing and advertising campaigns in targeted markets and developing post sales customer services;
- **Promoting competition abilities policies**. Means of these policies include implementing programs of long-term export credit, carrying out bilateral and multilateral trade agreements aiming at getting preferential export arrangements in targeted markets, establishing free trade zones, and effecting arrangements for equivalent liberal trade.

Presently, the application of such policies in Syria is limited to participating in a number of foreign trade fairs in the form of furnishing Syrian wings within trade fairs with samples of Syrian products, and setting up international fairs in Damascus.

3.2 Developing the Marketing Infrastructure

Elements of agricultural marketing infrastructure include roads (especially rural roads), means of transportation, wholesale and retail markets, cooled and normal storage facilities, seaports and airports, appropriate trade juridical and judicial systems, well functioning marketing rules and regulations, trade finance system, and marketing and trade information systems. Table 3.7 gives indicators on the developments in some of the

marketing infrastructure in Syria between the two periods 1986-88 and 1996-98. Analyzing the tables figures reveal the following:

- The length of main, paved, and gravel roads increased from 29.8 to 41.2 m. km between the two periods, with a total increase of 11.4 m. km or 38.4%;
- Numbers of wholesale markets in governorates and administrative regions remained the same, at 14 and 59 market, respectively;
- Storage capacity of silos increased from 770,000 to 1,217,000 m^3 between the two periods, with a total increase of 447,00 m^3 or 58%;
- The capacity of modern small silos increased from 12,000 m^3 to 238,700 m^3 between the two periods, with a total increase of 226,700 m^3 or almost 19 times as much;
- Open grain storage capacity increased from 749,000 ton to 902,000 ton between the two periods, at a total increase of 153,000 ton or 20.5%; and
- Sea and airports remained the same, at 5 ports each.

In spite of the development realized in storage facilities, it was mostly confined to grain storage. Shortages in quick cooling facilities in production fields, cooled storage, and cooled transport facilities are considered among the most important constraints to the marketing and trade of vegetables, fruits, milk and milk products. Problems related to these shortages are exacerbated by the fact that marketing of these products is mostly carried out by small producers, who lack the ability to establish these facilities.

Moreover, wholesale markets do not provide any marketing service other than wholesaling. Lacking services, such as cold storage facilities, grading, and packaging reduce markets' performance. Whenever, needed, goods are transferred to where these services are provided. In addition to the increase in transport and marketing costs, unnecessary marketing time is unduly lost.

This same phenomenon is also noticed in main ports, where negative effects would be more serious. It might result in nonconformity of exported commodities with required specifications, which might cause refusal of the deal and burdening exporters, over and above, with financial penalties. In addition, the high prices charged for such services, whenever available, add to export costs and reduce competitive edges for Syrian products. It is also very important to study the comparative cost of normal and cold storage and shipping and handling in seaports in Syria and neighboring countries with a view of increasing the competitive edge for Syrian products.

Table 3.7: Changes in elements of marketing infrastructure between the two periods 1986-88 and 1996-98

Item	Unit	1986-88	1996-98	Change	
				Amount	%
Road lengths (main, paved & gravel)	000 km	29.798	41,247	11,420	38.3
Wholesale markets in governorates	No.	14	14	0	0
Wholesale markets in admin. Areas	No.	59	59	0	0
Silos storage capacity	M^3	700,000	1,217,000	517.000	58.1
Small modern silos' storage capacity	M^3	12,000	238,667	226,667	1889
Open grain storage capacity	Ton	749,042	902,744	153,720	21
Sea ports	No.	5	5	0	0
Air ports	No.	5	5	0	0

Source: Collected and computed from:

1. The Annual Statistical Bulletin for the years 1986-88 and 1996-98;
2. The General Organization for Marketing and Processing of Grains, Directorate of Statistics and Planning; and
3. The General Company for Silos, Directorate of Statistics and Planning.

There is also a clear-cut scarcity in marketing information. On the one side, the multiplicity of governmental agencies carrying related functions reduces the truthfulness, reliability, and sufficiency of information. On the other side, available information lack the timely data and future estimates of market information. Scarcity of this information reduces the ability to take appropriate trade decisions. Moreover, studies based on such information might reach unrealistic conclusions, which may weaken the ability to appropriately plan for marketing and trade activities.

Relative shortages have also been noticed in marketing and trade financial services, both with respect to sufficiency of finance and the practicality of regulations and collaterals required. As aforementioned, availability and accessibility of marketing finance is of utmost importance for developing agricultural marketing and trade and increasing their efficiencies. Available information in this respect indicates the inexistence of specialized financial services for domestic marketing and foreign trade in agricultural products. The role of the Agricultural Cooperative Bank in this respect is very limited.

3.3 Effectiveness of Food Marketing and Distribution

Food marketing includes all post harvest activities for food products until they reach the wholesale markets, while food distribution encompasses all functions carried out on food products from wholesaling to their delivery to the final consumer. Marketing

and distribution effectiveness refers to the actual achievement of the marketing and distribution activities of their objectives of satisfying the final consumers in delivering the commodities in the form, amount, and quality they prefer; and at competitive prices. Because of lack of information on marketing and distribution effectiveness, the study will be limited to reviewing food marketing and distribution policies.

3.3.1 Food Marketing Policies

Before the application of the economic policy reforms that started in 1986, marketing of food products was under complete government control. The role of the private sector was very limited. No matter how beneficial these policies were, they resulted in lowering the allocative efficiency of agricultural resources on one hand, and caused a number of different market failures.

Reform policies applied since 1987 to the national economy endorsed the following principles:

- Activating the role of the private sector in marketing activities;
- Protecting the rights of both producers and consumers; and
- Developing marketing functions and services.

These principles are still being enforced, and hence the major characteristics of present marketing policies for agricultural products might be summarized in the following:

- The public sector takes the major role in the marketing of wheat and barley along determined price polices that guarantee the rights of agricultural producers. It also procures the offered lentils and chickpeas according to the determined prices, whereas the private sector plays a major role in marketing these two products based on market prices.
- Marketing of industrial products, including cotton sugar beets, and tobacco, remains in the hands of the public sector as all processing firms are publicly owned;
- The private sector takes the lead role in marketing all other agricultural products, including vegetables, fruits, feed crops, and livestock and poultry products; and
- The cooperative sector provides some marketing services to the private sector such as collecting, transporting, and selling the produce of its members for their benefit to the private sector or public marketing institutions.

However, imposed fixed prices for major food products, especially for wheat, barley, lentils, and chickpeas have played a major role in restricting private sector marketing activities in these products. The public sector is still marketing the larger amounts of these products, especially with respect to wheat, as fixed farm-gate prices are higher than corresponding international prices. Moreover, wheat exports are still a government monopoly. Similar arrangements prevail for lentils as higher than market prices are offered to farmers by the public grain organization without any upper limit on

delivered quantities. This policy has resulted in having the public sector market 80% of wheat production and about 65% of lentils; irrespective of the fact the policies do not put any limit to amounts that could be marketed by the private sector.

The private sector, on the other hand, has full command on chickpeas and barley marketing as it markets about 99% and 90%, respectively, of their production. This is explained by the fact that government set prices for the two crops at lower than their corresponding international prices. Hence, the private sector command on these two products covers also export activities.

Marketing policies applied for other agricultural products, such as vegetables, fruits, livestock and poultry products, and other agricultural products, enable the private sector to participate in, and completely control their marketing and foreign trade activities. The involvement of public sector in the marketing of these products is almost limited to the amounts of publicly produced products.

3.3.2 Food Distribution Policies

Food distribution policies play a major role in the effectiveness and efficiency of market performance. Inappropriate distribution policies always lead to states of disequilibria between supply and demand, causing unjustifiably higher prices in some places.

The following summarizes food distribution policies in Syria, which differ among different food commodities:

- Public institutions import, store, and distribute main food commodities including grains, sugar, and vegetable oils. The Public Authority for Grain Trading and Processing handles these activities. The Public Milling Company distributes its wheat products to public and private bakeries, which produce subsidized and non-subsidized bread. However, private sector bakeries get their wheat from the General Company for Mills, whereas the private mills get their requirement of wheat directly from the farmers at the market prices. The General Sugar Authority delivers its sugar production to the General Authority for Consumption, which, in turn, distributes the sugar to wholesale and retail markets. The same arrangements apply for the production and distribution of vegetable oils;
- Private and cooperative sectors distribute a large number of food commodities including sugar, rice, tea, coffee, livestock and poultry products, vegetables, fruits, and many other consumer products; and
- Food distribution is carried out through large numbers of retailers' food stores distributed all over urban and rural areas. Most of these stores belong to the private sector. Some of them still belong to public organizations such as the General Authority for Consumption and the General Authority for Retail Trading.

3.4 Promoting the Quality of Food Commodities

Promoting food quality is considered as one of the activities contributing to food security. Major areas for the improvement of food quality include:

- Spelling out health specifications of different commodities. These are technical specifications related to production technology, type of inputs, storage techniques, expiry date, period of commodity handling, …; and
- Identifying trade specifications, which are related to the quality of handled commodities. These differ among different companies producing the same or similar commodities.

Abiding by the approved specifications is a very important factor in food security issues. Control and follow up activities in this respect are the state responsibility. Controlling is exercised on two stages, the first is to control production at the fields and within factories, and food imports at seaports and airports. The second is the quality control undertaken at wholesalers and retailer stores. The government has approved quality specifications for about 2,000 food commodities that might be imported. Importers are required to abide by these specifications. Ministries of supply, health, and industry undertake control activities at different stages of food production, marketing, and distribution.

As commodity specification involves production techniques and production inputs, which are undergoing continuous change, specifications should be periodically revised to be commensurate with technology changes, in order to cater for the well being of consumers and to meet their demand requirements.

The consultant, through visiting a number of wholesale and retail vegetables, fruits, and fish markets, noticed the inadequacy of sorting, classifying, and grading of furnished commodities. He also noticed the low quality of packaging and casing. These techniques have remained the same, without being developed, for quite a long time. It might be appropriate to start developing these methods.

IV. ACQUISITION OF FOOD SUPPLIES

If food is produced in ample amounts and is supply is stable, the only factor remaining to achieve food security would be ensuring access to available supplies on the part of those who need them. This would require achieving stability of food prices and developing the ability of disfavored groups to get their food needs. These two issues are discussed in the present Chapter.

4.1 Enhancing Price Stability

Most important factors affecting food prices on the supply side are seasonality of production, and structure and competitivity of food markets. Price and food distribution policies have their effects on food prices both on the supply and demand sides. High increases in food prices negatively affect the ability of consumers to get their food needs, especially within less privileged groups. This effect is exacerbated in cases of low cross elasticity. Food distribution policies and their effect on food security were discussed under item 3.3.2. Hence the discussion in this section would be confined to food distribution policies and the nature and degree of price fluctuations in food prices during the study period.

4.1.1 Food Price Policies

Liberalization of marketing polices gradually effected since 1987 obligated the liberalization of price polices. Analyzing price policies before the policy reforms reveals that their main characteristics may be summarized in the following three main points:

- Administering the prices of a large number of agricultural products, including food grains, potatoes, a number of fruit crops, onions, garlic, industrial crops, and animal feed crops;
- Keeping administered prices fixed all the year round and for more than one year, irrespective of changes in amount or cost of production; and
- Prevalence of large discrepancies between domestically administered prices and international prices for agricultural products.

On the other hand, main changes introduced to these policies since 1987 include:

- Increasing the administered prices for all commodities delivered to governmental agencies, which included wheat, chickpeas, lentils, yellow corn, cotton, sugar beets, tobacco, soybeans, and groundnuts. Rates of increase ranged between 175% (for groundnuts) and 436% (for sugar beets) during the period 1986-98;
- Establishing indicative price list for a number of products including poultry meat, milk, apples, grapes, garlic, and dry onions. These prices are not obliging, even for the public sector;
- Leaving prices of other products (vegetables, fruits, and livestock and poultry products) to be determined according to market forces; and
- Allowing the private sector to participate in the marketing of products handled by the public sector, without being obliged by their fixed prices.

Hence, post 1987 polices allowed the private sector to buy and sell all but industrial crops, at market prices. However, the government provides for guarantee prices for major crops, including wheat, chickpeas, lentils, and yellow corn. Marketing of industrial corps (cotton and sugar beets) is still confined to the public sector, as they are manufactured by public sector organizations. These changes in price polices had their effect on retail prices for all consumer commodities. However, this effect differed among the following 4 commodity groups due to the difference in price policies, as indicated below:

- **Food commodities of major impact on consumers:** These commodities include bread, sugar and rice. Bread price is fixed for all consumers, irrespective of the amount demanded. However, consumer prices for sugar and rice are fixed at low prices, only for limited quotas per person per month. They have been included among supply commodities for which governmental subsidies range between 40-60% of their market prices. Any amounts over and above quotas would be purchased at market prices. Prices of these commodities are fixed for long periods of time;
- **Locally produced food commodities:** This group includes wheat, barley, chickpeas, lentils, vegetables, fruits, and livestock and poultry products. Their prices are mostly left to be determined according to market forces. Indicative prices are set for some of them, mostly during periods of short supply that significantly increase consumer prices;
- **Imported Food commodities:** Food imports are allowed only through government licenses. Taking import cost in consideration, and leaving reasonable margins for importers, the government determines wholesale and retail prices of imported food commodities. However, these prices are only indicative and may change according to market forces. Government fixed prices are enforced only in the case of supply shortages that significantly affects consumer prices; and
- **Processed food (locally produced and imported):** Prices for processed food, whether locally produced or imported are left to be determined by market forces. Normally, producing companies set their sale prices according to cost of production and reasonable profit margins for producers and distributors.

Hence, it could be concluded that prices of consumer food commodities, except for bread, sugar and rice, are mainly market determined. Government role is limited to issuing indicative prices, price monitor, and interference only in cases of unreasonable high prices.

4.1.2 Food Price Changes

Food prices have experienced significant changes during the study period, 1986-98. These included seasonal price fluctuations, and trend affected changes related to increases in cost of production and forces of inflation. Appendix 3 provides for patterns of seasonal price variations at the wholesale and retail levels, Table 4.1 gives some comparisons between wholesale and retail prices for 20 food commodity including

grains, legumes, vegetables, fruits, meat, fish, and olive oil for the two periods 1986-88 and 1996-98. Analysis of the table's figures reveals the following:

- Wholesale and retail prices of all food commodities have significantly increased between the two periods however, at different rates. It should be noted that the table gives nominal prices and that inflation has tremendously increased between the two periods;
- Food commodities included in the table may be classified into three groups according to the rate of price increase:
    - The first group included food commodities for which the annual rate of increase was within an average annual of 7%. This group includes only tomatoes, and oranges, for which annual rates of price increase at the wholesale level were 4.9% and 4.6% and 5.3% and 4.9% respectively at the retail level;
    - The second group included food commodities for which the annual rate of increase was between 7% and 12%, noting that 12% of annual increase means doubling the price between the two periods. These commodities include half of the commodities referred to in the table. These are yellow corn, barley, chickpeas, grapes, apples, cherries, eggplant, green beans, green olives, and sheep meat. Average annual rate of increase for these commodities was about 9.7% for wholesale, and 9.6% for retail prices; and
    - The third group included food commodities for which the annual rate of increase surpassed 12%. It includes hard wheat, soft wheat, red lentils, white maize, potatoes, cabbages, black olives, and fresh fish. On the average, their wholesale price increase reached 12.9% and their retail price increase reached 13.2% annually.
- Rates of retail price increases differed significantly between the two periods according to the nature of the commodity and prevailing price policy, as indicated in Table 4.2. The Table shows that while price increases for grains and legume groups were about 12.1% during the first period, they were about 15.2% during the second period. While the same phenomenon was noticed for all other commodities, rates of price increases varied among different groups. Rates of increases were 10,4% for meat and fish, 14% for olives, 15.2% for grains and legumes, about 20.6% for fruits, and 26.3% for vegetables.

4.2 Ensuring Food Acquisition

Available information indicate that GDP per capita is still limited to a little over US$1,000 per annum, in spite of the intensive development efforts put forth during the last years. Studies and information necessary for estimating size and rate of poverty in

rural and urban areas are scanty and unreliable. However, a number of indicators unveil that poverty is a serious problem, in both areas.

Table 4.1: Changes in wholesale and retail prices for main food items (1986-88 & 1996-98)

Commodity	Wholesale prices (SP)				Retail prices (SP)			
	Average during		Annual rate of growth	Total rate of change	Average during		Annual rate of growth	Total rate of change
	1986-88	1996-98			1986-88	1996-98		
Hard wheat	3.40	11.70	13.20	339	3.70	13.10	13.50	350
Soft wheat	3.40	11.10	12.60	324	3.70	12.40	12.90	335
Barley	3.00	7.90	10.20	261	3.30	9.20	8.00	277
Chickpeas	11.0	29.60	10.40	268	12.30	33.90	10.70	275
Red lentils	7.40	26.10	13.40	353	8.50	30.10	13.50	354
Yellow corn	5.10	10.80	7.80	213	5.90	12.90	8.10	219
White maize	3.80	14.10	14.00	371	4.50	16.80	14.10	373
Potatoes	4.40	14.40	12.60	327	5.30	18.00	13.00	339
Tomatoes	8.40	13.60	4.90	162	10.60	17.70	5.30	167
Eggplant	5.70	13.70	9.20	240	7.10	16.70	8.90	235
Cabbage	2.60	8.40	12.40	323	3.20	11.50	13.60	359
Green beans	9.60	28.80	11.60	300	11.50	34.80	11.70	302
Black olives	14.80	52.80	13.70	362	16.60	58.20	13.40	356
Green olives	15.80	44.00	10.80	279	18.40	52.40	11.00	285
Apples	11.00	26.70	9.30	243	13.30	31.60	9.00	237
Oranges	12.20	19.20	4.60	157	14.50	23.40	4.90	162
Cherries	15.30	37.70	9.20	242	18.20	43.90	9.20	242

Grapes	7.44	19.40	10.10	262	8.80	24.10	10.60	274
Boned sheep meat	72.50	176.80	9.30	244	79.20	198.10	9.60	250
Fish	23.0	73.20	12.30	318	25.70	79.80	12.00	316

Source: Collected and calculated from tables of appendix no. 3.

Table 4.2: Changes in the rate of price increases in retail trade between the periods 1986-88 and 1996-98

Commodity	Average rate of price increase	
	1986-88	1996-98
Soft wheat	8.8	11.7
Hard wheat	8.8	12.0
Barley	10.0	16.5
Chickpeas	11.8	14.5
Red lentils	14.9	15.3
Yellow corn	15.6	19.4
White maize	18.4	19.1
Potatoes	20.5	25.0
Tomatoes	26.2	30.1
Egg plant	24.6	21.9
Cabbage	23.1	36.9
Green beans	19.8	20.8
Apples	20.9	18.4
Oranges	18.9	21.9
Cherries	19.0	18.6
Grapes	18.3	24.3
Black olives	12.2	10.2

Green olives	16.5	19.1
Sheep meat	9.2	12.1
Fish	11.7	9.0

Source: Collected and calculated from Tables of Appendix 3.

The government has always been trying to ease up the burden of poverty on behalf of low income and less privileged groups through implementing subsidy policies. These policies have helped to reduce the negative effects of poverty and provide some social care services for the less privileged groups. However part of the subsidy goes to all of the people irrespective of their income or poverty status, which increased the burden on the government budget while reducing the positive impact on low income and less privileged groups. Moreover, these subsidies have also resulted in price distortions that helped increase food losses, encourage malutilization of food products, and decrease efficiency of resource allocation. The following two sections will shed some light on the levels of poverty in Syria and adopted policies for ensuring food acquisition by less privileged groups, in as much as the scarcity of data and information would allow.

4.2.1 Poverty in the Syrian Economy

Table 4.3 gives some information on the development of total and rural population, gross domestic product, and gross agricultural domestic product for the period 1989-98, at the fixed 1995 prices. Analysis of the table's figures reveals the following facts:

- GDP at fixed prices featured a favorable annual rate of growth amounting to 6.77% during the 10-year period, while the same for GADP reached 9.6%, which reflects the efforts of development within the agricultural sector during this period. This differential rate of growth resulted in increasing the percentage of participation of the agricultural sector in the overall GDP from 25.7% in 1989 to 32.4% in 1998;
- The high rate of population increase has absorbed more than half the increase in GDP, which resulted in a moderate rate of annual increase in the per capita GDP (3.5%). On the other hand, the annual increase in per capita GADP in rural areas increased at the rate of 6.5% to reach SP28,700 in 1998; and
- Applying the exchange rate of 1998, amounting to SP46.5 for the US dollar, which is almost the same rate prevailing in neighboring countries, the per capita GDP would amount to US$993 at the national level and US$617 in rural areas, in 1998.

On the basis of income distribution patterns, the percentage of poor people in Syria might be estimated at 25 to 30% of total population. However, this percentage may reach 40 to 45% in rural areas. These estimates are in line with the 1996 estimates of the

United Nations that put about 3.5 millions of the rural population, which amounts to 48%, below poverty line.

However, whatever the real percentage of poverty would be, features of poverty are widespread in rural, as compared to, urban areas. Most important poverty features indicated by available data and information include:

- About 45% of the rural population do not have access to safe and clean drinking water;
- Only 10% of the rural population have access to reasonable standards of health services; and
- Education services available for rural population are limited. In many areas they are confined to primary schools;

The most important reasons of poverty in rural areas may be summarized in the following factors:

- Low and fluctuating agricultural productivity in rainfed areas, caused by low and fluctuating rainfall, which result in low incomes and low levels of living in these areas;
- On the other hand, small farm size and large families are the main factors of poverty in irrigated areas within the first and second settlement areas that enjoy higher and less fluctuating rainfall. Moreover, Chapter II of the present study has

Table 4.3: Development of Gross National Product and Gross Agricultural Product at 1995 fixed prices, and per capita income during the period 1986-98

Years	GNP SP million	Agricultural GNP SP million	% Agricultural GNP to total GNP	Total population (000)	Rural population (000)	Average GNP Per capita (SP)	Average agricultural GNP per capita in rural areas (SP)
1989	372,387	95,730	25.7	11,719	5,864	31,800	16,300
1990	389,469	115,974	29.8	12,116	6,029	32,100	19,200
1991	420,242	123,819	29.5	12,529	6,194	33,500	20,000
1992	476,850	146,003	30.6	12,958	6,364	36,800	22,900
1993	501,436	145,780	29.1	13,393	6,578	37,500	22,200
1994	539,929	154,689	28.6	13,844	6,732	39,000	23,000
1995	570,975	161,024	28.2	14,263	6,945	40,000	23,200
1996	612,896	184,535	30.1	14,694	7,165	41,700	25,800
1997	628,148	179,200	28.5	15,139	7,391	41,500	24,300
1998	677,173	219,170	32.4	15,597	7,625	43,400	28,700
Rate of growth	6.7%	9.6%	-	3.23%	2.96%	3.5%	6.5%

Source: Collected and calculated from: The Central Bureau for Statistics: Annual Statistical Bulletin, different years.

indicated that irrigated areas do not exceed 25% of the cropped area; and that the average size of farm is less than 5 ha in four governorates, and ranges between 5 and 10 ha in 6 governorates. It has also indicated that the size of holdings of 75% of farmers is less than 5 ha. The prevailing pattern of holdings is low farm size in irrigated areas, and relatively larger sizes in rainfed areas;

- The deterioration of rangeland in the desert area (the Badea), along with the instability of rainfall resulted in large fluctuations in numbers of sheep flocks, which are the main source of income and wealth for population in these areas. More than 80% of shepherds' families in these areas own sheep flocks of 100-150 head, which cannot produce enough income to support the prevailing large families, especially if it is added that rangelands do not support their flocks for more than 6 months per year during years of average rainfall. That is, shepherds have to provide feed for their flocks from other sources for at least 6 months per year. They have to sell part of their flocks to be able to support the other part;
- The insufficiency of heath, education, and other social services add to the problem of low incomes prevailing in these areas. Moreover, more than 45% of the rural population do not have access to safe water; and
- The very limited numbers of job opportunities in rural areas, the prevalence of disguised unemployment embodied in the seasonality of agricultural production, and the concentration of industrial and services activities in urban areas add to the causes of poverty in rural areas.

4.2.2 Food Acquisition Policies for Less Privileged groups

The government has been, for long periods, applying highly subsidy-oriented consumption polices with a view to promoting the nutrition standards for the population and improving their consumption abilities. Policy directives in this respect included subsidizing both consumers and agricultural producers. Consumer subsidies enabled fixing prices of major food commodities at low levels (sometimes at one-tenth their international levels). Subsidized consumer commodities included bread, sugar, rice, wheat flour, and vegetable oils. Producer subsidies, on the other hand, helped fixing prices of agricultural prerequisites at low levels, and hence supported consumers' price policies.

Positive effects of these policies included combating poverty, especially in rural areas. However, their negative effects were multiple, including (as afore-mentioned) increased burden on the government budget, and price distortions that increased food losses, encouraged malutilization of food products, and decreased efficiency of resource allocation. Moreover, the same subsidies were provided to rich people who do not need it, which represented waste of public funds. Accordingly, the government started reviewing these policies to rationalize government expenditure. It started a program of gradual reduction of agricultural inputs' subsidies, which resulted in abolishing all but limited subsidies on fuel and interest on agricultural loans. This has resulted in increasing cost of agricultural production and hence, in prices of agricultural products. At the same time, the government started to reduce the number of subsidized products, limiting it to bread, sugar, and rice as aforementioned.

Bread is subsidized at a level exceeding half its production cost. Subsidized bread is sold at SP8 per kilogram, while unsubsidized bread is sold at SP19[6]. However, subsidized bread is still available for all consumers, irrespective of their income levels. Sugar and rice, on the other hand, are subsidized only within given quotas per person holding rationing cards. Quotas per person per month are 1.5 kg for sugar and 0.5 kg for rice, provided at about half market prices.

In this respect, it ought to be mentioned that the government implements health, education, and other social polices to support limited income groups. These policies allow giving monetary grants in case of emergencies.

[6] Estimated while taking into consideration the difference in the rate of flour extraction for producing subsidized and non-subsidized bread, 70% and 80% respectively.

V. DEVELOPMENTS IN THE STATE OF FOOD SECURITY

The present study has dealt, in previous chapters, with policy changes and their effect on food and agricultural production, productivity, cost, and prices of food and agricultural products. Discussion and analysis have also covered developments in the competitivity of food and agricultural products and their ability to penetrate in foreign markets. Moreover, the study included changes in consumption and consumer price polices and their effect on price stability, along with policies adopted to secure food needs for limited income and less privileged groups.

These economic policy changes at the economy and agricultural sector levels have resulted in changes in the state of food and nutrition within the country. This chapter intends to identify and analyze resultant changes in the state of food consumption and nutrition.

5.1 Developments in Food Consumption

Studies undertaken on food consumption in Syria are, more or less, confined to two major issues, family budget surveys undertaken by the Central Bureau of Statistics, and food balance sheets prepared and published by the Department of Food and Nutrition of the Directorate of agricultural Economics of the Ministry of Agriculture and Agrarian Reform. This same division also undertakes field studies to estimate annual food budgets for a limited sample selected according to given bases. Main results of the most recent of these studies are summarized below.

5.1.1 Developments in Food Availability

Table 5.1 gives the average annual production, consumption, export and available for consumption during the period 1986-88, while Table 5.2 gives the same for the period 1995-97, and the amount and parentage changes between the two periods. Analysis of the figures of the two tables reveals the following:

- Amounts of food commodities available for consumption increased between the two periods however, at different rates. Wheat increased by 900,000 tons or 36.6% of the available amounts during the first period. Red meat increased by 55,000 tons or 39.9%, poultry meat increased by 19,000 tons or 23.9%, milk increased by 366,000 tons or 29.5%, eggs increased by 567 million egg or 36.1%, fish increased by 7,000 tons or 140%, and sugar beets increased by 795,000 tons or 213.1%;
- These increases in the amounts food commodities available for consumption might be attributed to the increase in their production, as imports during the second period did not include any amounts. To the contrary, exports during the second period included 407,000 tons of wheat and 49 million egg;
- Available amounts for consumption of yellow corn increased by 500,000 tons or 335.5%. However, this was mainly attributed to the increase in imports that amounted to almost 400,000 tons or 80% of the increase in available amounts between the two periods;

Table 5.1: Average annual food balance sheet for the period 1986-88
(in thousand tons unless otherwise stated)

Commodity	Production	Imports	Exports	Available for consumption
Wheat	1,897	576	15	2,458
Barley	1,509	12	59	1,462
Lentils	102	0	14	88
Chickpeas	42	0	3	39
Yellow corm	74	76	*	150
Sugar beets	373	0	0	373
Groundnuts	22	*	1	21
Green beans	72	0	4	68
Watermelon	542	0	5	537
Sweet melon	119	*	1	118
Potatoes	410	9	16	403
Tomatoes	602	8	4	606
Dry beans	17	0	2	15
Eggplant	197	2	1	198
Olives	373	*	*	373
Grapes	501	*	0	501
Figs	45	0	2	43
Apricots	59	0	1	58
Apples	161	*	20	141
Pears	17	*	*	17

Table 5.1: (continued)

Commodity	Production	Imports	Exports	Available for consumption
Plums	54	0	1	53
Pomegranates	67	0	1	66
Cherries	23	0	0	23
Pistachios	15	*	*	15
Citrus	195	44	1	238
Cattle (thousand h.)	726	4	0	730
Sheep (thousand h.)	12,672	*	25	12,647
Goats (thousand h.)	1,023	0	25	998
Milk	1,176	0	0	1,176
Eggs (million egg)	1,572	1	2	1.571
Fish	5	*	*	5
Red meat	130	8	0	138
Poultry meat	68	*	*	68
Green beans & cowpea	64	1	*	65
Cabbage & cauliflower	160	0	1	159
Dried onions	126	0	9	117
Cucumbers	341	*	0	341

- less then 1000.

Source: Collected and calculated from: Ministry of Agriculture and Agrarian Reform, Annual agricultural Statistical Bulletin, different issues.

Table 5.2: Average annual food balance sheet for the period 1995-97 and changes from the average annual for the period 1986-88 (in thousand tons unless otherwise stated)

Commodity	Production	Imports	Exports	Available for consumption	Change	
					Amount	Percentage
Wheat	3,765	0	407	3,358	900	36.6
Barley	1,447	0	482	965	-497	-34.0
Lentils	129	0	108	21	-67	-76.1
Chickpeas	53	0	4	48	9	23.1
Yellow corn	251	398	*	649	500	335.5
Sugar beets	1,168	0	0	1,168	795	213.1
Groundnuts	29	*	*	29	8	38.1
Green beans	37	0	5	32	-36	-52.9
Watermelons	243	0	4	239	-198	-45.3
Sweet melons	54	*	12	42	-76	-64.4
Potatoes	392	2	27	367	-37	-9.2
Tomatoes	414	0	88	326	-289	-46.2
Dry beans	14	0	13	1	-14	-93.3
Eggplant	137	0	1	136	-62	-31.3
Olives	491	0	*	491	118	31.6
Grapes	459	0	18	441	-60	-12.0
Figs	46	0	7	39	-4	-9.3
Apricots	50	0	6	44	-15	25.4
Apples	294	0	5	289	148	105
Pears	23	0	5	18	1	5.9

* less than 1,000 ton.

Table 5.2: (Continued)

Commodity	Production	Imports	Exports	Available for consumption	Change	
					Amount	Percentage
Plums	32	0	4	28	-25	-47.2
Pomegranates	71	0	1	70	4	7.1
Cherries	41	0	7	34	11	47.8
Pistachios	22	1	9	14	-1	-6.7
Citrus	604	0	12	592	353	147.7
Cattle (000 head)	814	3	0	817	88	12.1
Sheep (000 head)	13,008	1,049	625	13,431	748	6.2
Goats (000 head)	1,082	1	61	1,032	34	3.4
Milk	1,511	0	0	1,511	344	29.5
Eggs (in millions)	2,187	*	49	2,138	567	36.1
Fish	12	*	0	12	7	140.0
Red meat	185	0	0	185	65	39.9
Poultry meat	87	0	*	87	19	27.9
Green beans & cow peas	40	0	4	36	-28	-43.8
Cabbage & cauliflower	154	0	3	151	-8	-5.0
Dry onions	126	0	2	124	7	6.0
Cucumbers	124	0	2	122	-219	-64.2

- Less tan 1,000 ton
- Source: Ministry of Agriculture and Agrarian Reform, Annual Agricultural Statistical Bulletin, different issues.

- Available amounts for consumption from some other field crops increased; chickpeas increased by 9,000 tons or 23.1%, groundnuts increased by 8,000 tons or 38.1%, and dry onions increased by 7,000 tons or 6%, in spite of exporting 4,000 tons of chickpeas, and 2,000 tons of dry onions;
- Available amounts for consumption for some fruits increased; citrus increased by 353,000 tons or 147.7%, apples be 148,000 tons or 105%, olives by 118,000 tons or 31.6%, cherries by 11,000 tons or 47.8%, pomegranates by 4,000 tons or 7.1%, and pears by 1,000 ton or 5.9%. These increases are also attributed to production increase. Moreover, fruit exports during the second period included 12,000 tons of citrus, 5,000 tons of apples, 7,000 tons of cherries, 100 tons of pomegranates, and 5,000 tons of pears;
- Available amounts for consumption of some field crops decreased; barley decreased by 498,000 tons or 34%, lentils by 67,000 or 76.2%, and dry beans by 14,000 tons or 93.3%. These decreases were attributed to the decrease in barley production by 52,000 tons and increase in its exports by 423,000 tons, decrease in lentils production by 27,000 tons and increase in its exports by 84,000 tons, decrease in dry beans production by 3,000 tons and increase in its exports by 12,000 tons;
- Available amounts for consumption of most of the vegetables decreased; tomatoes decreased by 280,000 tons or 46.2%, cucumbers by 219,000 tons or 64.2%, watermelons by 198,000 tons or 45.3%, sweet melons by 76,000 tons of 64.4%, eggplant by 62,000 tons or 31.3%, potatoes by 37,000 tons or 9.2% green beans by 46,000 tons or 52.9%, green beans and cowpea by 28,000 tons or 43.8%, and cabbage and cauliflower by 8,000 tons or 5%. With respect to tomatoes, its production decreased by 188,000 tons and its export increased by 84.000 tons. Cucumber production decreased by 217,000 tons, while watermelons production decreased by 299,000 tons. With respect to sweet melons, its production decreased by 65.000 tons, and its export increased by 11,000 tons. Eggplant production decreased by 60,000 tons. Potatoes production increased by 18,000 tons and its exports increased by 11,000 tons. Green beans production decreased by 35,000 tons. Green beans and cowpea production decreased by 24,000 tons and their exports increased by 4,000 tons. Finally, cabbage and cauliflower production decreased by 6,000 tons and their exports increased by 2,000 tons; and
- Available amounts for consumption of some fruits decreased; grapes decreased by 60,000 tons or 12%, plums decreased by 25,000 or 17.2%, apricots decreased by 15,000 tons or 25,4%, figs decreased by 4,000 tons or 9.3%, and pistachios decreased by 1,000 tons or 6.7%. These decreases were attributed to the decrease in grapes production by 42,000 tons and increase in its exports by 18,000 tons; the decrease in plums production by 22,000 tons and increase in its exports by 3,000 tons; the decrease in apricots production by 9,000 tons and increase in its exports

by 5,000 tons. With respect to figs and pistachios, their production increased by 1,000 and 7,000 tons respectively, and their exports increased by 5.000 for figs and 9,000 tons for pistachios.

5.1.2 Development in Per Capita Share of Food Commodities

The most recent family budget survey has not yet been published. Hence, to identify and analyze the latest developments in consumption pattern, the report would utilize the commodity balance sheets that are prepared on annual basis by the Ministry of Agriculture and Agrarian Reform. Table 5.3 presents the developments in per capita share of the main food commodities during the period 1992-1997. Analysis of the table's figures reveals the following:

- Per capita share of the main food commodities witnessed a high degree of stability, slightly increasing for all commodities except for olives, tomatoes, nuts, and olive oil, of which per capita consumption slightly decreased during the period 1992-97;
- Per capita share realized significant increases in a few number of food commodities. These commodities included citrus with 63% increase, potatoes with 22% increase, and oils with 16% increase during the same period;

Table 5.3: Developments in per capita share of main food commodities during the period 1992-97 (in kg per person)

Commodity	1992	Average 1993-95	Average 1994-96	Average 1995-97
Wheat	199.4	176	187	201
Rice	9.6	8.8	7	11
Potatoes	13.1	15.6	17	16
Sugar	31.4	29.8	33.2	33
Glucose	0	1.3	1.2	1
Legume grains	6.9	5.7	20	8
Nuts	5.7	4.2	4.5	4.5
Olives	7.4	5.7	6.2	5
Tomatoes	28.1	19.9	19	18
Other vegetables	-	55.1	43	54
Citrus	19.6	31.4	35	32

Apples	16.4	11.9	14	16
Other fruits	73	64.7	55.6	57
Olive oil	7.1	5.3	6.8	5.7

Table 5.3: (Continued)

Commodity	1992	Average 1993-95	Average 1994-96	Average 1995-97
Cotton oil	3.6	2	2.9	3.55
Total oils	14.7	15.7	16.4	17.06
Tea	-	1.3	1.3	1.14
Green coffee	-	0.8	0.7	0.74
Cocoa	-	0.2	0.2	0.2
Mate	-	0.4	0.5	0.7
Red meat	10.3	11.5	11.9	10.7
White meat	5.8	5.2	5.1	5.3
Fish	0.6	0.8	1	1
Eggs	6.6	6.9	6.7	6
Milk & dairy products	93.5	84.2	87.5	93
Dried milk	0.2	0.4	0.4	0.5
Cream & butter	0.6	0,5	0.4	1

Source: Department of Food and Nutrition, Directorate of Agricultural Economics, Ministry of Agriculture and Agrarian Reform.

- Average annual per capita share of wheat and wheat flour during the period 1995-97 was estimated at 201 kg, which is much above the estimates for the two periods, 1993-95 and 1994-96.
- Average annual per capita share of rice during the period 1995-97 was estimated at 11 kg, which is much above the estimate for the period 1994-96;
- While the average annual per capita share of fruits did not significantly change between 1992 and 1995-97, its structure significantly changed,

with the contribution of citrus almost doubled, increasing from 18% to 30%;

- Average annual per capita share of tomatoes decreased by about 36% between 1992 and 1995-97, from 28.1 to 18 kg;
- Average annual per capita share of red and white meat was almost stabilized at about 11 kg and 5.3 respectively; and
- While average per capita share of milk and dairy products decreased from 93.5 kg in 1992 to 84.2 and 87.5 kg in 1993-95 and 1994-96, it increased again to 93 kg in 1995-97.

Comparing per capita consumption of different food commodities between urban and rural areas, figures of Table 5.4 indicate the following:

- Per capita share of milk (fresh and processed) is higher in rural areas, 167 g per day as compared to 139 g in urban areas, at a total increase of 28 g or 29%. On the other hand, per capita share of dairy products is higher in urban areas, 26 g per day as compared to 19 g in rural areas, at a total increase of 7 g or 37%;
- Per capita share of olive oils is higher in rural areas, 16 g per day as compared to 13 g in urban areas, at a total increase of 3 g or 23%, while they are equal for other vegetable oils (12 g per day);
- Per capita share of fresh white meat is higher in rural areas, 35 g per day as compared to 27 g in urban areas, at a total increase of 8 g or 30%. On the other hand, per capita share of fresh red meat is higher in urban areas, 25 g per day as compared to 22 g in rural areas, at a total increase of 3 g or 14%;

Table 5.4: Average per capita share of main food commodities in 1994
(gram per day)

Commodity group	Rural areas	Urban areas	General average
Bread	367	388	387
Bulgur	31	34	33
Other wheat products	18	38	28
Rice	40	45	43
Lentil (whole grains)	7	7	7
Crushed lentils	8	8	8
Beans (grains)	8	15	12
Other legume grains	8	8	8
Fresh red meat	25	22	24
Fresh white meat	27	35	36
Canned meat and fish	3	3	3
Eggs	26	23	25

Table 5.4: (continued)

Commodity group	Rural areas	Urban areas	General average
Fresh milk	52	57	55
Dried milk	2	2	2
Yogurt	67	88	87
Drained milk	18	20	19
Cheese	17	12	15
Butter and ghee	9	7	8
Olive oil	13	16	15

Other vegetable oils	12	12	12
Hydrogenated oils	10	12	11
Nuts	10	4	7
Potatoes	53	62	58
Onions	16	17	17
Dry garlic	4	5	5
Apples	41	28	35
Olives	12	12	12
Tahini*	2	1	2
Sugar	55	57	56
Tea	6	7	7
coffee	5	4	5

* Thick sauce made of sesame oil.

Source: Ministry of Agriculture and Agrarian Reform, Directorate of Agricultural Economics, A study on the nutritional status in the Syrian Arab Republic for 1994.

- Per capita share of eggs is higher in urban areas, 26 g per day as compared to 23 g per day in rural areas, at a total increase of 3 g or 13%, while they are the same for canned meat and fish, 3 g per day;
- Per capita share of nuts is much higher in rural areas, 10 g per day as compared to 4 g in urban areas, at a total increase of 6 g or 150%. The same applies to apple, 41 and 28 g per day in rural and urban areas respectively, at a total increase of 13 g or 64%; and
- Per capita shares of sugar, hydrogenated oils and tea are slightly higher in rural areas as compared to urban areas; for sugar it is 57 and 55 g per day, for hydrogenated oils it is 12 and 10 g per day, and for tea it is 7 and 6 g per day, respectively.

5.1.3 Developments in Per Capita Calorie Intake

Analyzing the figures of Table 5.5 reveals that the per capita calorie intake has increased from 3,107 to 3,378 k calorie per day between 1988 and 1998, at a total increase of 271 k calorie or 8.7%. The table also indicates that there has been a slight change in favor of commodities of plant origin as compared to those of animal origin. The ratio of calorie intake from plant origin commodities to the same from animal origin commodities increased from 86:14 to 88:12 during the period of study. Protein per capita

intake increased from 83.6 to 88 g per day, at total increase of 4.4 g or 5.3%. No significant change has been recorded with respect to the percentage of proteins of animal origin in per capita protein intake between the two years, as the ratio has remained at about 24.5%. Fat per capita intake has increased by 12.6%, from 85 to 95.7 g per day. Percentage of food of plant origin in per capita fat intake has increased from 60.2% to 66.2% during the same period.

Table 5.5: Per capita daily calorie intake from protein and fat in 1988 and 1998

Commodity group	Per capita daily calorie intake (k calorie per day)		Per capita daily protein intake (gram per day)		Per capita daily fat intake (gram per day)	
	1988	1998	1988	1998	1988	1998
From plant origin	2,684	2,960	63.2	66.4	51.2	63.4
From animal origin	423	418	20.4	21.6	33.8	32.3
Grand total	3,107	3,378	83.6	88	85.0	95.7

Source: FAOSTAT

Analyzing the figures of Table 5.6 reveals that the shares of wheat, sugar, vegetable oils, poultry meat and fish in the per capita daily calorie intake have increased between 1988 and 1998. Daily per capita calorie intake from wheat increased from 1,455 to 1,682 k calorie, increasing its share from 46.8% to 49.8%, while that from sugar increased from 317 to 360 k calorie, increasing its share from 10.2% to 10.7%. Daily per capita calorie intake from vegetable oils increased from 280 to 374 k calorie, raising its share from 9% to11.1%. Daily per capita calorie intake from poultry meat increased from 20 to 23 k calorie, and hence its contribution increased from 0.6% to 0.7%. Because Syrians do not eat much of fish, the daily per capita calorie intake from fish, while being doubled, from 1 to 2 k calorie, its share is still insignificant (0.06%).

Table 5.6: Per capita daily protein and fat intake from different food commodities in 1988 and 1998

Commodity group	Per capita calorie intake (k calorie/day)		Per capita protein intake (gram per day		Per capita fat intake (gram per day)	
	1988	1989	1988	1989	1988	1989
Wheat	1,455	1,682	44	50.9	8.0	9.3
Rice	104	100	2	1.9	0.2	0.2
Potatoes	48	42	0.8	0.7	0.1	0.1
Sugar	317	360	0	0	0	0

Oilseed crops	59	63	2.1	2.1	5.4	5.9
Vegetable oil	280	374	0	0	31.6	42.2
Hydrogenated oil	111	56	5.2	2.7	0.9	0.4
Vegetables	152	133	1.7	1.7	0.7	0.6
Fruits	20	21	1.1	1.1	1.7	1.8
Beef meat	71	74	3.7	3.9	6.1	6.4
Sheep & goat meat	20	23	2.1	2.4	1.2	1.4
Animal fat	92	63	0	0	10.3	7.1
Milk	186	199	10.2	10.7	12.2	13.2
Eggs	24	25	1.8	1.9	1.7	1.8
Fish	1	2	2.1	0.3	0	0.1

Source: FAOSTAT

On the other hand, shares of per capita calorie intake from rice, potatoes, vegetables, fruits, sheep and goat meat, animal fat, and milk in the total per capita daily calorie intake decreased between 1988 and 1998. They decreased from 3.3% to 3% for rice, from 1.5% to 1.2% for potatoes, from 3.6% to 1.7% for vegetables, from 4.9% to 3.9% for fruits, from 2.3% to 2.2% for sheep and goat meat, from 3% to 1.9% for animal fat, and from 6% to 5.9% for milk. This fall in the shares of these groups of commodities in the per capita daily calorie intake, except for sheep and goat meat and milk, was due to corresponding fall in their per capita daily intake. To the contrary per capita daily intake from sheep and goat meat increased from 71 to 74 k calorie, and that from milk increased from 186 to 199 k calorie.

Table 5.6 also shows that the per capita daily protein intake from wheat, sheep and goat meat, poultry meat, milk, eggs, and fish increased between 1988 and 1989, while the same from oilseed crops, fruits, and beef, did not change, and that from rice, potatoes and vegetables declined. On the other hand, per capita daily fat intake from wheat, oilseed crops, vegetable oils, beef, sheep and goat meat, poultry meat, milk, eggs, and fish increased, while the same from rice and potatoes did not change, and that from vegetables, fruits and animal fat declined.

5.2 Developments in Household Expenditure on Food

The Central Bureau of Statistics undertakes periodic family budget surveys. These surveys are normally based on representative samples drawn from groups of different consumption expenditure levels and patterns, from all regions of the country. Unfortunately the most recent family budget survey undertaken for the year 1994 was not

published when undertaking the present study. Therefore, the analysis would cover the latest published study in this respect; the one undertaken for the year 1985-86, with a view to identifying the nature of consumption pattern in rural and urban areas. Table 5.7 exhibits some details of expenditure on food in rural an urban areas of the country. Main conclusions of the study, along with the analysis of the table's figures indicate the following:

- Expenditure on food amounted to 48.4% of gross family expenditures. It was followed by expenditure on clothing (9.3%), education (6.6%), health care, house utilities, and furniture. Expenditures on each of the last three items were about 6%;
- Average annual per capita expenditures on main food items were SP 3.909 in rural areas, SP 4,246.9 in urban areas, and SP4,078 in Syria at large; and
- On the average, expenditure on meat, fish, and eggs came at the forefront. It took about 18.61% of total expenditure on food commodities. This percentage increased to 20% in urban areas and decreased to 17% in rural areas. This was followed by expenditure on vegetable oils at 16.45% (14.5% and 18.6% in urban and rural areas respectively), expenditure on milk and dairy products at 15.5% (16.4% and 14.6% in urban and rural areas respectively). Expenditure on vegetables occupied the fourth rank at 12.7% (10.8% and 12.6 in urban and rural areas respectively). This was followed by expenditure on fruits and nuts at 7.85% (8.9% and 6.9% in urban and rural areas respectively), on sugar and sugar products at 6.3% (6% and 6.5% in urban and rural areas respectively), and on grains and grain product at 5.34% (4.9% and 5.8% in urban and rural areas respectively). Expenditure on these seven commodity groups amounted to 82.9% of expenditure on food commodities (83.6% and 82.1% in urban and rural areas respectively).

Table 5.7: Average and percentage of per capita expenditure on food
(1985-1986 in Syrian Lira)

Commodity group	Urban	Rural	Average	% of total expenditure on food	% of individual expenditure
Grain and grain products	208.5	227	217.8	5.34	2.6
Dry legumes	111.9	146.3	129.1	3.17	1.54
Meat, fish, and eggs	853.2	665	759.1	18.61	9.05

Milk and dairy products	694.5	572.7	633.6	15.54	7.55
Vegetable oils	615.6	726.3	671	16.45	7.99
Vegetables	543.5	493.1	518.3	12.71	6.18
Fruits and nuts	377.8	270.5	324.2	7.95	3.86
Sugar and sugar products	256.8	255.1	256	6.28	3.05
Other food items	226.5	198.6	212.6	5.21	2.53
Drinks and beverages	205	209.5	207.2	5.08	2.47
Tobacco and the like	153.6	145.2	149.4	3.66	1.78
Total	4,246.9	3,909.3	4,078.1	100	48.6

Source: Central Bureau of Statistics, Annual Statistical Bulletin.

5.3 Development in Food Self-Sufficiency

Table 5.8 presents developments in self-sufficiency for major food commodity groups for Syria at selected periods between 1970 and 1990, while table 5.9 presents the same for the period between 1991 and 1998. Analysis of the figures in these tables indicates that food self sufficiency has significantly improved during the past three decades:

- Self-sufficiency rates for wheat increased from 72% on the average during the period 1970-72 to achieve self dependency during the period 1994-96, and to realize a surplus for export in 1997-98, with the self sufficiency rate reaching 118%;
- Self-sufficiency rates for potatoes improved from 92% in 1970-72 to reach full self-sufficiency in 1984-86, and to realize surplus for export, with self-sufficiency rates reaching 136% in 1990. However this high rate declined to reach 101% in 1997-98;
- Self-sufficiency rated in vegetables developed from 94% to more than 100% as of 1987-89;
- Self-sufficiency rates for dry legumes ranged during the whole period between 108% and 172%;
- Self-sufficiency rates for apple and citrus improved from 70% and 15% respectively in 1970-72 to be slightly more than 100% as of 1987-89 for apples and as of 1990 for citrus;

- Self-sufficiency rates for olives consistently maintained the level of 100%;
- Self-sufficiency rates for red meat ranged between 86% and 99% before becoming 100% in 1997-98;

Table 5.8: Developments in self-sufficiency rates for main food commodities for selected periods between 1970 and 1990 (in percentages)

Commodity group	1970-72	1977-79	1984-86	1987-89	1990
Wheat	72	81	66	66	69
Dry legumes	139	172	113	108	129
Potatoes	92	79	102	108	136
Vegetables	94	95	99	104	100
Citrus	15	32	43	99	101
Apple	70	77	100	101	100
Other fruits	114	101	100	101	105
Sugar	13	11	17	9	11
Olives	100	100	100	100	100
Red meat	86	99	97	98	99
Poultry meat	-	96	102	100	100
Milk	90	88	87	96	98
Eggs	75	100	100	102	106
Fish	33	61	100	100	100

Source: Ministry of Agriculture and Agrarian Reform, directorate of Agricultural Economics, Department of Nutrition, A Study on the State of Food and Nutrition in the Syrian Arab Republic, 1991.

- Full self-sufficiency for poultry meat has been sustained since 1984-86;
- Self-sufficiency rates for sugar have been ranging between 9% and 17%; and
- Self-sufficiency rates for other groups of commodities have improved to 100% or slightly above that level as of 1984-86, except for eggs for which self-sufficiency rates reached 100% as of 1977-79.

Table 5.9: Developments in self-sufficiency rates for main food commodities for selected periods between 1991 and 1998 (in percentages)

Commodity group	1991-93	1994-96	1997-98
Wheat	86	103	118
Dry legumes	125	159	130
Potatoes	115	109	101
Apples	102	102	103
Citrus	101	106	102
Tomatoes	109	120	125
Olives	100	100	100
Red meat	92	93	100
Poultry meat	101	100	100
Fresh milk	100	100	100
Eggs	103	102	103
Fish	100	103	100

Source: Ministry of Agriculture and Agrarian Reform, Directorate of Agricultural Economics, Department of food and Nutrition.

VI. PROSPECTS OF FOOD SECURITY

6.1 Prospects of Food Availability

Based on the analysis carried out in previous chapters regarding achieved development in land and water resources, agricultural productivity and production, and support services provided for the agricultural sector, the present section assesses the future prospects for food availability.

6.1.1 Prospects of Agricultural Resources

As stated in Chapter II, the rate of growth in irrigated areas reached 6.3% during the period 1991-98, and the irrigated area increased from 788,350 ha in 1991 to 1.2 million ha in 1998. This rate of growth in irrigated areas was made possible through the policy reforms and arrangements that motivated farmers to invest in irrigation. However, in order to conserve groundwater resources and achieve efficiency in the use of irrigation water, the government applied a number of regulations to limit digging new wells until finalizing a comprehensive assessment of water aquifers and designing appropriate policies for their utilization. Therefore, estimates of future developments in irrigated areas were based on conservative estimates for the annual rates of increase; 1.86% during the period 1998-2010 and 1.17% during the period 2010-2020. Accordingly, estimates of the irrigated area for 2010 and 2020 amounted to 1.5 and 1.7 million ha respectively (Table 6.1).

Assuming that the area under rainfed irrigation would increase by the annual rates of 0.6% and 0.04% within the aforementioned two periods, and assuming that increases in irrigated areas would be on the account of rainfed areas, estimates of the rainfed areas would amount to 3.9 and 4.1 m ha for the years 2010 and 2020, respectively.

Table 6.1: Estimates of land and water resources in 2010 and 2020

Item	Actual values for 1998	Annual rate of % growth (1998-2000)	Estimates for 2010	Annual rate of % growth (2010-2020)	Estimates for 2020
Cropped area (000 ha)	4,868	1.07	5,440	0.62	5,787
Irrigated area	1,213	1.86	1,513	1.17	1,700
Rainfed area	3,655	0.6	3,927	0.4	4,087
Water use (1,ooo m^3)					
Available water	17,112	-	17,112	-	17,112
Utilized water	14,556	0.82	16,056	0.64	17,000

Source: Estimates of the study team.

Within the ongoing policy of developing irrigation and encouraging the use of modern irrigation techniques, and assuming that annual rates of increase in irrigation water would increase by 0.82% and 0.64% within the two aforementioned two periods respectively, estimates of utilized water in irrigation would amount to 16 and 17 billions of cubic meters in 2010 and 2020 respectively. On the other hand, assuming that the increase in the use of modern irrigation techniques would enhance the efficiency of irrigation projects, estimates of water requirements per ha would be expected to decrease from 12,000 m^3 in 1998 to 10,600 m^3 and 10,000 m^3 in 2010 and 2020, respectively, which would allow achieving the assumed increase in the irrigated areas.

6.1.2 Prospects of Agricultural Production

Based on the estimated increase in cropped area (rainfed and irrigated) and productivity per hectare, and taking into consideration domestic and international trends in demand, estimates of expected food and agricultural production were calculated as exhibited in Table 6.2. According to these figures, food commodities may be classified into three groups with respect to their expected rate of growth:

- The first group includes vegetables, citrus, and olives. These commodities are expected to realize a high rate of growth in the coming 20, mainly because they enjoy high demand in the domestic market, and have good prospects in Arab and European markets. Moreover, they enjoy high yield potentials;
- The second group includes fruits other than citrus and olives, wheat, dry legumes, and potatoes. These commodities are expected to accomplish a moderate rate of development during the same period. Expanding their production is expected in irrigated and rainfed areas. Expansion in rainfed areas is, to a great extend, limited; and
- The third group includes livestock and poultry products, which are expected to accomplish a rate of growth sufficient to meet additional needs of the expected increase in the population.

6.2 Prospects of Stability in Food Supplies

Future stability in food supplies depends on the development of local food production (estimated under item 6.1 above), and the promotion of foreign trade. Promoting foreign trade depends to a great extent on the development of competitivity, which is the main factor behind the ability to penetrate in international markets. Penetration in international markets boosts the demand for domestic production, enhances efficiency of resource utilization, and increases the ability to import food to meet the increasing domestic demand. Boosting competitivity depends on a number of factors, most important of which are the following:

- Existence of appropriate domestic economic and social environment. As aforementioned, Syria started to gradually develop towards liberalizing the economy and adopting the market system as the main motivator in allocating natural and human resources while, at the same time, maintaining social equity and stability. It is expected that Syria will keep following this path to achieve its objectives of sustained development;
- Increasing agricultural productivity and production, and increasing the allocative efficiency of agricultural resources. In this respect, a lot needs to be done for increasing the rate of utilized technology, especially in the areas of irrigation, use of high-yielding crop varieties and increasing livestock productivity through breading and genetic engineering;

Table 6.2: Projections for the production of food commodities in 2010 and 2020 (in thousand tons)

Commodity	Achieved production development between the two periods 1986-88 and 1996-98			Production estimates for 2010		Production estimates for 2020	
	Average for 1986-88	Average for 1996-98	Rate of change	Rate of change 1998-2010	Production Projections	Rate of change 2010-2020	Production projections
Wheat	1,897.5	3,741.0	7.02	2.27	5,289.0	2.20	6.574.8
Dry legumes	170.6	212.6	2.22	2.50	285.9	2.20	355.4
Potatoes[1]	359.9	318.9	1.03	2.50	549.9	2.20	683.6
Tomatoes	602.2	457.1	2.7	3.20	688.4	3.0	925.2
Other vegetables	2,035.2	1,355.8	3.98	3.20	2,041.9	3.0	2,744.1
Citrus	227.3	673.1	11.47	5.00	1,269.2	4.0	1,878.7
Apples	161.0	340.0	7.76	4.00	566.1	3.0	760.8
Olives	327.5	611.9	5.09	4.00	1,018.9	3.0	1,369.3
Other fruits[2]	845.8	947.8	1.15	3.00	1.392.0	3.0	1,170.0
Red meat	131.2	196.5	4.12	3.20	295.9	2.8	39.9
Poultry meat	67.8	90.6	2.94	5.00	171.0	5.0	278.0
Milk	1,177.4	1,632.9	3.32	3.30	2,490.4	3.0	3,446.4
Fish	5.3	11.9	8.42	5.00	22.4	5.0	36.6
Eggs[3]	1,576.1	2,243.6	3.59	3.50	3,508.9	3.2	4,808.0

1. Includes spring, summer, and fall potatoes.
2. Includes fruits other than those mentioned in the table along with almonds, pistachios, and walnuts.
3. In million egg.

Source: calculated by the study team.

- Maximizing benefits from bilateral and multilateral trade agreements. Item 2.2.2.3 indicates that Syria has signed a number of trade agreements and protocols. However, none of them was developed to any degree of economic grouping that gives Syrian products preferential treatment;
- Speeding up negotiations with the European Union to sign the partnership agreement that would enable Syria to get the best possible benefits for its products. Such an agreement would allow agreed upon agricultural products to enter European markets free of custom duties and other charges, according to the agricultural calendar attached to the Agreement. This Agreement will also allow Syria to benefit from European technical assistance in developing industrial and agricultural production skills necessary for increasing the competitivity of its products in international markets; and
- Starting negotiations with the International Trade Organization, trying to get the best possible conditions for joining. It would be advised, before starting such negotiations, to thoroughly evaluate all benefits and costs. In this respect, it should be mentioned that joining the Organization requires realizing significant changes in production patterns and policies, supporting and developing research centers and trade infrastructure with a view to improve the quick response of the national economy to international changes influenced by the development of international trade. As Syria is presently progressing in the implementation of reform policies that introduced institutional and structural changes, joining WTO would enhance the integration of the Syrian market into international markets and hence, improve its penetrating ability. Because Syria has significant agricultural surplus for export that is expected to increase in the near future, it would highly benefit from joining WTO.

6.3 Prospective Rates of Per Capita Food Consumption

Table 6.3 gives estimates for per capita share of food commodities for the years 2010 and 2020. These estimates were based on the developments in consumption levels realized during the period of economic reform policies, estimated between 2% and 4%, taking into consideration the income elasticity of food commodities in consideration. Analysis of the table's figures shows that food commodities may be classified under five different groups, with respect to estimated per capita shares:

- The first group includes vegetable oils, nuts, tea, coffee, cocoa, and glucose, for which per capita consumption rates are expected to stabilize until 2020 at their 1997 rates;
- The second group includes commodities, for which per capita consumption rates in 2010 are expected to increase within 10% over their 1997 levels, and stabilize at the same rate until 2020. This group comprises wheat, rice, and sugar. Eggs may be considered among this group, except that its per capita consumption in 2020 is expected to increase by 15% over its rate in 2010;

Table 6.3: Expected per capita consumption of different food commodities (kg/year)

Commodity	1997 (actual)	2010	2020
Wheat	201	205	205
Rice	11	12	12
Dry legumes	88	10	12
Sugar	33	35	35
Glucose	1	1	1
Potatoes	16	20	22
Citrus	32	40	45
Apples	16	20	25
Olives	5	7	10
Tomatoes	18	25	30
Other vegetables	54	60	70
Other fruits	58	65	75
Olive oils	5.7	5.7	5.7
Total vegetable oils	17.1	17.1	17.1
Nuts	4.5	4.5	4.5
Tea	1.14	1.14	1.14
Green coffee	0.74	0.74	0.74
Cocoa and chocolate	0.2	0.2	0.2
Red meat	10.7	12	15
Poultry meat	5.3	8	10
Milk	93	115	125
Fish	1	1.2	1.5
Eggs	6	6.5	7.5

Source: Estimated by the study team

- The third group includes commodities for which per capita consumption is expected to increase by the rates of 10% to 25% in the year 2010, and 8 to 25% between 2010 and 2020. This group includes vegetables other than tomatoes and potatoes (11% and 17% respectively), red mead (12% and 25% respectively), fruits other than citrus, apples and olives (12% and 15% respectively), fish (20% and 25% respectively) and milk (8% and 15% respectively);
- Commodities for which per capita consumption is expected to increase by 25% in 2010 and by smaller percentages until 2010 constitute the fourth group. It comprises citrus, and potatoes, for which per capita consumption is expected to increase by 25% for each until 2010, and by 12.5, and 10%, respectively in 2020; and
- The fifth group includes commodities for which per capita consumption is expected increase in 2010 by more than 25%, and by less or more than 25% in 2020. It includes olives, which is expected to increase by 40% and 43% in 2010 and 2020 respectively, tomatoes (39% and 29% respectively, and poultry meat (51% and 25% respectively.

Table 6.4: Population estimates in 2010 and 2020 (in thousand person)

Item	2010		2020	
Projected rate of increase (%)	3.3	2.7	2.7	2.3
Population estimates	24,100	21,473	29,366	26,956

Source: Estimated by the study team

6.4 Prospective Demand for Food

Estimates of the total demand for food commodities for the years 2010 and 2020, given in Table 6.5, are based on per capita consumption estimates of table 6.3 and population estimates of Table 6.4. Analysis of Table 6.5 figures indicates that commodities might be differently classified under different assumptions of population increases up to 2010 and 2020, with respect to the increase in their prospective demand. Results of the analysis are presented in the following sections.

6.4.1 Prospective Demand in 2010

Assuming a high rate of population increase between 1997 and 2010 (3.3%), food commodities might be classified into 3 groups with respect to expected increase in demand in 2010:

- Commodities for which increase in expected demand in 2010 exceeds 100% of their 1997 levels. This group includes poultry meat with a 140% increase, olives (123% increase) and tomatoes (121% increase);

- Commodities for which increases in expected demand in 2010 are close to 100% of their 1997 levels. This group includes dry legumes, potatoes, citrus, apples, vegetable oils, milk, fish, tea, and green coffee; and
- Commodities for which increases in expected demand in 2010 lie between 60% and 80% of their 1997 levels, which include red meat along with all other commodities.

Reducing the expected rate of population growth between 1997 and 2010 to 2.7% would result in decreasing the aforementioned estimates for the increase in the demand for food commodities in 2010:

- From 22% to 26% with respect to poultry meat, dry beans, olives, tomatoes and potatoes;
- By 20% for red meat and fish; and
- From 17% to 19% for all other food commodities.

6.4.2 Prospective Demand in 2020

Assuming a high rate of population increase between 2010 and 2020 (2.7%), food commodities might be classified into the following groups with respect to the expected demand increase in 2020:

- Commodities for which projected demand lies between 360% and 390% of their 1997 levels. These are olives (388%) and poultry meat (355%);
- Commodities for which projected demand lies between 300% and 325% of their 1997 levels, which are tomatoes, (323%) and apples (303%);
- Commodities for which expected demand lies between 250% and 300% of their 1997 levels. They include dry beans and fish (291% each), citrus (273%), red meat (272%), potatoes (267%), milk (261%), vegetables other than tomatoes and potatoes, and fruits other than citrus, apples and olives (251% each);
- Commodities for which expected demand lies between 200% and 250% of their 1997 levels, which include eggs (243%) and rice (211%); and
- Commodities, for which expected demand lies between 150% and 200% of their 1997 levels, which include wheat (198%), cocoa and chocolate (197%), glucose (195%), tea (158%), and olive oil, nuts, and green coffee (154% each).

Reducing the expected rate of population growth between 2010 and 2020 to 2.3% would decrease the aforementioned estimates for the increase in the demand for food in 2010 to:

- Between 25% and 32% for olives, poultry meat, and tomatoes;
- Between 20% and 25% for apples, dry legumes, citrus, fish, potatoes, red meat, milk, fruits other than apples and olives, eggs, and vegetables other that tomatoes and potatoes;

- Between 15% and 20% for wheat, rice, sugar, glucose, olive oil and other vegetable oils, nuts, and cocoa and chocolate; and
- Between 10% and 15% for tea.

Table 6.5: Demand projections for food commodities in 2010 and 2020

Commodity	1997	Expected demand in 2010		Expected demand in 2020	
		3.3%*	2.7%*	2.7%*	2.3%*
Wheat	3,042.9	4,940.5	4,402	6,020	5,536
Rice	166.5	289.2	257.7	352.4	323.5
Dry legumes	121.1	241	214.7	352.4	323.5
Sugar	499.6	843.5	751.6	1,027.8	943.5
Glucose	15.1	24.1	21.5	29.4	27
Potatoes	242.2	482	429.5	646	593
Citrus	484.4	964	858.9	1,321.5	1,213
Apples	242.2	482	429.5	734.2	673.9
Olives	75.7	168.7	150.3	293.7	269.6
Tomatoes	272.5	602.5	535.8	881	808.7
Other vegetables	817.5	1,446	1,288.4	2,055.6	1,886.9
Other fruits	878.1	1,566.5	1,395.7	2,202.4	2,021.7
Olive oil	86.3	137.4	122.4	167.4	153.7
Total vegetable oils	258.3	411.1	366.3	501	459.9
Nuts	68.1	108.5	96.6	132.1	121.3
Tea	21.2	33.7	24.5	33.5	30.7
Green coffee	11.2	17.8	15.9	21.7	19.9
Cocoa and chocolate	3.0	4.8	4.3	5.9	5.4
Red meat	162.0	289.2	257.7	440.5	404.3
Poultry meat	80.2	192.8	171.8	293.7	269.6

Milk	1,407.9	2,771.5	2,469.4	3,670.8	3,369.5
Fish	15.1	28.9	25.8	44	40.4
Eggs	90.8	156.7	139.6	220.2	202.2

* Rates of population increases. Source: Collected and calculated from Tables 6.3 and 6.4

6.5 Prospects of Food Security

Table 6.6 gives estimates for prospective self-sufficiency rates for different food commodities in 2010 and 2020. Analysis of the table's figures indicate the following:

- Except for white meat, milk, fish, and fruits other than citrus, apples, and olives, self sufficiency rates would be realized for all food commodities included in the table, leaving a surplus for export, even under the assumption of a high rate of population increase between 1997 and 2010 (3.1%). The surplus for export would be expected to range between 51% (for other vegetables) and 10% (for red meat). Rates of self-sufficiency for excluded commodities range between 95% and 96% for poultry meat, milk and other fruits, and 82% for fish;
- Assuming lower rate of population increase (2.7%) during the same period, only fish would not realize full self-sufficiency (85%). Poultry meat and fruits other than citrus, apples and olives would realize full self-sufficiency without export surplus. All other food commodities are expected to realize surplus for export in 2010 ranging between 1% for milk and 59% for vegetables other than potatoes and tomatoes;
- Assuming a 2.7% rate for population increase between 2010 and 2020, projections for the year 2020, shows that 7 food commodity groups will be expected to realize self-sufficiency, leaving a surplus for export ranging between 1% for dry legumes and 42% for citrus. These groups include citrus, vegetables including tomatoes and potatoes, eggs, wheat, and dry legumes. Olives will realize self-sufficiency without any residue for export. Other food commodity groups would realize a rate of self-sufficiency between 84% and 95%. These groups include poultry meat, milk, fruits other than citrus, apples, and olives, red meat, milk, and apples; and

Assuming a lower rate of population increase between 2010 and 2020 (2.3%), projections indicate that the number of commodity groups realizing less than 100% self-sufficiency rates are expected to decrease to 4; fruits other than citrus, apples and olives, along with fish (93% each), red meat (97%), and milk (99%). Other food commodity groups are expected to realize excess for export ranging between 3% for poultry meat, and 55% for citrus.

Table 6.6: Projected food self-sufficiency rates for years 2010 and 2020

Commodity	Self-sufficiency rates (%)				
	1987-88	Projected for 2010		Projected for 2020	
		2.7%*	3.1%*	2.3%*	2.7%*
Wheat	118	120	115	119	109
Dry legumes	130	133	128	110	101
Potatoes	101	128	122	115	106
Citrus	102	148	141	155	142
Apples	103	132	126	113	91
Table olives[1]	100	136	127	109	100
Tomatoes	125	128	122	114	105
Other vegetables	-	159	151	145	135
Other fruits	-	100	95	93	85
Red meat	99.6	115	110	97	89
Poultry meat	100	100	95	103	95
Milk	100	101	86	99	91
Fish	100	85	82	93	84
Eggs	103	138	132	131	120

*Assumed rates of population increase between the years indicated in the table.

1. Estimated to keep its 1997-98 rate of 20% of total production in 2010 and 2020.

Source: Collected and calculated from tables 6.1, 6.4 and 6.5.

VII. RECOMMENDED POLICIES AND PROGRAMS

7.1 Recommended Policies for Production of Adequate Food Supplies

Agricultural economic policies form an integral constituent of national economic policies. National economic policies normally conform to the economic orientation of the country, which is reflected in the countries regional and international economic relations. Therefore, it is important to recognize the nature of the prevailing and prospective regional and international economic and trade environment before formulating recommendations for future policies and programs. Work within this environment necessitates recognition of all requirements that need to be fulfilled and precautions that should be averted. Within this context, it is important to refer to the following main points:

- Syria has approved the importance of adopting the national reform course in formulating its economic policies. It has already started, for more than ten years, to gradually implement a bundle of economic reform policies with a view to liberalize economic activities, without overlooking the Syrian social and value considerations;
- Syria has also acknowledged the principle to gradually proceed to integrate with the international economy. As a member of the Arab nation, it has agreed in 1998 to establish the Arab Free Trade Zone on the same principles approved by the international society upon the signature of the Agreements reached at the Uruguay GATT Round. The International Trade Organization was established to monitor the implementation of these principles on the international trade. On the other hand Syria has started its negotiations to sign a partnership agreement with the European Union, which is expected to set principles and regulations for facilitating the trade flow between partners. These principles and regulations would not be different from those of the International Trade Organization. In other words, this agreement, when signed, would motivate Syria to speed up liberalization of its trade policies, which would facilitate taking the decision to join WTO; and
- Syria has succeeded in developing its agricultural production capabilities. Economic reform policies adopted during the last decade have resulted in increasing the area under irrigation and improving the productivity of main crops. Moreover, the use of environment friendly pest control methods has improved crop quality. The development of agricultural production has resulted in some crop surpluses that need to be exported at reasonable prices. Otherwise, it would result in decreasing prices of agricultural products, which would have their serious effects on farmers, and expose achieved developments in the agricultural sector to serious hazards. Therefore, it is of utmost importance to make all possible efforts to increase the share of Syrian agricultural products in the international market. These efforts would compliment previous and ongoing efforts to develop agricultural production and productivity. It may even be stated

that promoting agricultural exports is a necessary condition for the sustainability the already achieved developments in the agricultural sector.

Based on the above-mentioned three points, the main requirements for the sustainable development of the agricultural sector may be shaped up in the following six points:

- Development of agricultural production and productivity at the rate necessary for supporting the competitiveness of agricultural products in domestic and foreign markets;
- Preparing the agricultural public sector to bear the responsibilities of integration with the international market, with a view to maximizing the benefits of this integration;
- Controlling the negative effects of rain fluctuation and other natural hazards on the agricultural sector;
- Improving living standards of rural people through enhancing their incomes;
- Rationalizing the use of limited resources, especially water resources; and
- Improving the environment for agricultural investment to increase the flow of capital in the agricultural sector and create job opportunities within agriculture and related activities.

Along the aforementioned six points, the following sections summarize the recommended policies and programs for the production of adequate food supplies.

7.1.1 Development of Agricultural Techniques

The design and implementation of policies to develop agricultural technology and techniques play a vital role in:

- Supporting the competitiveness of agricultural products in domestic and international markets, not only through increasing agricultural production, but also through improving products' qualities and reducing production cost;
- Diversifying agricultural raw and processed products through developing new varieties and processing techniques that would develop product quality, create additional demand, and improve marketing opportunities;
- Decreasing agricultural waste during harvest, transport, display, and storage of goods, which amounts, in some cases, to 40% of production;
- Utilizing agricultural residuals and byproducts that would otherwise be wasted;
- Increasing the ability to comply with the obligations of the agreement on intellectual rights (one of the agreements of Uruguay GATT Round), and hence saving hefty royalties payable to foreign innovators.

Establishing what might be called 'the technological infrastructure' and/or 'market for agricultural technology' constitutes the necessary condition for achieving

tangible outcome regarding the development of technical know-how. In other words, enhancing technical know-how and innovation ability entails promoting the scientific and innovative capabilities and developing means and ways to advise producers and processors of agricultural products on the use of the new technology, and hence promoting the demand necessary for the production of such technology.

Accordingly, recommendations for the development of agricultural technology focus on a number of policies and programs to promote the agricultural technical know-how and innovation ability, the supply and display of innovated techniques, extension of knowledge on the benefits of these techniques and increasing the demand for them. The following sections summarize these polices.

7.1.1.1 Reshaping Agricultural Research

Reshaping scientific agricultural research would include reforming the institutional structure, developing research cadre, setting appropriate motivating wage systems, designing good research plans and programs, securing financial appropriation, and exchanging experience at the regional and international levels. A set of priorities would, of course, be followed. Issues related to competitivity and efficiency of water use should be on the top of these priorities. Fields of present or prospective excellence in Syrian agriculture include:

- Fresh and processed vegetable and fruit products;
- Olives and olive oil;
- Cotton and cotton products;
- Dry legumes such as chickpeas;
- Medical and aromatic plants;
- Flowers and ornamental plants; and
- Livestock products, especially from Awasi sheep breed.

Accordingly these fields should have appropriate priorities within research programs, along with research on water resources management and field irrigation systems. In this respect, it might be advised to establish a number of specialized research centers operating within a relatively flexible managerial and financial systems that allow high wage levels and good incentive systems that would help improve and stabilize research work. Coordination among these and other research centers should be organized through a supreme agricultural research council headed by the Minister of Agriculture. This council should approve research programs and their financial appropriations, and evaluate program achievements. Financial appropriations for research should include sufficient funds for sending research mission of young researchers to be qualified and trained in countries enjoying good standing in the afore-mentioned fields of research.

It is also recommended to involve Syrian universities in national agricultural research programs to benefit from their research capabilities. In this respect, it may be wise to encourage university professors to get sabbatical leaves to devote all their time to national research programs.

7.1.1.2 Promoting the Use of Modern Technology

Agricultural policies should be designed to promote the use of modern technology. Such policies would, not only increase the demand for modern technology, and hence help in initiating the afore-mentioned 'market for agricultural technology', but also improve agricultural performance and increase productivity, both in quantity and quality.

Law No. 10 for 1991 specified investment incentives in tax exemption of 5 years for private projects and 7 years for joint private-public projects. The Law also introduced two new incentives; the first has a regional dimension, where investment projects outside Damascus and Aleppo provinces would enjoy 2 more years of tax exemption. The second is export oriented, where projects exporting more than 50% of their production are given additional tax exemptions. However, the Law did not give any incentive for the use of modern technology, which involves higher cost especially at initial stages.

South Asian countries have models of success in this respect. Therefore, it is recommended to give promotional advantages to projects in accordance with the level of technology utilized. Cost of using new technology, the rate of its use in the country, and its positive effects on the economy would constitute the bases for differentiation between technology levels applied in investment projects..

7.1.1.3 Reformulating the Structure of Agricultural Credit

Presently, the percentage of medium-term loans provided by the Agricultural Cooperative Bank does not exceed 18% of its total loans, which limits to a very great extent the rate of agricultural investment, including investment in modern agricultural techniques. Therefore, it is recommended to change the Bank' credit policy to increase the ratio of the medium-term loans, taking into consideration the following factors:

- Improving loan conditions, including the rate of interest, to suit small farmers. It is suggested to keep the present level of interest, at least for projects utilizing high levels of technology;
- Granting agricultural projects interest and repayment allowance periods in line with their gestation periods. In this respect the Bank my benefit from credit facilities from donor countries to increase its capability in the provision of medium and long-term credit. European countries do provide this type of facilities; and
- Adopting the principle of granting loans to projects, taking their assets as collaterals as long as loans could be structured to suited to the projects revenues' flows. This approach would facilitate the establishment of many projects in the form of corporate.

7.1.1.4 Establishing Data Base for Investment in Agricultural Technology

The idea is to have a sufficient number of pre-feasibility studies for agricultural and agricultural processing projects to be promoted among Syrian investors and businessmen. This may be achieved trough establishing a number of working groups that may be financed through foreign assistance, to identify project ideas and prepare appropriate pre-feasibility studies. Promotion may be effected through holding annual or

biennial conferences called for by the Ministry of Agriculture, and following up arrangements undertaken by investors to implement the projects with a view to assisting them in overcoming administrative problems. A special directorate might be established within the Ministry of Agriculture and Agrarian Reform to carry out this responsibility. This new directorate may also be responsible for suggesting arrangements and policies needed for the promotion of the agricultural investment environment.

7.1.1.5 Establishing Specialized Unions

Specialized agricultural producers, such as producers of flowers and decoration plants, processed dairy products, poultry producers; and exporters of agricultural products share similar interests and face related problems and constraints. Therefore, they would benefit from establishing specialized unions. All entities (individuals, cooperatives, and companies), working in the fields of a specialized union would be eligible to join. Boards of directors of these unions may invite representatives of specialized research centers to attend their meetings. Activities of specialized unions would include assisting members to overcome technical, administrative, and trade problems and constraints facing their members within domestic and foreign markets, helping them develop their products, providing them with information on new developments in their fields and trade information and data necessary for exporting their products.

Unions' financial resources consist of membership fees, fees imposed on services provided to members, and grants accepted by the board of directors. Unions might arrange with specialized research centers to undertake research activities to serve the unions' interests. It might be necessary to issue a special legislation to give relevant ministers the right to issue orders for the establishment of specialized unions. Egypt and Saudi Arabia have successful experience in this respect that might be of benefit to Syrian producers, investors, and businessmen.

7.1.1.6 Expanding the Food Security Project

The on-going Food Security Project provides modern inputs and necessary extension services for a number of farmers. The first phase of the Project gave positive results represented in the farmers' abidance by the approved plan for the project, and the increase in crop productivity that ranged between 11% for wheat and sugar beets and 20% for potatoes. Expanding this project to serve larger number of farmers would have significant effect on the development of Syrian agriculture.

7.1.2 Developing Water Resources and Rationalizing their use

Chapter II of the present report discussed the present state of water resources and their development in the recent years. Results of these analyses may be summarized as follows:

- In the light of the present and prospective demand, water resources are quite limited and hence, rationalizing their use is of utmost importance;
- The area under irrigation has significantly increased during the past years of policy reform;

- In spite of concession loans provided by the state for the development of field irrigation systems, areas irrigated by modern techniques constitute only 7% of the total area under irrigation;
- The government has revised irrigation fees more than once, until it reached SP35,000 per ha. While this cost might be high, it only covers part of the investment, operation, and maintenance cost of establishing and running irrigation projects. However, this 'high' rate did not motivate most of the farmers to establish modern irrigation techniques;
- Efficiency of water use in Syrian agriculture does not exceed 50% in most cases. The major source of water waste at the farm level is the prevalence of traditional field irrigation systems,;
- Experiments carried out by the Directorate of Irrigation within the Ministry of Agriculture and Agrarian Reform on a number of crops planted in large areas proved that the use of modern irrigation techniques decreases water requirements, on the average, by at least 3,000 m^3 per ha and increases productivity by an average of 25%; and
- Without the use of modern irrigation techniques, available water resources would enable keeping the present rate of increase in irrigated areas for a maximum of 15 years.

Hence, adopting agricultural policies and regulations that enable realizing more development in water resources and rationalizing their use are of utmost importance. Some of these policies and regulations are outlined in the following sections.

7.1.2.1 Promoting Concession Loans for Developing Field Irrigation Systems

The government has followed, as aforementioned, a credit policy that provides farmers with loans at subsidized rates to develop their field irrigation systems. These polices proved their effectiveness and resulted in the gradual increase in the application of modern farm irrigation techniques. Hence, it is recommended to keep following these policies, increasing funds earmarked for such objective.

7.1.2.2 Reformulating Irrigation Charges

Charging a flat rate per hectare for irrigation water may induce farmers to over use, instead of rationalizing water use. Therefore, it is suggested to adopt a system that would relate water charges to the amount utilized on the farm. This would work as a motive for farmers to invest in developing their irrigation techniques and to rationalize the use of water. To reach these objectives, it is recommended that the reformulated charges would consider the following two dimensions:

- Establishing water charges at different rates for different crops according the their water requirements, keeping the average rate at the present rate of SP3,500 per ha.;
- Reducing established water charges (up to 50%) for farmers applying modern irrigation techniques.

It is believed that reformulating water charges along these lines would help increase the use of modern irrigation techniques. If the reduction of water charges for the use of modern irrigation would reduce water revenues charged by the government, the average water charges might be increased to keep the present level of water revenues.

7.1.2.3 Involving Farmers in Managing Irrigation Systems

Farmers may be involved in managing irrigation systems through helping them establish "water users associations". Objectives of these organizations include optimization of water use among farmers sharing one source of irrigation water, and helping them to value irrigation water, conserve water resources, and economize on water use.

7.2 Recommended Policies for Stability of Food Supplies

7.2.1 Management and Organization of Agricultural Foreign Trade

This section includes a number of recommendations that may be implemented at a number of stages according to the vision of the policy makers and prevailing economic and financial capabilities. They include recommendations of utmost importance that will also affect non-agricultural sectors. However, implementation of these recommendations should be preceded by more specialized and detailed studies.

7.2.1.1 Liberalization of the Rate of Foreign Exchange

The government has moved towards he liberalization of the foreign exchange rate. However, a lot still needs to be done. It is important to reconsider the present rates, allowing dealing with and transferring of foreign currency, and ultimately liberalizing the foreign exchange market.

7.2.1.2 Abolishing the Import License System

The prevailing system for import licensing should be abolished and replaced by issuing necessary legislation to protect domestic market against monopolies that would affect the interest of consumers and subject them to unnecessary hardships. A special law should be issued to protect competitivity and a highly efficient and effective governmental system should be established to implement and monitoring the law. It should be noted that a number of Arab countries has already started to issue such legislation, and that the UNCTAD support developing countries in issuing such legislation.

7.2.1.3 Issuing Anti-Dumpling Legislation

Domestic market should be protected from being dumped by imported commodities through issuing a special anti-dumping law, along with a specialized governmental agency for its implementation and follow up. It should be noted that training a special cadre to carry out such activities takes a long time and condensed effort. Therefore, it might be better to start this training activity early enough, benefiting from the support presently provided by international institutions in this respect. A number of Arab countries have already issued such legislation and started training their cadre.

7.2.1.4 Financing Agricultural Exports

Developing agricultural exports requires the existence of a special program, with flexible loan conditions, easy procedures, and with no specified credit ceilings as long as appropriate collaterals are secured. It might also be beneficial to subsidize the rate of interest on such loans to be in line with production loans.

7.2.1.5 Developing the Formal Framework for Agricultural Foreign Trade

The formal framework for agricultural foreign trade may be developed through identifying main targeted markets and main products enjoying high competitive abilities. Exports may be supported by agreements providing for preferential treatment. Free trade zones, along those agreed upon between Egypt and some Arab countries such as Morocco, Tunisia, and Jordan, represent other alternatives for developing the framework for agricultural foreign trade.

7.2.1.6 Abolishing Production Tax on Agricultural Exports

Production taxes are still enforced on some agricultural products, which reduce their competitivity in foreign markets. It is recommended to abolish this tax or refund it for exported commodities. It is also recommended to reduce tariff rates on imports of production prerequisites, especially for those not domestically produced. If necessary, alternative taxes, such as sales taxes or value added taxes might be charged to compensate for budget deficit.

7.2.2 Supporting Market Penetration

Supporting penetration to foreign markets obligates the establishment of institutional arrangements that conform to the future requirement, most important of which are summarized in the following sections.

7.2.2.1 Establishing Supreme Council for Agricultural Exports

The Prime Minister, would head this Supreme Council, with ministers of economy, foreign trade, finance, and other ministers related to production of exportable commodities acting as members. Heads of specialized commodity councils established by this Supreme Council may serve also as its members. This Council would be entrusted with the design of export promotion policies, in light of the reports and studies prepared by the specialized commodity councils and relevant governmental agencies.

7.2.2.2 Establishing Specialized Commodity Councils

A specialized council would be established for different agricultural and industrial commodities enjoying high competitivity. Members of these councils would include, among others, producers, traders, and exporters of given commodities. The councils would discuss all aspects contributing to the development of related export activities and prepare periodic reports to be presented to the Supreme Council for Export. They would also estimate necessary investment to develop production and export capabilities. They will also cooperate with governmental agencies, presenting their services to production and export sectors. Syria may benefit from the experience of other Arab countries that achieved significant success in this respect, such as Egypt and Tunisia. The following councils for agricultural commodities are recommended:

- A specialized council for horticultural crops such as vegetable and fruit crops, medical and aromatic plants, and plants producing natural dyes;
- A specialized council for cotton and cotton products; and
- A specialized council for olives, almonds and related industries.

7.2.2.3 Establishing International Trade Development Center

The Syrian International Trade Center should be developed into an international trade development center, or a new center would be established. Such a center, while belonging to chambers of trade, would be supported by the state. It should enjoy flexibility and be provided with well-trained cadre capable of implementing promotional programs for commodities targeted for export.

7.2.2.4 Implementing National Program for Promoting Agricultural Exports

This program would include the following activities;

- Preparation of foreign markets studies and research, and preparation of plans for their penetration;
- Organization of missions for market penetration;
- Implementation of special programs that would organize buyers missions, including importers of commodities similar to the Syrian agricultural products, in targeted markets; and
- Implementing propaganda and advertising programs for agricultural products.

7.2.2.5 Establishing Trade Information System

This system would provide exporters and related institutions with needed information. Assistance could be requested, in this respect, from the International Trade Center of the UNCTAD.

7.2.2.6 Developing Foreign Trade Management in Targeted Markets

Developing the management of foreign trade may be achieved through the establishment of specialized trade companies to work in targeted markets utilizing spot marketing techniques. All marketing facilities, such as sorting, grading, packaging, and storage facilities, should be made available for these companies, at least during their initial stages. It is recommended to establish a number of export companies to specialize in the export of fruits and vegetables, medical and aromatic plants, flowers and ornamental plants, and cotton and cotton products. It could even be better to request a number of specialized international marketing companies to market a number of agricultural products through its international trade network.

7.2.3 Promoting Quality of Food Commodities

A number of regulations are recommended to ensure safety and quality control in food production, enhance packaging and storage of food commodities, and improve the display of food supplies. The following recommendations serve to achieve these objectives:

i. Developing technical and trade specifications, guided by international standards, with a view to facilitating penetration into international markets, in addition to achieving the aforementioned objectives. Prevalence of such specifications would induce producers to improve the quality of their products to become of the same standard within export markets.

ii. Promoting the establishment of consumer protection associations. Such associations proved to be among the most important instruments for the control of the quality of commodity supplies. They serve also in guiding consumers to healthier and more economic food patterns. A number of developing countries, including Tunisia, Egypt, and Morocco, have started to establish consumer protection associations, where they proved to be effective in assisting governmental market control activities and increasing consumer awareness. It might be more appropriate to start promoting the establishment of these associations in urban areas, where the Ministry of Supply and Domestic Trade might provide its support.

7.2.4 Promoting Marketing and Post-Harvest Services

The present report has investigated, in aforementioned chapters, the present state of marketing and post-harvest services for agricultural products in local and foreign markets, as well as for agricultural processing activities. The following summarizes the results of this investigation:

i. While production has undergone unprecedented development during the period of policy reform, marketing and other post-harvest services are still provided at the same traditional level, without any significant development that would help farmers to market their excess supply and guard them against marketing risk, especially during peak seasons. Hence, sustaining production achievements depends on the ability to achieve corresponding development in marketing and other post-harvest activities;

ii. There is a complete dissociation between production and market requirement with respect to a number of agricultural products that enjoy comparative advantages and could be widely exported. The main missing link here is the lack of marketing information on behalf of agricultural producers;

iii. There is also a relative deficiency in marketing facilities of extreme importance in foreign trade. Examples include field quick cooling facilities, cooled storage facilities, and packaging material and equipment. Lack of such facilities constitute a major constraint for agricultural exports, especially to European markets; and

iv. A relative deficiency also prevails in marketing finance, which is considered among the most important marketing services, especially for

agricultural products. Deficiency in marketing finance cover availability, conditions and required collaterals[7].

v. Accordingly, it is important to effectively develop and modernize the agricultural marketing and trade systems, especially with respect to vegetable and fruit products, and flower and ornamental plants. In this respect, it is recommended to introduce specialized cooperatives or corporations to ensure provision of the main marketing services. Examples of such organizations include centers that may be established in main fruits and vegetable production areas, which can provide specialized marketing services for their members. Producers, exporters, and transport and processing companies may share in establishing such centers. These centers may be entrusted with collecting, sorting, and grading of farmers' products of given types and qualities, according to domestic and foreign markets' specifications. Centers would market commodities within domestic markets to wholesalers, processors, and exporters. They could also sell directly to retailers if they have packaging facilities, and export to foreign markets if they have the required facilities. Services provided by such centers include:

   - Modern agricultural prerequisites;
   - Specialized technical extension;
   - Simplified marketing information for the use of farmers; and
   - Sorting, grading, packaging, and storage facilities.

   It might be advisable to start establishing some of these centers on experimental basis, and gradually expand them in different areas whenever they prove to be successful. It should be mentioned that the International Bank, International Development Agency, or donor countries might provide loans and/or grants for the private sector to establish such centers. The role of the state in this connection would be limited to the technical support, whenever it is needed.

7.3 Policies for Ensuring Food Acquisition

Policies and programs enabling less privileged and small income groups to get their requirements of food supplies may be classified in two main groups. The first concentrates on the design of policies and programs to provide rationalized subsidies targeted for less privileged and small income groups. The second group is more concerned with the promotion of their income to enhance their ability to get their food requirements. In all cases, the good design and effective implementation of these policies and programs require the establishment of information base on levels of income, rates of poverty and unemployment, and patterns of consumption in different areas. Such information base would also serve developmental policies, programs and projects.

[7] For more details refer to appendix No. 3.

While the importance of the design and implementation of policies aiming at helping the poor and small income groups such as those presently applied cannot be over estimated, they need to be rationalized to limit their effect to targeted groups.

7.3.1 Rationalizing Subsidy Programs

Subsidized consumer commodities in Syria include bread, sugar and rice. Subsidized bread is sold at the subsidized price for all people and for any amount, while subsidized sugar and rice are sold only in given quotas per person per month. However available information indicate the following:

- According to the aforementioned information on the percentages of the poor and small income groups, and taking into consideration that part of the high income groups do not consume subsidized bread, it may be stated that more than 35% of the government food subsidies does not reach the targeted groups; and
- Taking into consideration the administrative burden of managing the subsidy system, along with the economic loss caused by the improper use of subsidized commodities, preliminary estimates would raise the percentage of government subsidies not reaching the targeted groups to 40%.

Accordingly, rationalization of subsidy programs should start by identifying the targeted groups and applying practical criteria. Once the characteristics of consumers to be subsidized are identified, rationalization of the subsidy programs would be much easier. One of the means would be to grant targeted groups monetary compensations or food stamps that would enable them to buy their food needs. If this system is applied, with the same subsidy budget, targeted groups might get as much as double the equivalent of what they are getting under the present system.

The International Food Policy Research Institute has developed some mathematical models to establish index number systems that would help define, at a reasonable accuracy, targeted groups for food subsidy programs. These index numbers are estimated on the basis of family-type information such as the nature of the residence, its size, building material, furniture, equipment, source of energy, and household expenditure. A special model could be adapted to the Syrian conditions to estimate the appropriate index number for the poor, according to which targeted groups for food subsidy programs could be identified, and consequently, subsidy programs cold be rationalized.

7.3.2 Promoting Incomes of the Poor and Low-income Groups

Policies aiming at promoting incomes of less-privileged groups through creating job opportunities and training among are the most successful policies for improving their living standards. They are much more effective as compared to other programs based on the subsidy approach. In this respect it is recommended to undertake necessary arrangements to support small and medium sized projects that can be implemented by low-income groups. These measures include:

- Establishing an information base on investment opportunities for small and medium sized projects based on pragmatic knowledge regarding implementation possibilities and level of technology applied;
- Designing and implementing a special program to promote and support small and medium-sized projects both financially and technically. Such support might be provided through a social fund that would finance unemployed youth at subsidized rates and conditioned collaterals to enable them implement small and well identified and studied projects prepared by experienced groups; and
- Providing technical and marketing support, through the same social fund. This support would include offering free training programs for the establishment and operation of small projects, as well as provision of problem-solving technical extension for such projects. It would also include organizing market promotion programs, holding specialized exhibitions and sharing in all-purpose exhibitions.

It should be noted that donor countries and international institutions might assist in the establishment of the aforementioned social fund and in financing its activities.

VIII. RECOMMENDED PROJECTS FOR PROMOTING FOOD SECURITY

8.1 Improving Irrigation Efficiency

Project title: Improving irrigation efficiency.

Management:

- **Implementing Agency:** Ministry of Irrigation.
- **Cooperating Agencies:** Ministry of Agriculture and Agrarian Reform.

Project Duration: 5 years.

Project Location: First, second, and third settlement areas**.**

Project Description:

Given the potential high capital cost of developing non-traditional water supplies, improving irrigation efficiency is the most cost-effective method to improve water management. This project enhances the use of irrigation of water through:

- Increasing on-farm water use efficiency;
- Improving water infrastructure including collection and conveyance systems; and
- Promoting the establishment of water users associations.

Background:

The sound management of natural resource is the cornerstone of sustainable agriculture. This issue assumes high priority, especially for Syria, where the use of surface water is approaching its potential, and getting higher shares of joint water resources is compounded by political factors. The total area of irrigated lands in Syria amounted to 1.2 million ha. Sources of water comprise river water for 215,000 ha or 17% of the irrigated land, groundwater for 724,000 ha or 60%, and river and spring water for 274,000 ha or 23% (surface irrigated). Water requirements per ha range between 5,600 m^3 for wheat, and 15,250 m^3 for cotton. Yellow corn and sugar beets requirements amount to 9.800 and 9.900 m^3 per ha respectively. Weighted average water requirement per ha amounted to 8,485 m^3 in 1998. Lease farming does not motivate lessees or landlords to invest in modern irrigation techniques. Accordingly, large amounts of irrigation water are wasted. Water savings attributable to the use of modern irrigation techniques average about 3,269 m^3 per ha, i.e., about 38.5% of the aforementioned weighted average of per ha water requirement.

Project Justification:

According to the aforementioned estimates, the overall irrigation water efficiency in Syria can be increased by 35%, i.e., about 4 BCM or 23.1% of the present amount of water supplies estimated at 17.1 BCM per annum can be saved or used to increase the irrigated area. Up-grading the existing water infrastructure and encouraging the establishment of water users associations can further improve irrigation efficiency. Although local water markets are quite common in most areas, water transactions in Syria continue to be based on per ha rather than volumetric charges, which further hinders the

optimum allocation and utilization of irrigation waters. Further improvements in economic efficiency of water can be achieved through the promotion of local water markets, enhancement of their efficiency and water charges based on volumetric usage.

7. Project Objectives:

- Increase water irrigation efficiency;
- Increase profitability of irrigated farming;
- Increase awareness of water conservation issues among farmers;
- Active participation of farmers in water management;
- Increase the area under irrigation; and
- Improve Syrian food security.

8. Outputs:

- Improved irrigation infrastructure;
- Increased use of modern irrigation technologies;
- Improved irrigation efficiency;
- A practices' manual for on-farm water use extension efforts; and
- Established water users associations.

9.. Beneficiaries: The Syrian irrigated farming community.

10. Stakeholders: MOA, MOI, water users associations.

11. Externalities: Access to regional and international expertise is vital.

12. Sustainability:

Increased farmers' incomes from the project will lead to widespread adoption of improved technologies and infrastructure improvements, especially with the continuing provision of technical and regulatory mechanisms by the MAAR.

13. Work Plan:

- Assess current irrigation efficiency;
- Identify needs and scope for improving irrigation efficiency;
- Identify sites for introducing modern and improved irrigation technology;
- Identify sites for improving irrigation infrastructures;
- Identify interested farmers and water users;
- Install modern irrigation technology on selected farms;
- Build irrigation water infrastructure (reservoirs, collections and conveyance systems);
- Organize field days for farmers;

- Monitor water quality and abstraction; and
- Monitor and evaluate program results.

8.2 Promoting Supplementary Irrigation in Rainfed Farming

1. **Project Title:** Promoting Supplementary Irrigation in Rainfed Farming.
2. **Project Management:**
   - **Implementing Agency:** MAAR.
   - **Cooperating Agencies:** MOP and MOI.
3. **Project Duration:** 5 years.
4. **Project Location:** All rainfed areas in Syria.
5. **Project Description:**

The project will launch Phase I of a national program to enhance agricultural production through the application of supplementary irrigation, i.e., a process in which an additional amount of water is applied to rainfed crop to meet its optimal water requirement and increase and stabilize its yields. Phase I will test supplementary irrigation, determine the best practices and establish a core extension capability, and a number of demonstration sites in areas of rainfed agriculture. Phase II will promote widespread adoption of supplementary irrigation technology.

6. **Background:**

Water is the limiting factor for optimizing the production of rainfed farming, due to its dependence on the timing and quantity of the rainfall, especially in areas where annual rainfall is limited to 200-400 mm. Productivity and stability of rainfed farming can be greatly enhanced by augmenting crop water requirements with additional water during critical periods of the growing season. The source of additional water can be either groundwater, rain harvesting or treated wastewater. The effectiveness of supplementary irrigation depends on water quantity, quality and timing as well as soil, crop, and climatic conditions.

Project Justification:

Rainfed farming is the dominant type of farming in Syria, covering 76% of the cultivated areas. Productivity of this sector fluctuates considerably depending on rainfall quantity, intensity and timing. Supplementary irrigation can reduce yield risks in rainfed farming and contribute to the improvement and stabilization of production. Supplementary irrigation can be particularly productive where annual rainfall is inadequate for optimal crop growth, where a large percent of the Syrian agriculture is situated. Consequently, supplementary irrigation can have great impact on agricultural production, farmers and economic well being in rural areas.

9. Project objectives:

- Increase agricultural production;
- Reduce the risks in rainfed farming;
- Increase profitability and productivity of rainfed farming;
- Improve food security;
- Improve resource conservation and utilization;
- Enhance local water supplies; and
- Assist Syria in dealing with drought and climatic changes.

10. Project Outputs:

- Assessment of the potential of supplementary irrigation in Syria;
- Demonstration of successful supplementary irrigation throughout Syria;
- A practices' guide book for supplementary irrigation extension; and
- A core team of extension personnel trained in supplementary irrigation.

11. Beneficiaries:

Interested farmers in rainfed areas, selected on bases of topography, climate, soil type and other factors.

12. Stakeholders:

MAAR, MOI, MOP, universities, research institutions, farmer associations, rainfed farmers and communities.

13. Externalities:

- Coordination with MOA, MOI, and MOP is essential;
- Access to regional expertise is vital;
- Access to radar, climatic and other data and remote sensing images is vital;
- Technology transfer in run off modeling; and
- Credit availability for investment in irrigation infrastructure and equipment.

14. Sustainability:

It is anticipated that application of supplementary technology will increase farmer income sufficiently to result in widespread adoption of the technology.

15. Work Plan:

- Evaluation of the potential of supplementary irrigation in Syria;
- Identification of appropriate experimental sites and interested farmers;

- Testing and evaluating supplementary irrigation for different crops in the selected sites and harness these technologies in selected sites;
- Conducting farmers' field days;
- Development of human resources;
- Dissemination of the results through extension; and
- Expansion of the program through Phase II

8.3 Small-Scale Wastewater Reclamation Systems

1. **Project Title:** Small-scale Wastewater Reclamation Systems.
2. **Project Management:**
   - **Implementing Agency:** MAAR.
   - **Cooperating Agencies:** MOH and MOI.
3. **Project Duration:** 3 years.
4. **Project Location:** Rural arid areas in Syria.
5. **Project Description:**

The project will promote the introduction of small-scale domestic wastewater reclamation technologies that are potentially appropriate for rural household, neighborhoods, and small communities and the reuse of reclaimed water in agricultural production.

6. **Background:**

Syria belongs to the arid region of Western Asia that is suffering from shortages of fresh water. It has almost reached the full utilization of available water supply. Agriculture utilizes more that 80% of these waters. Expected population growth and rising living standards will threaten the water supply for all sectors, especially agriculture. The rural population in Syria amounted to 48.9% of the total population in 1998, distributed in a large number of villages all over the country. It is this population that depends in large part on agriculture to make their living. The need there is pressing for fresh water that can be provided at low cost.

Most rural areas in Syria are not connected with sewage networks and their sewage is disposed in cesspits. The accumulation of human bio-waste is constant and unmanaged wastewater directly contributes to the contamination of locally available fresh water supplies. Additionally, the cumulative results of unmanaged wastewater can have broad degenerative effects on both public and ecosystem health.

7. **Project Justification:**

The connection of dispersed rural areas in Syria to large centralized system for human waste management is not economically feasible, as the infrastructure needed would be very costly. Therefore, using low-cost decentralized small-scale wastewater reclamation technology that promotes the recovery and reuse of wastewater resources is

increasingly relevant. Reuse of reclaimed wastewater may be a significant part of the permanent solution for the water scarcity in agriculture in many rural areas.

8. Project Objectives

- Establish a number of test sites to evaluate the efficiency of small scale waste water reclamation systems;
- Identify acceptable uses of reclaimed wastewater in agricultural irrigation;
- Preserve the Syrian environment, groundwater and surface water from wastewater pollution; and
- Create public awareness about reusing reclaimed wastewater for irrigation.

Project Outputs:

- Identification of small-scale wastewater reclamation technologies that can be used for a house or small community;
- Establishing 20-25 operating small-scale wastewater reclamation facilities;
- Use of reclaimed wastewater to irrigate agricultural demonstration lots; and
- A core team of trained personnel.

10. Beneficiaries: Farmers, rural communities and community neighborhoods.

11. Stakeholders: MAAR, MOI, MOH, rural municipalities, farmers and rural population.

12. Externalities

- Access to regional and/or international expertise may be essential; and
- Farmers and consumers may not accept the reuse of treated wastewater in agriculture.

13. Sustainability:

It is anticipated that small-scale wastewater treatment technology will prove economically feasible in agricultural uses, thereby increasing income from the test plots and creating demand for widespread installation of wastewater reclamation systems.

14. Work Plan:

- Screen small-scale wastewater technologies and irrigation applications that could be applied at rural household, neighborhood and small community levels;
- Select rural communities as test sites based on criteria such as topography, climate, and socioeconomic characteristics;
- Evaluate test site water consumption, wastewater generation rate and wastewater characteristics;

- Conduct a participatory social assessment to identify the social issues that might affect the implementation of the project;
- Construct appropriate treatment plants and the required infrastructure in the selected sites and use the treated wastewater for irrigation;
- Test the performance of the treatment-irrigation systems including appropriate food safety tests on agricultural products grown with reclaimed wastewater;
- Use the treated wastewater for irrigation; and
- Assess the results.

8.4 Small-Scale Water Harvesting

1. **Project Title:** Small-Scale Water Harvesting.
2. **Project Management**
   - **Implementing Agency:** MAAR.
   - **Cooperating Agencies:** MOI and MOP.
3. **Project Duration:** 3 years.
4. **Project Location:** Rainfed areas.
5. **Project Description:**

The project initiates Phase I of a national program to demonstrate how water supply can be enhanced through small-scale water harvesting systems including greenhouse water harvesting, water harvesting ponds and cisterns. Phase II will expand the program through a revolving loan fund from which farmers can make loans for their share of individual system costs.

6. **Background:**

Water, not land, is the major constraint for expanding agricultural area in Syria. More than 70 % of the rainfall during the winter months evaporates. Water harvesting, i.e., the concentration of rainfall runoff from a larger area for use in a smaller target area, offers an opportunity to increase water supplies. Water harvesting is generally feasible in areas with an average annual rainfall of at least 100 mm in winter rains and 250 mm in summer rains. Water harvesting is part of the culture in Syria and neighboring countries that has been successfully used for ages. More recently, neighboring countries have tested a number of water harvesting schemes. Rooftop catchment systems, for example, are used to collect water and store it in household cisterns. It is estimated that currently there are approximately 80,000 houses in Palestine that utilize rooftop rainwater harvesting method, which gather 6.5 MCM of water annually. Water harvesting for greenhouses has been also used to reduce irrigation water requirements.

7. Project Justification:

Water harvesting is a simple indigenous measure that can enhance the constrained agricultural water supplies, which would:

- Reduce the vulnerability of rainfed farming in areas of low rainfall;
- Increase the profitability of rainfed farming;
- Improve water demand management; and
- Render more fresh water available for household and industrial use.

8. Project objectives

- Increase local water supplies;
- Enlarge the agricultural area;
- Promote profitability of rainfed farming;
- Promote resource conservation and utilization;
- Job creation; and
- Encourage farmer organizations to implement water-harvesting projects.

9. Project Outputs:

- 200 greenhouse water harvesting schemes;
- 75 water harvesting ponds;
- 100 cisterns;
- A guide book on water harvesting technologies;
- A core team of trained personnel; and
- A mechanism for farmers to adopt water-harvesting schemes.

10. Beneficiaries: Farmers in the rural areas to be selected based on rainfall isohyets and agro-economic regions.

11. Stakeholders: MAAR, MOI, MOP, NGOs, universities, and farmers and their organizations.

12. Externalities: Access to regional expertise is essential.

13. Sustainability:

It is anticipated that water harvesting will increase farmers' incomes on demonstration farms and lead to widespread demand for additional small-scale catchment systems. A mechanism for a soft loan to establish revolving fund will be proposed to facilitate expansion of the program.

14. Work Plan:

- Evaluate existing water harvesting initiatives in Syria;
- Review water harvesting technologies and technology transfer;

- Assess potential and scope of small-scale water harvesting in Syria;
- Build small scale water harvesting projects;
- Train farmers and extension workers;
- Disseminate information through a public awareness program; and
- Monitor and evaluate program

8.5 Medium and Large-Scale Water Harvesting

1. **Project Title:** Medium and Large-Scale Water Harvesting.
2. **Project Management**
   - **Implementing Agency:** MOA.
   - **Cooperating Agencies:** MOI and MOP.
3. **Project Duration:** 5 years.
4. **Project Location:** Rainfed areas.
5. **Project Description:**

The project will promote the enhancement of water supplies through construction of medium and large-scale dams, water storage capacity and other water catchment facilities. The increased water availability is expected to improve agricultural production and income, create jobs, improve economic well-being of rural communities and protect wild life.

6. **Project Background**

Water, not land, is the major constraint for expanding the agricultural area in Syria. More than 70 % of the rainfall during the winter months evaporates. Large-scale water harvesting, i.e., the concentration of rainfall runoff from a larger area for use in a smaller target area, offers an opportunity to increase water supplies. Water harvesting is generally feasible in areas with an average annual rainfall of at least 100 mm in winter rains and 250 mm in summer rains. Water harvesting is part of the culture in Syria and neighboring countries that has been successfully used for ages.

7. **Project Justification:**

Water harvesting is a simple indigenous measure that can enhance the constrained agricultural water supplies, which would:

- Reduce the vulnerability of rainfed farming in areas of low rainfall;

- Increase the profitability of rainfed farming;
- Improve water demand management; and
- Render more fresh water available for household and industrial use;

8. Project objectives

- Increase local and regional water supplies;
- Enlarge the agricultural area;
- Promote profitability of rainfed farming;
- Promote resource conservation and utilization;
- Job creation; and
- Encourage farmer organizations to participate in implementing water harvesting projects.

9. Project Outputs:

- Several operating medium and large-scale water harvesting projects;
- A core team of trained personnel;
- A guide book on technology for medium and large-size water harvesting systems;
- A mechanism for farmers to adopt water-harvesting schemes.

10. Beneficiaries: Selected farmers chosen on the basis of rainfall isohyets and agro-economic regions

11. Stakeholders: MAAR, MOI, MOP, NGOs, universities, research institutions, and farmers and their organizations.

12. Externalities:

- Access to regional expertise is essential.

13. Sustainability:

It is anticipated that water harvesting will increase farmers' incomes on demonstration farms and lead to widespread demand for additional catchment systems.

14. Work Plan:

- MOA will issue a work plan and terms of references for the work packages that would include:
    - Reviewing regional water harvesting technologies and technology transfer;
    - Assessing potential/scope of medium/large-scale water harvesting in Syria;
    - Human and natural resource development;

- Building a number of medium/large-scale water harvesting projects;
- Evaluation of results; and
- Disseminating information and increasing public awareness.

- Select contractors and initiate work program;
- Select sites and build water harvesting projects;
- Monitor and evaluate results; and
- Disseminate information, public awareness program

8.6 Promoting Sustainable Rainfed Farming

1. **Project Title:** Promoting Sustainable Rainfed Farming
2. **Project Management:**
   - **Implementing Agency:** MAAR
   - **Cooperating Agencies:** MOP
3. **Project Duration:** 5 years
4. **Project Location:** Rainfed farming areas
5. **Project Description:**

The project will launch an extensive program to enhance the sustainability of rainfed farming through applied research, demonstrations and extension on improved agricultural practices, inputs and crop diversification. The aim of this project is to increase the productivity and profitability of rainfed farming through:

- Introduction of well adapted improved varieties of field crops especially wheat, barley, chickpea, lentils and sorghum;
- Carrying out farming systems research;
- Improving agricultural practices;
- Improving rainfed vegetables production;
- Promoting organic farming;
- Improving crop quality: nutritional value, shelf life, and flavor;
- Intensifying production units, leading to increased yield per unit;
- Introducing improved crop varieties of apples, peaches, olives, grapes and almonds;
- Promoting the role of Syrian women in farming; and
- Promoting local seed multiplication and distribution;

6. Background:

Rainfed agriculture occupies more than 75% of the cropped land in Syria. Most of the olives, many fruits, and fodder crops are produced on rainfed lands. Most of the cultivable lands lie in rainfed areas. Rainfed agriculture did not develop much, especially if compared to irrigated agriculture, mostly due to the risk involved in the uncertainty of rainfall and lack of competitiveness with intensive agriculture. Therefore, possibilities of developing rainfed agriculture are great.

7. Project Justification:

In spite of the fact that rainfed farming occupies more than 75% of the agricultural land in Syria, its contribution to the agricultural GDP hardly reaches 50%. Possibilities of developing rainfed agriculture are great; especially that it has been relatively neglected in terms of its modernization. Means of development include use of high yielding varieties, diversification of production, and conserving biodiversity and genetic resources.

8. Project Objectives:

- Identify opportunities for crop diversification in rainfed farming. Examples of new crops include medicinal and aromatic plants, and herbs;
- Improve crop quality in terms of nutritional value, shelf life and flavor of rainfed crops through improved varieties and marketing facilities;
- Introduce improved varieties of fruit trees (apples, peaches, olives, grapes, almonds), forage crops (barley, common and bitter vetches, sorghum), field crops (wheat, chickpeas, lentils) and vegetables (e.g. okra, dry onion, snake cucumber, etc.) with characteristics of high yield and pest, disease and drought resistance;
- Develop improved storage practices for seed stock;
- Develop small-scale food processing and preservation units; and
- Promote the role of Syrian women in farming.

9. Project Outputs:

- Increased productivity in rainfed farming (tons per hectare);
- Increased profitability of the rainfed farming sector;
- More sustainable utilization of natural resources;
- Diversified rainfed farming production and new crop sources of revenue;
- Technology transfer in rainfed agriculture; and
- Information on agronomic, plant protection, crop management, and post harvest practices extended to the farmers.

10. Beneficiaries: Farmers in the rainfed farming rural areas, and consumers

11. Stakeholders: MAAR, MOP, NGOs, universities, research centers, and farmers and their organizations.

12. Externalities:

- Access to research outputs in neighboring countries is essential; and
- Need to integrate the program with socio-economic aspects of rural development.

13. Sustainability:

Farmers implementing improved rainfed farming technologies will experience increases in the profitability of their farming. This will result in widespread adoption of these technologies and increased demand for continued MOA research and extension activities in further technology improvement.

14. Work Plan

- Carrying out comprehensive needs assessment for technology in rainfed areas;
- Applied research on farming systems;
- Applied research on improved varieties and agronomic practices for rainfed crops;
- Applied research on and possible new crop and product opportunities including medicinal plants, organic farming, seed multiplication and food processing at the farm level;
- Extend results of research through demonstration fields, extension, field days, and workshops in cooperation with other organizations (for example, NGOs and input suppliers); and
- Monitoring and evaluation.

8.7 Developing Small Ruminant Production

1. **Project Title:** Developing Small Ruminant Production
2. **Project Management**
   - **Implementing Agency:** MAAR.
   - **Cooperating Agencies:** Farmers organizations and other NGOs
3. **Project Duration:** 5 years
4. **Project Location:** Syrian Badea
5. **Project Description:**

The project will promote the production of the small ruminant sector through intensifying rearing of Shami goats and improved Awassi sheep, and improving their feeding systems. A central feed laboratory will be established to assess the nutritional value of natural pastures, cultivated pastures, cultivated forage crops, agricultural by-products, concentrates and imported animal feed. This will allow improvement in the quality of rations and avoid costly over-feeding of supplemental feeding and/or underfeeding of essential nutrients. In addition, this project will improve the performance of cottage industries related to small ruminant production, such as milk and milk products. Special attention will be given to training of Syrian women, who are the principal actors in this sector.

6. **Project Background:**

The share of small ruminants (goats and sheep) and their products in the total value of livestock production is high, especially in the Badea. While exports of live animals (mostly small ruminants) decreased in more recent years, they used to account for 18-19% of the total value of agricultural exports. Average numbers of sheep and goats amounted to 14.1 and 1.1 million head respectively during the period 1996-98. Hence, increasing their productivity would have a significant effect on agricultural production and income. The grazing period for the natural rangeland in Badea extends between 3.6 to 5.8 months per year, depending on soil, plant and rainfall factors. Therefore, mixed feeding system, which depends on grazing and concentrates (seeds, grains and hay), is the dominant system. Beside green grazed feed, farmers give roughage fodder of alfalfa, common and bitter vetch, and wheat and barley hay.

7. **Project Justification:**

Small ruminants constitute a major source of red meat in Syria. Due to the low productivity of grazing land and the short grazing season in the Badea, herders are obliged to supplement grazing by concentrates, grains, and/or legumes. The cost of supplementary feed determines the profitability of the sector. Several issues affecting small ruminant farmers need to be addressed. The first is to develop the Awassi sheep to improve their productivity. This requires the establishment of breeding stations for these stocks. The second issue is to find the most economic feed formula that can be provided locally. This requires feed experiments and a feed analysis lab. The project addresses these issues.

8. Project Objectives:

Project objectives include the following:

- Increase ruminant milk and meat production;
- Achieve greater reproduction rates;
- Develop cost and nutritional feed information and train farmers on its use;
- Improve farmers' standard of living through increased production of animal products and more efficient and productive feeding programs;
- Develop human capabilities in the ruminant sector; and
- Contribute to food security by boosting both quantity and quality of sheep and goats.

9. Project Outputs:

Projects outputs include the following:

- A source of certified Shami goats;
- A source of improved Awassi sheep;
- A laboratory for feed analysis;
- Experimental sites for measuring feeding value and digestibility;
- Improved milk production and milk products quality;
- A feeding calendar including the feeding value of different sources;
- Database about the feeding value for different feed sources and different types of livestock; and
- Human resources development.

10. Beneficiaries: MAAR, herders, farmers, food processing companies, and consumers.

11. Stakeholders: MAAR, NGOs, herders, farmers, universities, and research institutions.

12. Externalities: Access to the experiences of neighboring countries is essential.

13. Sustainability:

Herders and farmers will experience increased profitability from the project activities and therefore continue to upgrade and maintain their herds and use least cost feed formula. MAAR will have established certified Shami goat and improved Awassi sheep breeding stations and a feed analysis laboratory. Income from these activities will help underwrite the costs of the services. MAAR will continue to provide extension services in breeding, feeding and herd management.

14. Work Plan:

- Establish a feed analysis laboratory; train MAAR staff on its operations;
- Evaluate the feeding value for natural and planted pastures, rangeland grazing, different feeding mixes and concentrates;
- Conduct grazing and animal feeding trials to measure feed values and digestibility;
- Create a feeding calendar to help farmers improve their animal feeding programs;
- Train herders, shepherds and farmers on sampling methodologies and how to use feed analysis results to improve their feeding programs;
- Establish breeding farms for improved Awassi sheep and Shami goats and train MOA staff on their operation;
- Promote purebred Shami goats and improved Awassi sheep for herders and farmers;
- Cross-breed local goats with Shami goats and evaluate the results;
- Evaluate the performance of re-introduced varieties of goats;
- Disseminate information through publications and field days; and
- Evaluate project results.

8.8 Integrated Pest Management

1. **Project Title:** Integrated Pest Management.
2. **Project Management:**
   - **Implementing Agency:** MAAR.
   - **Cooperating Agencies:** MOH, NGOs, universities, and research institutes.
3. **Project Duration:** 5 years.
4. **Project Location:** Nationwide.
5. **Project Description:**

The project will provide Syrian farmers with the knowledge and experience needed to adopt application of the Integrated Pest Management (IPM) technology and to facilitate the shift of their practices towards more organic farming. A pesticide residue lab will be established at MOA. A number of qualified and well-trained Syrian researchers and extension agents will implement this project in cooperation with selected farmers from different irrigated areas.

6. **Background:**

Overuse and misuse of chemical pesticides has become a major problem of modern agriculture. Many pesticides are toxic for plants, domestic animals, wild life and human beings who misuse the chemical pesticides and/or consume agricultural products that contain pesticide residues. Plant protection is important in intensive agriculture and for years Syrian farmers have followed the same trend used in the world of exclusively focusing on the use of chemical pesticides. They rarely use other safe environmental methods due to the lack of knowledge and information about them. In addition, many field studies show that farmers tend to overuse pesticides.

7. **Project Justification:**

The project intends to spread minimum chemical application practices among farmers. The extension and research services of the MAAR will be the vehicle for project implementation. An integral part of this project is the market education component. Consumers should be aware of and appreciate high quality vegetables produced under IPM practices.. This component is envisioned to promote such knowledge thereby render a good return to farmers and help continue applying the IPM technology.

The following justifications for the project have been identified:

- The application of pesticides often does not solve the pest control problems due to the built-up pesticide resistance. In fact, pesticide application can exacerbate pest outbreaks by destroying the natural enemies of pests;
- There is no doubt that pesticides have a negative impacts on environment and human being, therefore, great attention should be given to limiting their use;
- The economic importance of agricultural greenhouses is great. Assisting farmers to produce in green houses through lowering costs and minimizing environmental problems is needed; and

- Elsewhere in the world IPM has proven to be an effective technique that is sufficient to reduce the pest populations to non-economic injury levels. This technology has not been spread to Syrian farmers.

8. Project Objectives:

- Convince farmers to adopt the philosophy of integrated pest management and reducing the overall usage of pesticides;
- Enable farmers to use ecologically and economically sound plant protection systems;
- Create an economic and sustainable strategy for protecting greenhouse crops and citrus orchards from pest attacks and diseases;
- Increase farmer profits by reducing pest control costs;
- Educate farmers on the safe use of pesticides;
- Provide consumers and exporters with agricultural products that meet international maximum residue levels;
- Preserve the environment, public health and the natural balance between agricultural pests and their natural enemies;
- Promote local applied research projects in the IPM field; and
- The development objective of the Integrated Pest Management Project is to improve the livelihoods.

9. Project Outputs:

- High quality vegetables produced under IPM practices;
- New or improved adapted production technologies relying on minimum chemical application practices and maximum biological control methods, through testing activities;
- A number of trained farmers in effective IPM practices;
- Qualified agricultural engineers who are trained to use IPM techniques;
- Availability of IPM materials in the local market; and
- A pesticide residue lab operating at MOA.

10. Beneficiaries: The Syrian people by and large.

11. Stakeholders: MAAR**,** MOH, farmers, farmer associations, and consumers.

12. Externalities:

- Unfavorable political situation and macro-economic policies;
- Agricultural produce, in general, remains constrained in the region;
- Producers are not able to market their produce at premium prices; and
- Credit facilities for input supply are constrained.

13. Sustainability:

Adoption of IPM technology will lower farmers' cost of production and improve products quality, thereby insuring its sustainability. Over time it may also lead to premium prices for IPM grown foods.

14. Work Plan:

- MAAR staff conducts adaptive trials and testing at intervals through out the project period. Results of trials and testing will be disseminated to farmers through extension agents;
- Five hundred farmers will be selected and contracted at different localities;
- Field extension visits to farmers and to work hand-in-hand with them from soil preparation up to harvest;
- Selection of 90 demonstrational plots on soil solarization, pest identification and Monitoring through different methods, and pest control applications;
- Dissemination of information through pamphlets and field days;
- Field supervision;
- Evaluation;
- Introduction of certification system;
- Training of extension agents on organizing and launching promotion campaign;
- Market study tour and promotion campaign; and
- Coordination, exchange of experiences Monitoring, and reporting

8.9 Agricultural Market Information and Analysis System

1. **Project Title:** Agricultural Market Information and Analysis System.
2. **Project Management:**
   - **Implementing Agency:** Ministry of Agriculture**.**
   - **Cooperating Agencies:** Central Bureau of Statistics, regional directorates of agriculture, international price reporting organizations (International Trade Center, European market reporting agencies, etc.).
3. **Project Duration:** 2 years.
4. **Project Location:** Syrian Arab Republic.
5. **Project Description:**

The project will establish an Agricultural Market Information & Analysis Unit at the Ministry of Agriculture and Agrarian Reform. The Unit will be responsible for the regular collection and timely dissemination of agricultural prices and other relevant market information, through the establishment of a comprehensive and effective agricultural market information system. The system will cover the following main areas:

- Daily data collection on prices, quantities and types of agricultural produce sold in major Syrian wholesale markets;
- Production of daily bulletins on agricultural wholesale prices and same-day dissemination through the mass media;
- Periodic collection and dissemination of data on prices of agricultural inputs (agro-chemicals, seeds, irrigation equipment, diesel fuel, animal feed, hatchery eggs, etc.), agricultural wages, irrigation water prices, land prices/rents; interest rates; storage and transport costs, etc.;
- Compilation and dissemination of selected regional (e.g. Jordan, Egypt, Gulf Cooperation Council) and international market information related to Syrian main agricultural products (citrus, vegetables, strawberries, cut flowers, olive oil, etc.);
- Compilation, updating and dissemination of a database on regulations in key export markets (quality standards, packaging, labeling, phytosanitary requirements, pesticide residues, export licenses/procedures, quotas, etc.); and
- Analysis of compiled information to provide agro-industry sector participants with bases for decision-making

6. Project Background:

The gradual elimination of governmental controlled prices and liberalization of marketing and prices resulted in widening price fluctuations caused by market conditions and production seasons. Lack of information exacerbates the problem, causing higher price differentials among different markets. Collection and dissemination of market information assume more importance under more liberalized market system.. Accurate and timely market information allow dealers in the market (producers, traders, and consumers), to take right decisions. Information should include wholesale and retail market prices for different commodities in domestic, export and import markets.

7. Project Justification:

Syria is gradually and steadily moving towards market liberalization, where the private sector takes the lead in investment, production, marketing and distribution of different commodities. The effective and efficient performance of a free-market economy depends, to a large extent, on the ability of all concerned economic agents (farmers, dealers, traders, agro-processors, exporters, and importers) to have timely access to relevant and accurate market information (changes in prices, quantities sold, cost of inputs and other factors of production, market regulations, etc,). This information provides the necessary market signals for all economic agents to take key decisions such as what crop/variety to plant, when to sell the produce, how much to store, when to buy inputs, etc.

Currently, there is no mechanism for collecting and disseminating information on domestic agricultural markets in Syria, or on foreign markets. Farmers and other economic agents have only limited access to market information, mainly through their own occasional interactions with domestic wholesale markets or through scattered informal mechanisms for information dissemination (e.g., contacts with suppliers, traders, etc.). Furthermore, although neighboring countries collect and publish information about their own domestic agricultural markets, there are no private or public institutions in Syria, which systematically compile, update and disseminate this readily available information. Similarly, Syrian exporters have limited access to information about international commodity markets of relevance to current or potential exports, which is readily available from various international and other specialized bodies. Syrian traders and exporters also have limited knowledge of complex market regulations in key export markets such as those of the European Union.**8. Project Objectives:**

The main objective of the project is to enhance the economic efficiency and competitiveness of the Syrian agricultural sector and its ability to quickly adapt to changes in international and domestic market conditions. Specific objectives are:

- To enhance the access of farmers, traders, exporters and other economic agents to relevant market information;
- To ensure the timely, efficient and transparent flow of market signals to all participants in the agricultural sector (producers, traders, agro-industries, exporters, etc.);
- To promote the efficiency of domestic marketing of agricultural products;

- To reduce agricultural production and marketing bottlenecks;
- To stimulate private sector investment in marketing infrastructure (cold storage, transport fleet, grading and packing plants, etc.);
- To enhance agricultural export marketing capability;
- To identify marketing windows for Syrian products in key export markets; and
- To promote food security and self-reliance.

9. Project Outputs:

- A functional and effective Agricultural Market Information & Analysis Unit at the Ministry of Agriculture and Agrarian Reform;
- Production of daily bulletins on agricultural wholesale prices and same-day dissemination through the mass media;
- Publication of quarterly bulletins providing analyses of trends in the domestic agricultural output and input markets and forecasts on possible future trends;
- Publication of periodic reports on trends in agricultural markets in neighboring countries;
- Publication of periodic reports on trends in international markets related to key agricultural commodities;
- Compilation of an updated database on agricultural export regulations in key export markets;
- Training of relevant staff at MAAR; and
- Creating Internet website for dissemination of agricultural market information and on-line availability of databases, international publications, and other relevant information.

10. Beneficiaries: Farmers, traders, agro-industries, exporters, importers, as well as consumers.

11. Stakeholders: MOA, wholesale markets, chambers of commerce, exporters associations, and farmer cooperatives, and consumers at large.

12. Externalities: There is a need for regional and/or international expertise.

13. Sustainability:

The project will provide the required training and initial set-up to launch the activities of the proposed Agricultural Market Information & Analysis Unit. Since this activity relies heavily on skilled manpower, the MAAR will make the best use of surplus staff (recent graduates) to ensure that the Information System will continue functioning effectively after the project is completed. The project will also cover the costs of subscribing to relevant international publications (including internet/electronic subscriptions) with access provided for free to the public. In the medium term, the MAAR may introduce some user fees to partially cover these costs.

14. Work Plan:

- Assessment of data collection requirements for domestic markets and information requirements related to regional and international markets;
- Design of a market information system, and identification of staff requirements and training needs;
- Training program in market data collection, compilation and dissemination;
- Launching of data collection and dissemination on domestic markets;
- Compilation of international publications;
- Launching of data collection and dissemination on selected international markets; and
- Establish database on regional and EU market regulations