

Vulnerability Assessment and possible Adaptation Policies on Agricultural Sector in Syria



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The project implemented in the ministry of local administration and Environment (MLAE)/General Commission of Environmental Affairs (GCEA), in collaboration with Global Environmental Facility (GEF) and United Nation Development Programm (UNDP) in Syria.

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(INC-SY_V&A_Agriculture Policy -En)

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This report has been approved unanimously by the technical committee, during the Technical Workshop which took place on 24/ 03/ 2009 in the Dedeman Hotel Palmyra.

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1 Executive Summary

Syria has a total land area of about 18.5 million hectares and a population of over 19 million. The population growth has slowed down from an average of 3.3% during the period 1981-1994 to 2.4% during the past decade. This rate of increase is placing continuous pressure on the infrastructure and resources in the country.

The agricultural sector has historically accounted for the largest portion of GDP, representing 26% of the national output and providing employment for over 30% of the national workforce. Agriculture is also the major (46%) employer of the female workforce. Livestock production accounted for 37% of the total value of production and export of animal products amount to 18% of the value of agricultural exports. Agricultural annual growth rate averaged 2.7% during the period 1994-2004.

The country is largely arid with less than one-third of its total area being fertile land. About 55% of the area is natural steppe-range land and mountains, and only 3% forest. Land degradation and desertification is severe with an estimated 18% of the total surface area having been seriously affected. Cultivated area is estimated at 5.5 million ha or about 30% of the total land area.

The Government has placed great emphasis on agricultural development and on stabilizing agricultural production through the expansion of irrigation facilities. The main crops are wheat, cotton, sugar beet, barely, pulses, fruits and vegetables. Production, pricing and marketing of seven major crops that are officially referred to as strategic crops (wheat, barely, cotton, sugar beet, tobacco, lentils and chickpeas) are centrally planned and controlled by the Government. Production plans and targets for different crops are set on an annual basis by the Supreme Council on Agriculture and implemented by the Ministry of Agriculture and Agrarian Reform. The seven strategic crops cover 75% of the cultivated area, consume 89% of irrigation water and contribute 60% of the value added in agriculture.

Despite some liberalization, the public sector controls in the cereals and cotton market is particularly strong. The private sector dominates livestock production, and has control over production, pricing and marketing of non-strategic crops, fruits and vegetables. Land is largely owned privately and following the land reform of 1960s, farming sector is dominated by smallholder farmers.

The objective of the agricultural policy is achieving food security, especially in wheat, resulted in a rapid expansion of irrigated agriculture during the last decade. Total irrigated area increased from 0.65 million hectares in 1985 to over 1.4 million hectares at present, of which 76% (1.1 million hectares) is under private sector management. This significant expansion could be attributed to the rapid increase in groundwater irrigation. Sixty percent of all irrigated areas are currently irrigated by groundwater which are privately owned and operated. Unsustainable groundwater use has led to overdraft and pollution in many areas making groundwater management one of the key challenges in irrigated agriculture.

Agriculture is the largest consumer of water, accounting for 89% of available supply, compared to 8% and 3% for domestic and industrial uses, respectively. While irrigated agriculture covers only 26% of the cultivable lands, it accounts for about 50% of the total value of the agricultural production. Inevitably, agricultural production is vulnerable to climate change and drought causing sharp declines in GDP as with the severe droughts in 1998-1999 and 2008.

Water resources, estimated at about 16 billion cubic meters per year, are very limited compared to the national needs. Major rivers originate outside boundaries and dependence on such waters reach 80%. The available renewable water resources average 840 m³/ person, which is below the international poverty line of 1000 m³.

Syria faces major challenges in terms of environmental and natural resources sustainability. Most water basins are under stress and water deficits are expected to worsen due to large and unsustainable water use in agriculture, and expected rapid increase in urban water demand. The overall water deficit is currently over 20% of the available renewable supply, varying distinctively across basins. Only three out of seven basins (Euphrates, Coastal and Al Badia) have positive annual water balance.

The Government has taken several steps to meet the challenge by introducing programs to modernize traditional irrigation methods for increasing efficiency and reducing demand for water, and at same time is exploring various options to improve ground water management such as more control on drilling new wells, restricting crops with high water requirements and ban on all new licenses for wells in water deficit areas, and well consolidation.

Scientists have concluded that the huge quantities of CO₂ and other gases resulting from the enormous use of energy have become an important factor in the transformation of the earth to a large greenhouse. When these gases are emitted, they form in the troposphere a cover around the earth that allows the sunrays to get in through the atmosphere but they block the reflected infrared rays by the earth surface to escape to the outer space. This phenomenon produces a rise of the earth temperature, which is known as the greenhouse effect. Indeed, a noticeable increase of earth temperature has been observed during the last century from 0.5 - 1 EC. If greenhouse phenomenon will continue to exist, the earth temperature will rise by another 1.5 - 4.5 EC by the year 2030 or 8.6 EC by the end of the century.

The temperature of the earth would increase about 0.3- 0.6 C, if the GHG emissions continue the temperature will increase about 1.5-4.5 C in 2100.

The effect of adverse conditions of climate change would, in the near future, result in an increase water requirement by about 10- 20% for agricultural purposes, and to decreased productivity and production accordingly when the extra water needs are not attained.

In addition to climate change, the socio economic development in Syria faces social, institutional, natural, technical and financial challenges.

The government has issued sufficient policies and legislations to regulate agricultural production, food security, environment, trade, marketing, fiscal, water resources, and investment. However, there is need for proper implementation of such policies and legislations in order to overcome all challenges including low precipitation and higher temperatures due to drought strikes and climate change.

To adapt to climate change and alleviate its impacts, the following are recommended:

- A- Capacity development at the human, institutional and the systematic levels.
- B- Conservation and rational use of water resources including modern irrigation.
- C- Develop and implement easily accessible drought forecast and drought monitoring information systems to improve drought preparedness.
- D- Development of the investment environment in agriculture and agribusiness.
- E- Develop Agricultural Research and extension.
- F- Integrate Agriculture whereby the proper crop rotations are applied in the different sites and for different types of production.

A mechanism for the implementation of policies and legislations is suggested. A National Committee should be established and include effective representatives of

all stakeholders of all projects and activities related to vulnerability of the agricultural and environmental sectors. The tasks of this committee include: Overall coordination of the implementation of all the projects and activities; integrating the priorities and requirements from the implementation of the projects and activities in the strategic planning of each stakeholder's institution/organization; and overall supervision and guidance of the implementation of the Action Plan of each related project.

A Scientific Advisory Committee is also suggested to act as a backstopping and advisory body to the National Committee and will be active in the formulation of full proposals based on the project concepts identified in the Action Plan.

A Monitoring and Evaluation Plan is also suggested.

2 Abbreviations and Acronyms

1. AADP: Annual Agricultural Production Plan
2. ADS: Agricultural Development Strategy
3. CBD: Convention on Biological Diversity (UN)
4. CBO: Community Based Organizations
5. CDM: Clean Development Mechanism
6. CEPD: Council for Environmental Protection and Sustainable
Development
7. CHF: Clearing House Facility
8. CIC: Conventions Implementation Committee
9. COP: Conference of the Parties
10. CST: Committee for Science and Technology
11. EFDB: Emission Factors Data Base
12. EIA: Environmental Impact Assessment
13. EWS: Early Warning System
14. FAO: Food and Agricultural Organization of the UN
15. FTA: Free Trade Agreement
16. FYP: Five Year Plan
17. GCEA: General Commission for Environmental Affairs
18. GCSAR: General Commission for Scientific Agricultural Research
19. GDP: Gross Domestic Product
20. GECG: General Establishment for Consumption Goods
21. GEM: General Establishment for Military
22. GERT: General Establishment for Retail Trade
23. GEF: Global Environmental Facility
24. GHG: Green House Gases
25. GM: Global Mechanism
26. GMO: Genetically Modified Organisms
27. GOF: Government of Syria
28. GSP: Global Support Program
29. GTI: Global Taxonomy Initiative
30. HCC: Higher Coordination Committee
31. ICARDA: The International Center for Agricultural Research in Dry
Areas
32. IPCC: Intergovernmental Panel for Climate Change
33. IUCN: International Union for Conservation of Nature (World Conservation
Union)
34. KM: Knowledge Management
35. LFA: Logical Framework Analysis
36. MAAR: Ministry of Agriculture and Agrarian Reform
37. MDGs: Millennium Development Goals
38. MLAE: Ministry of Local Administration and Environment
39. NAP: National Action Plan
40. NBSAP: National Biodiversity Strategy and Action Plan
41. NCSA: National Capacity Self-Assessment
42. NGGIP: National Greenhouse Gases Inventory Program
43. NGOs: Non-Governmental Organizations

44. PDD:	Project Design Document
45. PES:	Payments for Environmental Services
46. RAF:	Resource Allocation Framework
47. SAC:	Scientific Advisory Committee
48. SBI:	Subsidiary Body for Implementation
49. SBSTA:	Subsidiary Body for Scientific and Technological Advice
50. SADS:	Syrian Agricultural Development Strategy
51. SEA:	Strategic Environmental Assessment
52. SCCF:	Special Climate Change Fund
53. SPS:	Sanitary and Phytosanitary Measures
54. SRAP:	Sub-Regional Program
55. SGP:	(GEF) Small Grants Program
56. TCC:	Thematic Coordination Committee
57. TFB:	Task Force Bureau, which is connected to NGGIP
58. TRIPS:	Trade-Related Aspects of Intellectual Property Rights
59. TOR:	Terms of Reference
60. UNCBD:	United Nations Framework Convention on Biological Convention
61. UNCCD:	United Nations Convention on Combating Desertification
62. UNFCCC:	United Nations Framework Convention on Climate Change
63. UNDP:	United Nations Development Program
64. UNEP:	United Nations Environmental Program
65. WB:	The World Bank
66. WTO:	World Trade Organization

3 Definitions

1. "Climate change" means a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.
2. "Adverse effects of climate change" means changes in the physical environment or biota resulting from climate change which have significant deleterious effects on the composition, resilience or productivity of natural and managed ecosystems or on the operation of socio-economic systems or on human health and welfare.
3. "Climate system" means the totality of the atmosphere, hydrosphere, biosphere and geo-sphere and their interactions.
4. "Emissions" means the release of greenhouse gases and/or their precursors into the atmosphere over a specified area and period of time.
5. "Greenhouse gases" means those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and re-emits infrared radiation.
6. "Regional economic integration organization" means an organization constituted by sovereign States of a given region which has competence in respect of matters governed by this Convention or its protocols and has been duly authorized, in accordance with its internal procedures, to sign, ratify, accept, approve or accede to the instruments concerned.
7. "Reservoir" means a component or components of the climate system where a greenhouse gas or a precursor of a greenhouse gas is stored.
8. "Sink" means any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas from the atmosphere.
9. "Source" means any process or activity which releases a greenhouse gas, an aerosol or a precursor of a greenhouse gas into the atmosphere.
10. Adaptation includes all activities that help people and ecosystems adjust and reduce their vulnerability to the impact of climate change. There is no universal way to adapt; specific measures need to be tailored to specific contexts. Traditionally, agriculture was an adaptive activity to climate variations. Today, unsustainable land practices are no longer viable. Good adaptation strategies should build on sustainable development strategies.
11. Mitigation aims at reducing greenhouse gases or enhancing the ability of nature, in particular forests, to absorb them. Rich developed countries have been the main producers of greenhouse gases and must now take the lead in reducing emissions.

4 UN Framework Convention on Climate Change (UNFCCC)

The agreement was adopted in the (Earth Summit) Conference of the United Nations in Rio de Janeiro in Brazil in 1992. The agreement went into effect in 1994. The number of countries, which ratified the agreement, was 190. Syria signed and ratified the agreement in 1996, and went into effect in 2005.

Article 2 of the Convention states the objective, which is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas

concentrations in the atmosphere at a level (according to 1995 levels) that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a timeframe sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

Commitments of industrial, rich nations include modification of policies and measures in the fields of energy conservation; reducing green gas emissions; providing a positive example of leadership and development in the fields of global environment protection. Commitments also include providing financial support to empower developing countries in application of activities and projects aiming at reducing greenhouse gas emissions: helping these countries to adapt to the potential impacts of climate change; taking all possible practical measures to encourage transfer of environmentally friendly technology to developing countries.

Commitments of developing countries are limited to preparing National Communication about emissions from sectors: energy, transportation, industry, agriculture, municipalities, and housing. This commitment is present in several articles of the Convention (4, 5, 6, and 12). Other non-binding activities required from developing countries include integration of climate change policies in the national policies; implementing education and awareness programs; and provision of scientific research and information exchange.

The treaty contains general articles that require the parties to encourage scientific research on monitoring gas emissions, and determining impacts of climate change on the parties. The general articles of the treaty also concentrate on capacity building, awareness, education, and exchange of information relevant to climate change.

The ultimate objective of this Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve, in accordance with the relevant provisions of the Convention, stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

5 Enabling activities for Preparation of Syria's initial National Communication to UNFCCC

National communication includes the program of GHG Mitigations and Programs of Adaptations with the climate changes, Also the report include information About the Millennium Development Goals (MDGs).

Activities

- 1) Specify the National Circumstances.
- 2) Green house gases emissions inventory.
- 3) Programs to measures adaptation with Climate Changes.
- 4) Programs to measure the mitigation of the GHG emissions.
- 5) Identify the constrains and gaps (Capacity financial and technical).
- 6) Initial National Communication.

Expected outcomes

- Prepares reports related to the main activities
- Public outreach and the engagement of the stakeholders
- Raising awareness and public knowledge about the climate change issues, to be taken into consideration while setting national strategies and policies.

The project implemented in the ministry of local administration and Environment (MLAE)/General Commission of Environmental Affairs (GCEA), with collaboration of Global Environmental Facility (GEF) and United Nation Development Programm (UNDP). Website: www.inc-sy.org

6 Background

1. *The Political and institutional systems in Syria are based on the constitution of 1973 where the president of the republic is elected for a period of 7 years. The president of Syria is at the head of the three powers of the state:*

- The Judiciary powers.
- The Legislative power represented by the parliament (250 members elected by universal suffrage).
- The Executive power: council of minister, which is mainly formed by the National Progressive Front. This front is constituted of seven political parties, among them, the Baath Socialist Arab party which is the main one.
- Syria is divided into 14 provinces, different in size, resources and number of inhabitants. The president of the republic appoints the Governors of provinces who represent the executive power of the state.
- Each province contains several regions and districts. A district is an agglomeration of several villages. The village is considered as the smallest administrative unit.

2. *Location, surfaces and borders:*

- Syria is located at the eastern coast of the Mediterranean Sea between Latitude °32.19 and °37.25 in the Northern Hemisphere, and the two longitudes of: °35.43 and °41.25 in the East (Map 1).
- The total surface area of Syria is 185180 Km². Syria is bordered by Turkey from the north, Iraq from the east and southeast, Jordan and Palestine from the south and Lebanon and the Mediterranean from the west (Map 1).

3. *Climate in Syria:*

The climate in Syria is Mediterranean which is characterized by cold and rainy winters and hot and dry summers. The two main seasons are separated by relatively two short transitional seasons: the spring and the autumn. During winter, temperatures are moderated to cold, though frost can be formed in mountains during the night. The rain level stands between 100 and 1400 mm/year. In summer temperatures rise to reach more than 30C in most regions and can reach more than 40C sometimes. This weather is very dry with a high level of evaporation. In winter, Syrian weather is under the influence of two anticyclones which centers are located in Siberia for the first one and in the Mediterranean Sea for the second one. While in summer Syria is under the influence of a depression coming from the Arabian Gulf, the Red Sea and northern Africa. Weather in Syria can be divided into five climatic regions and into 5 agricultural settlement zones depending on

average annual precipitation ranging from over 800 mm in the humid zone I to less than 100 mm in the dry zone V (Map 1):

In Syria, farming systems have to a large extent been influenced by the physical and climatic characteristics of the five major agro-ecological zones

Zone I: Receives an average of rainfall of more than 350 mm. It consists of two sub zones. The first receives more than 600 mm annually where yields of rain fed crops are certain for all the years.

Zone II: Receives 250-350 mm precipitation annually. Main crops are wheat, barley and summer crops. This zone makes up 13.3% of the country area.

Zone III: Receives 250-mm precipitation annually. This amount of rainfall is certain for more than 50% of monitored years i.e. 1-2 of 3 years, the production is certain. This zone has mainly grain crops, however legumes can be grown. This zone makes up 7.11 of the total area.

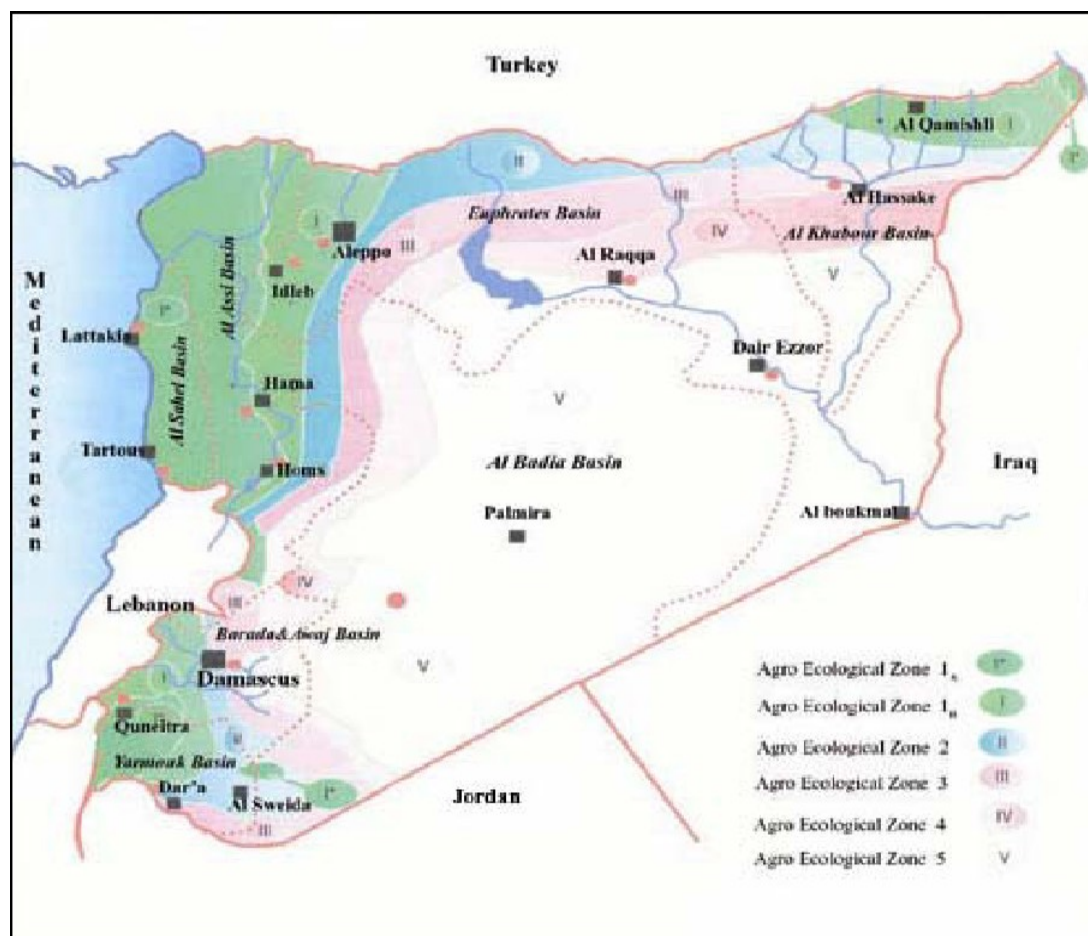
Zone IV (Marginal zone): Receives 200-250 mm precipitation annually. This amount of rainfall is certain for more than 50% of monitored years. However only barely can be grown and it can be used as permanent pastures. This zone makes up 9.91 of total area.

Zone V: This is the steppe land zone which makes up 55. 1% of the total area of the country and receives less than 200 mm precipitation annually. These lands are not suitable for rain fed cultivation.

Syria is a country with limited water sources. Its main water resources come from precipitation, which vary in quantity, geographical distribution and profit percentage. Annual consumption of groundwater went above its renewable incomes. This has affected the changes in quantity and quality of groundwater. Rivers are the second source of water by its quantity but it is the most important since it provides stable resources of water. However, the increasing use of the Euphrates waters by Turkey within the framework of its own developing projects has caused an important reduction of the average rate of the river flow. The Syrian Desert covers an important area of the Syrian territory as 10222 thousand hectares which represents 55.2% of the total surface area of Syria.

4. Population:

The population of Syria was estimated at about 12.3 millions in 1990 and reached 14.153 millions in 1995. The average population growth rate was estimated at about (3.4%). Population is estimated at about 19 millions in 2007. It is expected that by the year 2020, there will be over 30 million mouths to feed.



Map (1): The Agricultural Settlement (Agro-Climatic) Zones and Water Basins in Syria

Source: The General Commission for Agricultural Scientific Research (Adapted from NAPC, 2007).

7 Economical Development

The Syrian economy has experienced a great development during the last few years.

This development affected all sectors of the national economy. In 1963 the GDP was at (23150) million Syrian Pound, whereas in 1990 it reached (268328) million Syrian Pound. Since the beginning of the 90s, the Syrian economy has enjoyed a good growth., and the GDP reached (506101) million Syrian Pound in 1994 .The average annual growth was more than (4%). Table 1 shows the development of the value of agricultural production during the period 2000-2006.

At present, oil contributes 20% of GDP, two-thirds of exports, and half of the government revenues. From 1999 to 2003, real growth rate averaged 1.25%, below the current population growth rate of 2.4%; leading to a decline in living standards and an increase in unemployment, mainly due to declining oil production and impact of the regional conflicts on export and investment.

This was accompanied by high increase in the population, it reached 12.3 million people in 1990 and it is expected to reach 23.5 millions in 2010.

Table (1): Value of agricultural production in current prices (million SYP) 2000-2006.

Production	2000	2002	2003	2004	2005	2006
Plant Production	215383	257914	260338	272566	288142	329782
Cereals	39209	62511	66356	59457	65774	73653
Industrial Crops	37407	44916	41661	41565	46139	37908
Fruits	65692	73606	69241	83708	75849	114287
Vegetables	8713	23587	28046	29265	31053	36649
Dry Legumes	3313	5449	6856	6819	8076	8428
Range and Pastures	1489	1638	1678	1645	2199	2278
Cotton Ginning	27648	17109	14964	21956	22233	24004
Others	34912	29098	31536	28151	36819	32575
Animal Production	121716	130706	136480	146662	164219	176756
Grand Total	237098	388619	396818	419428	452360	506538

Source: CBS, 2008.

8 The Agricultural Production Assessment

The total area of the country amounts to about 18.5 million ha divided into cultivable land, uncultivable land, steppe and rangelands and forests. The cultivable land comprises the invested and un-invested areas. The invested areas include irrigated, rain-fed and fallow lands. Irrigated and non-irrigated areas represent the cultivated land. The uncultivable land includes sandy and rocky areas, buildings, roads, public places and rivers and lakes.

In 2006, the shares of the cultivable and uncultivable lands accounted for 32% and 20% respectively of the country's total area. In the same year steppe and rangelands and forests reached about 45% and 3% respectively (Figure 1). Land use differs among settlement zones (Figure 2).

Cereals production averaged 4,664 thousand tons during 1997-2001 and 6,871 thousand tons during 2002-2006 attaining an increase of 26%. Table 2 shows the development of the cereals production during 2000-2006 indicating an increase exceeding the targets of the agricultural development strategy with the exception of barley. About 71.6% of the total cereals production (irrigated and rain fed) was concentrated in the governorates of Al-Hassake (29.7-35.2%), Aleppo (18.8-23.7%) and Al-Raqqa (12.7-13.2%).

Table (2): Development of strategic crop production (000 Tons) and Productivity (t/ h) (2002-2006)

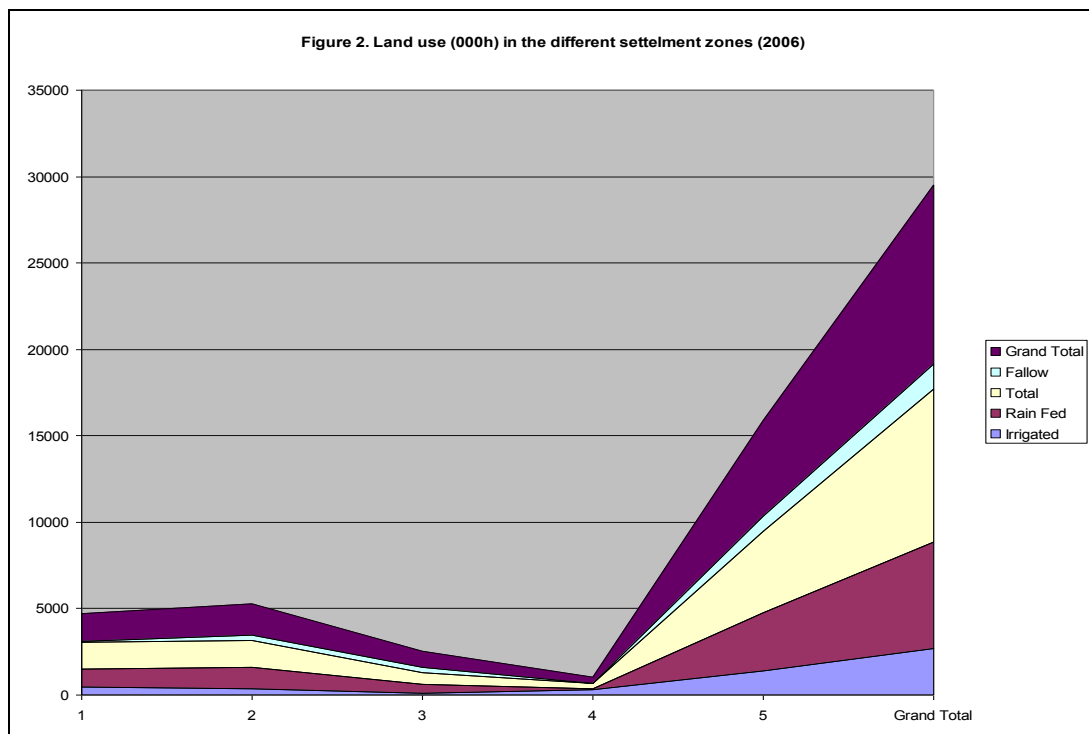
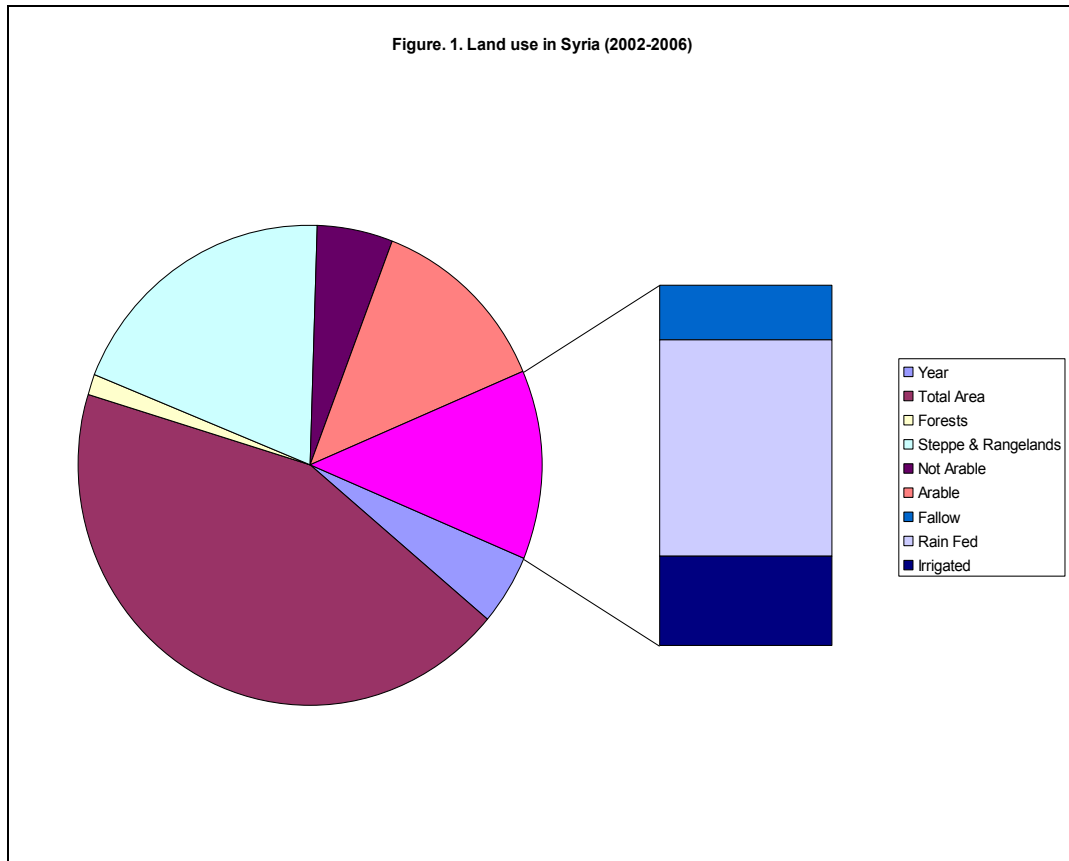
Crop	2002	2003	2004	2005	2006
Wheat	4775.4 (2.8)	4913.0 (2.7)	4537.5 (2.5)	4668.7 (2.5)	4931.5 (2.8)
Barley	917.5 (0.7)	1079 (0.9)	527.2 (0.4)	767.4 (0.5)	1202 (0.9)
Lentils	132.8 (1.1)	168.4 (1.2)	125.3 (0.9)	153.6 (1.0)	180 (1.2)
Chick Peas	88.8 (0.9)	87.0 (0.9)	45.3 (.06)	65.2 (0.7)	51.9 (0.8)
Cotton	802.2 (4.0)	811.0 (3.9)	794.7 (4.4)	1022.0 (4.3)	685.7 (3.2)
Sugar Beets	1522.7 (51.4)	1205.2 (42.7)	1217.7 (44.1)	1096.4 (42.2)	1437.9 (44.1)
Tobacco	27.7 (1.8)	24.8 (1.5)	23.4 (1.1)	28.8 (1.7)	24.9 (1.5)

Source: CBS, 2008.

Increase in cereal production by 79% from 2000 to 2006 is attributed to the changes of the area (3%) and yield. The increase in irrigated cereals production reached 48% during the same two years resulted from the area addition (20%) and yield amelioration (23%).

The main legumes grown in Syria are lentils and chickpeas. Other legumes include dry broad beans, dry peas, dry kidney beans and vetches. Both the government and farmers are interested in increasing the share of legumes in the crop rotation due to their importance for the provision of plant protein for humans and grain feed for the livestock as well as preservation of the soil fertility.

The legumes group accounts for 5.6% of the plant production cropped area (Table 3), 7% of the crops area, 2% of the plant production and 3% of the crop production. Moreover, it is distinguished for being labor intensive and low water consuming.



The comparison of the averages of the periods 1997-2001 and 2002-2006 shows that the legumes area increased from 274 thousand ha to 280 thousand ha in accordance with the policy objectives.

Table (3): Development of cultivated area (000h) with cereals, pulses and industrial crops (2002-2006)

Crops	2002	2003	2004	2005	2006
Wheat	1679.3	1796.0	1831.2	1903.8	1786.7
Barley	1234.0	1253.6	1209.6	1327.1	1307.4
Other Cereals	49.4	55.1	60.4	67.1	60.9
Lentils	121.1	138.9	137.4	142.8	150.1
Chick peas	62.5	86.3	75.8	99.5	102.2
Other Pulses	54.8	65.2	63.1	56.4	62.5
Cotton	199.8	205.4	234.2	237.8	215.6
Sugar Beets	29.6	28.2	27.6	26.0	32.6
Tobacco	15.7	16.3	21.0	16.3	15.9

Source: CBS, 2008.

The grazing crops (green fodder) comprise the following grazing crops: barley, maize, alfalfa, clover and others. It plays a significant role in both the livestock production and the achievement of the integration between plant and livestock production. The government is giving due attention to increase its share in the crop rotation. These crops are cultivated in small areas as they occupied only 1.1% of the total cultivated area (Table 3), 1.5% of the crops area, 5.7% of the plant production, and 9.3% of the crops production in 2006.

Irrigated green forage area decreased during 1997-2001 and increased during 2001-2006, while the rain-fed forages increased considerably during 1997-2000 and decreased significantly during 2000-2006 due to the conversion to the irrigated cultivation. Industrial crops

The importance of this group stems from the fact that crops such as cotton, sugar beet, tobacco, peanuts, sunflower and aniseeds, enjoy a high unit return compared to other crops and play an important role in both foreign trades as foreign currency suppliers and generation of employment and income.

In 2006, this group accounted for 7% of the total plant production area (Table 3), 9% of the crops area, 14% of plant production and 23% of crop production (table 2).

Vegetables attracted the attention of both the government and the farmers because it is a main source of income for producers and laborers as it is a labor intensive activity. It also plays a foremost role in the alternative crops strategy as well as in foreign trade. Therefore, the government endeavors to introduce modern technology to vegetables cultivation, with particular reference to modern irrigation technology as vegetables are heavy water consuming crops that are mainly planted in irrigated areas. The products within this group have a high nutritional value, so they are an important component of the food security policy.

In 2006, this group accounted for 3.3% of the total plant production area, 3.2% of the crops area, 18% of the plant production and 30% of the crop production.

The vegetables area increased on average from 125 thousand ha during 1997-2001 to 155 thousand ha during 2002-2006 at a rate of 24% in accordance with the alternative crops strategy and the increasing economic openness.

Fruit trees crops account for a significant portion of employment, income generation, input for agro-food and household industries and foreign trade. Moreover, they are an important source of nutrients that contributes to the food security of the country.

In 2006, this group accounted for 18.5% of the total cropped area and 21% of the plant production. Syria produces a wide variety of fruits, the most important of which are olives, grapes, apples, almonds, citrus, cherries, apricots, and figs.

In accordance with the economic openness policies, the fruit trees area increased on average from 787 thousand ha for the period 1997-2001 to 852 thousand ha during 2002- 2006 at a rate of 8% (Table 4).

Table (4): Area (000 h) and production (000 t) of major fruit trees (2002-2006)

Year	2002	2003	2004	2005	2006
Olives	501.5 (940.9)	517.0 (552.3)	531.4 (1027.2)	544.7 (612.2)	564.9 (1190)
Grapes	54.3 (341.9)	52.0 (307.3)	51.3 (242.7)	54.0 (306.3)	55.7 (336.7)
Apples	41.6 (215.8)	43.4 (306.7)	45.1 (308.2)	45.2 (290.0)	46.5 (374.3)
Almonds	55.8 (139.0)	57.4 (140.3)	58.0 (123.0)	61.3 (229.0)	66.0 (107.1)
Pistachios	57.6 (52.9)	57.3 (47.6)	56.9 (21.2)	56.9 (44.6)	56.7 (73.2)

Source: MAAR, 2007.

9 Major Crop Production

Strategic Crops: Are defined as crops for which the Government sets prices at which government establishments will purchase from farmers or their cooperatives. Seven crops are classified as strategic, namely: wheat, cotton, barley, sugar beet, lentils, tobacco and chickpeas. It should be noted that the crops are not strategic in the sense that they, unlike other crops, are part of some overall strategy or are all particularly important in meeting a particular strategic goal, such as poverty alleviation or increased rural employment. This study will cover most of the seven crops in detail in addition to olive production.

The Importance of Strategic Crops: Syria has a total of approximately 6.0 million hectares of potentially cultivable land of which about 5.5 million hectares have been cultivated in recent years. In the dry seasons of 1998-1999, about 4.6 million ha of this land were actually under cultivation with 960,000 ha left fallow. About 28% of this cultivated land was irrigated.

The seven strategic crops occupy about three-quarters of the 4.6 million hectares under cultivation. The majority of the remaining lands are occupied by fruit tree crops. Wheat occupies 70% of the irrigated land that is devoted to strategic crops and cotton a further 25%. Barley, which is grown almost exclusively on rain fed lands, accounts for about 55% of the total of rain fed land planted to the strategic crops; wheat accounts for a further 37%. Together, wheat and cotton account for 96% of the irrigated land planted to strategic crops, for 79% of the irrigated land planted to all annual crops and for 71% of all irrigated land under crops. Barley and wheat together occupy similar percentages of rain fed lands. Cotton production is the largest employer of labor within the agricultural sector, providing more than twice as many person-days of work than wheat. Sugar beet and tobacco production are also labor intensive, together providing one third the combined employment of wheat and barley on less than 2% of the area. Lentils and chickpeas are the most labor intensive rain fed crops, providing more employment on rain fed lands than wheat and barley combined, despite occupying less than one tenth of the area.

Wheat: Wheat is one of the major winter crops. It is a strategic crop and is of paramount importance for food security of the country because it is the main source for protein and energy. The government intervenes along the wheat commodity chain to subsidize producers, processors, and consumers. This subsidy is being gradually reduced in line with the economic openness policy and the income improvement. Wheat research is also subsidized in order to obtain better varieties more adaptable to the wheat cultivating regions. The policies pertaining to wheat can be summarized as follows:

- Maintaining the production of quantities sufficient for the current and future local demand and focusing on the production in irrigated areas, particularly the first agro-climatic zone.
- Excluding the low production areas from wheat cultivation that can be replaced with barley or other legume or grazing crops, particularly in the 3rd agro-climatic zone.
- Applying the crop rotation and gradually replacing the traditional crops with crops with comparative advantage and have better economic potential in such a way that ensures water rationalization and sustainability.

Both soft and durum wheat are planted in Syria. In 2006, they represented 42.6% and 57.4% respectively of the total wheat cropped area. In the same year, wheat occupied around 37% of the total cropped area, 47% of the crops area, and 57% of the cereals area. Wheat production accounted for 31% of the plant production, 51% of crop production, and 78% of the cereals production (Tables 2 and 3).

There was an increase of the total wheat area by 1%, and a higher rate of improvement (3%) of irrigated wheat land compared with that of the total wheat, while rain-fed wheat area decreased (-0.4%) during 1997-2007.

Barley: Barley is one of the main feed crops in Syria due to its importance for the improvement of the livestock sector and achievement of the integration between plant and livestock production. Barley production accounted for 27% of the total cropped area, 34% of the crops area, 42% of the total cereals area, 93% of the fodder area, 96% of feed grain area, 7% of the plant production, and 12% of the production of crops (Tables 2 and 3), 19% of cereals production, and 88% of feed grain production in 2006.

Strategic industrial crops: Cotton is one of the main cash export crops and the major irrigated summer crop in Syria. Sugar beet which is the second irrigated crop is planted in three seasons: fall, winter and summer. Tobacco is planted both in irrigated and rain-fed areas. These crops attract the government attention via production planning and agro-processing policies. The relevant policies can be summarized as follows:

- Cultivation of an area sufficient to cover the local demand, rationalize water use, and benefit from the value added by processing, based on socio-economic considerations.
- Introduction of summer crops, particularly industrial and feed crops that can replace cotton.
- Compliance to the targets of sugar beet with the aim of covering the local plants' needs and expanding its cultivation according to the actual processing capacity of these firms.
- Achievement of the tobacco production targets due to the stability of this crop and its cultivated areas.

In 2006 the strategic crops accounted for 5.4% of the total cultivated area, 6.9% of the crops area, 75.9% of the industrial crops area, 13.4% of the plant production, 22% of the crops production and 96.4% of the industrial crops production (Table 5).

Lentils: Lentils are one of the main legumes and rain-fed winter crops. It is considered as one of the income generating crops as it is labor intensive and has an increasing export potential. Furthermore, it has a high nutritional value and a soil fertility improving effect. Lentils accounted for 3% of the cropped area, 56% of the legumes area, 1% of the plant production, 2% of the crops production (Tables 2 and 3), and 59% of legumes production in 2006.

Lentils area increased at an annual rate of 2.5% during 1997-2006 from 120 thousand ha in 1997 to 150 thousand ha in 2006. Lentils area increased at a rate of 3.4% during the period 2002-2006 (Table 2).

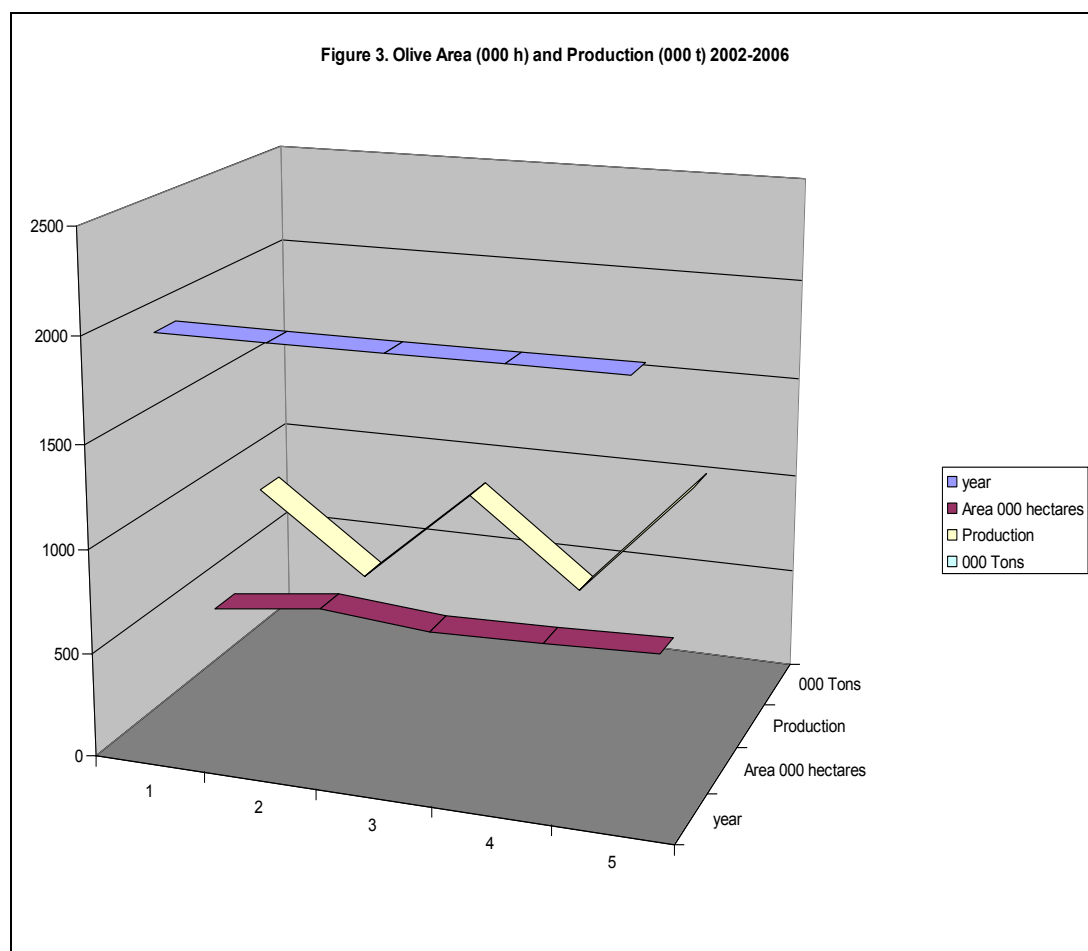
Chickpeas: Chickpeas have a significant importance within the legumes group. It is considered as one of the labor-intensive income generating crops. It is also acquiring an increasing importance due to its high nutritional value, export potential and its role in crop rotation and soil fertility.

In 2006, chickpeas accounted for 1.3% of the total cultivated area (Table 3), 1.6% of the crops area, 26.9% of the legumes area, 0.3% of the plant production, 0.5% of the crops production and 18.8% of the legumes production (Table 2).

The chickpeas area decreased at a rate of 7.7% during 2002-2006 (Table 3), resulting in a decrease in the share of legumes in the crop rotation against the strategy objectives.

Olives: Olive trees constitute the most important fruit tree in Syria. Syria is the world fifth olive oil producer, with 175 thousand tons in 2004 and world sixth olive oil producer in 2005 according to the International Olive Oil Council (IOOC, 2006). The area planted by olive tree reached 564938 hectares and the production was about 1,200000 ton of olives in 2006 (Table 4).

Figure (3) shows that area planted with olive trees increased from 502000 h on 2002 to 565000 h in 2006. Olive production fluctuated every other year from 552 thousand tons to 1190 thousand tons.



Source: Figures adapted from MAAR, 2007.

10 Water Requirements

Syria is located within the arid and semi-arid areas where water is usually scarce in terms of both per area unit and the average per capita share, not well geographically distributed and difficult to be managed and invested. The average annual per capita share of water amounts to slightly over 1000 m³ while it amounts to 7500 m³ at the global level. This share is expected to worsen in the future which might drop to 500 m³ in 2025 because of the high population growth rate and the diminishing water quantities received from the common rivers with neighboring countries, which constitute 50% of the available water resources.

Main water resources come from precipitation, which vary in quantity, geographical distribution and profit percentage. Annual consumption of groundwater went above its renewable incomes. This has affected the changes in quantity and quality of groundwater. Rivers are the second source of water by its quantity but it is the most important since it provides stable resources of water. However, the increasing use of the Euphrates waters by Turkey within the framework of its own developing projects has caused an important reduction of the average rate of the river flow.

There are various water sources for irrigation in Syria totaling about 62 billion cubic meters (m³), composed of rainfall (45 billion m³) and permanent sources (17 billion m³) including the share of the Euphrates River fixed by the temporary agreement with Turkey. Whereas, the available annual water resources are estimated at 15 billion m³. Ground water increased from 3 billion m³ in 2000 to 5.8 billion m³ in 2005, and similarly, the surface water increased from 6.42 to 7.1 billion m³ for the same years (Table 5).

There are 17 rivers in the country. The Euphrates is the largest river, which runs through Syria for 680 km and has an average flow of 564 m³ /sec. The second largest river in Syria is the Al-Khabour which extends for 552 km and has an average flow of 6.6 m³/ sec. In addition, Syria has a big dam (Euphrates) besides four medium dams: Al-Rastan, Katteneh, Teldao and Mhardeh. There are also 154 small dams, three of them totaling 87% of their total storage capacity. The number of the dams increased from 153 with a storage capacity of 16785 million m³ in 2000 to 161 dams with a storage volume of 18629 million m³ in 2005.

Table (5): Available water resources (m³) 2000-2005

Source/ Year	2000	2001	2002	2003	2004	2005
Ground Water	3.0	3.75	4.37	6.11	5.90	5.80
Surface Water	6.42	6.67	7.13	7.48	7.30	7.10
Subtotal	9.42	10.42	11.50	13.59	13.20	12.90
Sewage & Drainage Waters	3.10	3.24	3.41	3.51	3.40	3.30
Total	15.52	13.66	14.91	17.10	16.60	16.20

Source: MAAR,2008.

There is an increasing water deficit in Syria as a result of the increasing water demand, frequent drought waves and population growth. In fact, 9% of the annual rainfall runs as surface water most of it evaporates or leak to the ground water. This ensures the deficit among the competing uses for different purposes (e.g. drinking water and water for agricultural purposes). The deficit was estimated at around 20% of the total available water resources. The per capita share of water available for all purposes (drinking, industry and agriculture) declined during 1996-2005 by an annual rate of 0.73% from 950 m³/ per capita/year in 1996 to 883 m³/ per capita/ year in 2005 reaching its lowest value in 2000 (767 m³/ per capita/year) and indicating a less rate

than that of water poverty level agreed upon internationally (1000 m³/ per capita/ year for all purposes). The per capita share of traditional water sources (ground and surface) that are used for drinking water and domestic use also declined from 759 m³/ per capita/ year in 1996 to 703 m³/ per capita/year in 2005 by a rate of 0.77%. The lowest value (577 m³/ per 20 capita/ year) was in 2000. Meanwhile, the per capita share of water for agricultural purposes increased from 871 m³/ per capita/year in 1996 to 882 m³/ per capita/year in 2005 by a rate of 0.12% annually causing a deficit in drink water.

The effect of adverse conditions of climate change would, in the near future, result in an increase water requirement by about 10- 20% for agricultural purposes, and to decreased productivity and production accordingly when the extra water requirements are not attained.

Seven main water basins can be identified in the country (Map 1), which vary in their volume, amount of rainfall and water quantities, Al-Badia basin is one of the largest ones in terms of area (38% of the total area of the country), conversely the Coastal basin is the smallest one (2.8% of the total area of the country). Most of the water supply is in Dejala and Al-Khabour which have also the greatest water deficits. Exploiting rate of ground water (annual water use of the available water) amounts to 500%. Water balance at basin level indicates that the deficit is estimated at 2980 million m³ with a probability of 75% water supply. Water deficits concentrate in the following basins: *Dejala and Al-Khabour, Al-Aassi (Orontes), Barada and Al-Aawaj, and Al- Yarmook*. The deficits result from the difference between the supply and demand by all the different sectors (Prime Minister Decision no. 9 dated 16/ 07/ 2001).

Most of the basins provide examples of contamination of ground and surface waters by various pollutants due to both agricultural and non-agricultural sources like sewage, chemicals, nitrates, leather industry and oil refineries waste and salinity.

Since water resources are limited in Syria, the government plans like the Syrian Agricultural Strategy, five year plans and annual plans aim at improving water resource management, maintaining it by the renewable level, organizing its investment and ameliorating its uses through:

- Setting a comprehensive national plan for the integrated use and sustainable management of the available water resources in order to protect the ground water and to achieve food security.
- Increasing the irrigation efficiency and improving the water returns of all sources, in particular from the public irrigation schemes which need rehabilitation to introduce the modern irrigation methods. It is also necessary to define water rations for each crop to avoid overexploiting water, to expand the irrigated areas to the maximum and to improve the contribution of the water sector to the Gross Domestic Product (GDP). The focus has to be put on the basins of severe deficits (*Dejala and Al-Khabour Basin and Barada and Awaj Basin*).
- Evaluating all current water establishments such as dams and irrigation and drainage projects to rehabilitate them relying on economic returns, environmental impact and good performance, and choosing the projects that serve the sustainable development.
- Stopping the digging of wells and organizing the unlicensed ones by setting up numerators to organize ground water, to define rations according to renewable water resources and to control the consumption of water.

- Protecting the water resources from all sorts of pollution comprising chemicals, sewage, salinity or others.
- Establishing associations for water users to be involved in the programs and irrigation planning for resource allocation in order to keep the water resources out of overexploitation and deterioration.
- Developing methods for artificial rainfall to ensure an optimal agricultural production.
- Studying the possibility of establishing dams in the privileged basins especially in the Coastal and the Euphrates Basin in light of the results of economic and feasibility studies.
- Putting the irrigation projects in use and maintaining them constantly.
- Raising the efficiency of water use for irrigation from 50% to 80% in modern irrigation areas and minimizing the water loss in all irrigation nets.
- Limiting effectively the overexploitation of ground water.
- Expanding the drainage systems in the areas, which suffer from drainage and salinity, especially in the *Euphrates* Basin.

Through the above mentioned policies, substantial improvement was achieved until 2006 in expanding the irrigated area, irrigation efficiency (about 30% of the public irrigation schemes), defining water requirements for crops and introducing modern irrigation methods. There is an increase of the irrigated area from all sources, an expansion of the sprinkle irrigated areas and an enhancement of the irrigated areas by modern schemes at a higher rate than the traditional ones.

Table (6): Irrigated area (000 h) according to irrigation methods in the Governorates (2006)

Governorate	Modern Irrigation			Traditional Irrigation			
	Total	Drip	Sprinklers	Total	Gov Schemes	Wells	Rivers & Springs
Damascus	-	-	-	1.6	-	1.0	0.6
Rural Damascus	16.5	14.2	2.3	75.8	-	53.9	21.9
Aleppo	26.9	5.5	21.4	193.7	76.9	106.8	10.0
Homs	19.8	10.3	9.5	56.7	22.2	27.8	6.7
Hama	54.8	4.0	50.8	154.3	54.9	94.2	5.2
Lattakia	6.3	5.7	0.6	32.0	24.5	4.6	2.9
Der El Zor	1.0	0.7	0.3	149.0	22.4	40.2	86.5
Idleb	36.6	7.8	28.8	57.1	8.1	45.1	86.5
Hasakeh	43.1	2.6	40.5	432.8	15.7	385.0	32.1
Raqqa	5.0	0.7	4.3	187.8	79.9	64.9	43.0
Sweda	0.7	0.7	-	1.4	-	1.4	-
Daraa	16.5	12.4	4.1	27.8	14.8	10.2	2.5
Tartus	7.0	6.5	0.5	27.5	14.8	10.2	2.5
Qunetra	1.6	1.5	0.1	4.6	1.6	3.0	-
Total	235.8	72.7	163.2	1402.1	335.5	851.1	215.5

Source: MAAR, 2007.

Hence, it is noteworthy that 60% of irrigated areas rely on the ground water. It is noticeable also that the irrigated area by modern irrigation methods decreased between 2002 and 2004 and started again to increase because the government worked a lot to eliminate the factors constraining the process of transferring to modern irrigation.

Many other projects have been also introduced to improve the water efficiency (achieving the highest rate of production for each water drop) like the projects of: “Developing Natural Resource Research”, “Operating and Maintenance of Irrigation and Drainage Systems” in Al-Ghab, Funds for Adopting the Modern Irrigation and Establishing Weather Forecast Stations in coordination with JICA.

Because of the importance of both agricultural research and extension services, twelve stations specialized in irrigation research have been established to define sustainable water consumption rates and adequate cropping patterns at basin level. At the same time, farmers and technicians have been trained to facilitate the transformation process towards the modern irrigation methods.

Finally, it is necessary to adopt policies aiming at eliminating water resource overexploitation, raising the efficiency of water use in all the sectors especially agriculture, utilizing of sewage water in agriculture, using modern irrigation methods (drip, sprinkles, localized irrigation) to rationalize water use and facilitating the

provision of financial, technical and institutional infrastructure to implement these policies by various land types and crop species.

11 Production Policies and Planning

The majority of agricultural production in Syria derives from small family-based farms. In total, some 98% of national agricultural production is in private hands. Despite this dominance of the private sector, the Government plans the areas to be planted annually to key crops and implements a crop area licensing system for farms of over 0.5 hectares.

The Government also intervenes intensively in marketing and processing. It owns and operates the majority of the nation's basic agricultural processing facilities, including all cotton ginneries, sugar factories and tobacco plants, and a set of wheat mills, oil mills and feed factories.

The Government sets producer prices for all the main crops other than fruits and vegetables. For cotton, sugar beet and tobacco, farmers must sell to government organizations at these prices. For the other main crops, farmers now have the option to sell to the Government at the official price or to private buyers at a negotiated price. For all the main crops, other than cotton, lentils and chickpeas destined for export, the Government controls domestic prices through to the point of final sale to consumers.

The Government has been progressively reducing the intensity of its agricultural planning, price control and intervention in processing and marketing. However, government involvement in these activities remains sufficiently intense to continue both to constrain the ability of farmers to react to price signals and to affect the role and commercial decision-making of private entrepreneurs engaged in agricultural trading and processing.

The ongoing progressive transition in Syria from a mixed system to a system that places greater reliance on market forces leads to major management problems, since new situations are continually being created for which there is no past experience. Consequently, policy makers in Syria face major challenges. Both the transition and the day-to-day operation of the agricultural economy will need to be managed with great skill if the result is to be an efficient agricultural sector able to meet the set of diverse growth, equity and food-security objectives that are currently being pursued.

The five-year plans for agriculture have the overall objective of meeting a government growth target for the sector. The Syrian government has given a great attention to the programs related to land resources and included in the Syrian Agricultural Strategy (2000-2010) and the 10th Five Year Plan (2006-2010) through the following actions:

- Adoption of an ecological agricultural and economic map for Syria that shows the optimal areas for crop and tree production in co-ordination with the land classification according to comparative advantages and the use of the geographic information system.
- Optimal utilization of cultivable land and adoption of crop structures and agricultural rotations that ensure production sustainability and the integration between crop and animal production.

The five-year plan for agriculture is developed taking account of the Ministry of Irrigation plans related to irrigate areas. This is essential because the agricultural plan is necessarily dependent on planned investment in irrigation and, in particular, on the new land that is to be brought under irrigation during the course of the plan. In addition to data from the irrigation plan, the other main input into the development of targets for the agricultural sector relates to projects and programs that will lead to an

expansion of rain fed land and/or to yield increases on both irrigated and rain fed land. For example, rapid rates of growth in the area of olives and pistachios are targeted in the 8th Plan, to reflect a major on-going project to reclaim hilly areas. In general, the rapid expansion in irrigated area has meant that past plans have included substantially higher area growth rates for irrigated crops than for rain fed crops.

Although some account is taken of economic factors, the national MAAR targets are based principally on technical considerations, such as water availability and the need for particular crop rotations that will preserve soil fertility.

The government has issued sufficient polices and legislations to regulate agricultural production, food security, environment, trade, marketing, fiscal, water resources, and investment (Annexes 1-8). However, there is need for proper implementation of such policies and legislations in order to overcome all challenges including low precipitation and higher temperatures due to drought strikes and climate change.

12 Challenges

There many challenges which face socio economic development in general and agricultural development in particular in Syria including:

- Social challenges including high rate of population growth.
- Institutional challenges including weak coordination among stakeholders, and weak mechanisms for implementing policies and legislations and development plans.
- Natural including climatic conditions, depleted water resources.
- Technical including weak research and extension services; and
- Financial where the existing regime for investment, including the agribusiness sector, has several drawbacks that have so far impeded a more vigorous and sustainable process of investment and growth.

13 Adaptation Options

13.1 (Recommendations)

Scientists have concluded that the huge quantities of CO₂ and other gases resulting from the enormous use of energy have become an important factor in the transformation of the earth to a large greenhouse. When these gases are emitted, they form in the troposphere a cover around the earth that allows the sunrays to get in through the atmosphere but they block the reflected infrared rays by the earth surface to escape to the outer space. This phenomenon produces a rise of the earth temperature, which is known as the greenhouse effect. Indeed, a noticeable increase of earth temperature has been observed during the last century from 0.5 - 1 EC. If greenhouse phenomenon will continue to exist, the earth temperature will rise by another 1.5 - 4.5 EC by the year 2100.

The effect of adverse conditions of climate change would generally result in an increase in water requirement by about 10- 20% for agricultural purposes (for the different crops) and to decreased productivity and production when the extra water needs are not provided. To adapt to climate change and alleviate its impacts, the following are recommended:

A-Capacity development at the human, institutional and the systematic levels:

1. Capacity Development at the Individual Level
2. Capacity development at the individual level refers to the process of changing attitudes and behaviors, most frequently through imparting knowledge, and developing skills through training. However, it also involves learning by doing, participation, ownership, and processes associated with increasing performance through changes in management, motivation, morale, and levels of accountability and responsibility.
3. Capacity Development at the Institutional Level
4. Capacity development at the institutional level focuses on the overall performance and functioning capabilities, such as developing mandates, tools, guidelines and information management systems for the ability of the institution to adapt to changes. It aims to develop its constituent individuals and groups, as well as its relationship to the outside. Institutions can be governmental or non-governmental, local or national, and formal or informal.
5. Capacity Development at the Systematic Level
6. The systematic level capacity development is concerned with the creation of enabling environments, i.e. the overall policy, economic, regulatory, and accountability frameworks within which institutions and individuals operate. Relationships and processes between institutions, both formal and informal, as well as their mandates, are also important.

B- Conservation and rational use of water resources including modern irrigation.

Irrigated areas have increased from 451 h in 1970 to over 1402 h in 2006. Total water requirements increased from 6.05 to over 1404 billion m³ annually during the same period (Table 7). Availability of water resources dramatically changed leading to changes in irrigated areas on each of the water resources. Irrigated areas from surface water resources decreased 40 % of the total while irrigated areas dependant on ground water increased up to over 59% (Table 8). Ground water was depleted to an alarming stage in the basins of upper and mid *Oriente*, *Khabour*, *Barada*, and *Yarmouk*. Moreover, water quality was affected in certain areas.

To overcome this problem and the problem of low production, the GOS launched the Project on Transfer to Modern Irrigation (PTMI) in 2000 and to be implemented by MAAR. The project aimed at increased agricultural productivity and production and conservation of water and soil resources.

PTMI also aimed at increasing water efficiency use by 45% and reduce loss of water by 70% from the all water systems. The major expected results have been saving 3.795 billion m³ of water to overcome the gap between water requirements and resources (Tables 7 and 8). The annual water savings and increase in production could be divided as follows:

- To save 1.647 billion m³ (43% of water resources) to irrigate 69000 h of wheat and to increase productivity by 23% and production by 819 thousand tons.
- To save 200 million m³ (30%) to irrigate 64000 h of corn and to increase production by 166000 tons.
- To save 89 million m³ of water to irrigate 28000 h of sugar beets and to increase productivity of roots by 24% and sugar content by 26% and production by 408000 tons.
- To save 2.167 billion m³ water to irrigate 260000 h Cotton and to increase productivity by 19 to 35% (depending on method of modern irrigation). The overall expected increase in cotton production is estimated at 270000 tons.

- To save 78 million m³ water to irrigate 29000 h olives and to increase productivity by 29% and production by 332000 tons.
- To save 31 million m³ water to irrigate 10340 h grape vines and increase productivity by 31% and grape production by 85000 tons.

Cost of production would decrease while net revenues significantly increase for all crops at the local and the national levels. The PTMI faces many institutional, social and technical challenges which lead to slow implementation (less than 25%) of its activities.

Table (7): Development of irrigated areas (000h) from different irrigation sources, and total (Bm³) and per hectare (m³) water requirements during the period 1970-2006

Year	Irrigated Area	Total water Requirements	Per Hectare Water Requirements
1970	451	6.05	13415
1976	547	7.11	12687
1981	567	7.60	13404
1986	652	8.77	13451
1990	693	8.30	11954
1995	1089	13.16	12084
2000	1211	14.05	11608
2004	1439	17.52	12955
2006	1402	16.26	13431

Source: Soumi and Al Shayeb, 2002; MAAR Agr Statistics,2007; some figures are computed and rounded.

Table (8): Effect of modern irrigation on water use and yield of major crops

Crop	Traditional (m ³ / h)	Modern (m ³ /h)	Traditional (kg/ h)	Modern (kg/ h)
Wheat	9092	5808	5141	6328
Cotton	14446	5986-10612*	3337	3952-4516*
S Beets	9721	6872	60790	75401
Maize	8970	6290	4360	6953
Olives	5669	2927	3974	5120

Source: Soumi and Al Shayeb, 2002; MAAR Agr Statistics,2008; MAAR,2005; some figures are rounded.* requirements differ according to irrigation Method.

C- Develop and implement easily accessible drought forecast and drought monitoring information systems to improve drought preparedness.

Drought reduces agricultural production, which leads to a reduction in the total value of agricultural output and income, and damages national economic growth. At the community level, drought causes loss of crops, livestock and, in severe cases, leads to chronic food shortages and famines. The migration of rural people from drought stricken areas to cities, in search of food and employment, can add to the pressure on urban resources causing social problems. The actions that farmers take in tackling drought challenges are regulated by their socio-economic environment, knowledge and experience. The social and economical possibilities and constraints that they face also determine the way in which they cope with drought. Hence, drought management should be closely associated with household food security and be linked to ensuring food supply and developing the human resources necessary for sustainable agricultural development.

A wide range of drought mitigation measures is available. Some of these measures can be considered as long-term management actions, while others are of a short-term nature. Drought has both bio-physical and socio-economic dimensions and an integrated approach is essential for an effective long-term strategy to mitigate its effects. The most important of these measures are:

- Climatic prediction and early-warning systems.
- Adaptation of production systems to match the bio-physical and socio-economic environment (e.g. crop diversification, cropping patterns, etc).
- Application of agro-climatic information in crop improvement research for better targeting of crop varieties and management to specific agro-ecological environments.
- Crop manipulation and crop management for improved water- use efficiency and drought tolerance.
- Improved management of livestock and rangelands.
- Soil and water conservation and watershed management including water harvesting.
- Efficient and sustainable use of different alternative water resources (rain, groundwater, surface water, non-conventional water sources).
- Policy and institutional measures that enable implementation of drought mitigation strategies and practices and can provide necessary assistance in case of disaster.
- Animal and crop insurance.
- Establishment of special emergency funds.
- Capacity building.

Farmers, herders and other stakeholders have to commit resources each year before the commencement of key rainfall outcomes. For example, decisions about planting crops (variety, date of planting, seeding rate, fertilization, etc.) usually have to be made at the beginning of the wet season, before knowledge about rainfall quantities and distribution is available. The ability to provide early warning drought forecasts would represent a powerful tool for avoiding many of the economic costs associated with the misallocation of resources, particularly in combination with a well functioning response farming system.

Reliable drought forecasts could also enable governments and relief agencies to position themselves each year for more effective and cost efficient drought interventions.

It is therefore important to develop drought forecast and monitoring information systems that can be easily accessed by all stakeholders involved in drought preparedness. Requirements on meteorological networks and remote sensing techniques, data acquisition, storage and analysis, GIS, and access to information (dissemination) have to be identified and satisfied. Adaptation of models used in African countries might represent a cost - effective and efficient way to achieve this goal.

D- Development of the investment environment in agriculture and agribusiness.

The existing regime for investment, including the agribusiness sector, has several drawbacks that have so far impeded a more vigorous and sustainable process of investment and growth. The general problem is that the regime grants special temporary benefits for new investments, without altering much the general macroeconomic and institutional environment, or making those benefits permanent. This encourages the pursuit of short-term advantages, but hardly promotes long-term growth. The following recommendations are made for promoting agricultural investments:

- Facilitating access to land, especially publicly owned land, including the development of industrial zones provided with all basic services (mainly electricity and water).
- Facilitating the development of cooperative enterprises for joint development of farming projects (not necessarily involving joint production, but chiefly joint input procurement and joint processing and marketing). This implies improving the recently existing cooperative sector.
- Facilitating the development of rural micro-finance institutions to expand the use of credit in the countryside, and introducing further flexibility in the banking system to improve credit conditions for private investors.
- Resource allocation policies, implying taxes, trade, prices and subsidies.
- Money and banking, implying foreign exchange liberalization and currency convertibility, banking reform, independence of monetary institutions and policy and establishments of stock markets; simplification of financing procedures by public and private banks and establishment of new advanced banks to comply with the transactions of trade; and
- Reduction of inefficiencies and overhead costs, implying administrative reform of the public sector, simplification of administrative procedures, and improvements in basic infrastructure and services.
- Improving and decentralizing agricultural planning.
- Introducing more initiative and innovation in the strategic-crop sector.
- Promoting foreign investment in agricultural export products. Foreign capital and technology are needed to expand production of specific high quality agricultural products, especially fruit and vegetable, for export to other markets.
- Developing improved rural finance.
- Promoting marketing of agricultural products.
- Fostering on-farm investment for modernization of irrigation systems.

- Providing governmental studies about the projects required for economic growth, which are beneficial for investors, and provisional studies related to these projects to help investors in the decision making process.
- Adjusting the laws of agricultural relations and property should be flexible to comply with the needs of domestic and foreign investments.
- Improving the information system and the provision of investment studies to comply with the international standards of marketing agricultural products.
- Attracting foreign, Arab, and Syrian (abroad) capital by providing more incentives.

E- Develop Agricultural Research and extension

Agricultural research and extension in all sectors and at all levels should include traditional crop breeding and the use of modern technologies to develop varieties that are tolerant to adverse conditions of climate changes and drought, and soil and water salinity among other adverse conditions.

Application of traditional crop breeding system is adopted and many varieties of wheat, barley and cotton have been developed. However, this process is slow.

Modern technologies are very expensive and difficult to attain to develop new crop varieties at this stage. The system needs regional efforts since all the Arab countries face the same difficulties in attaining food security, and share similar challenges of water shortage, land degradation, climate change and drought, lack of coordination among institutions and experts, etc.

It is anticipated that when new crop varieties are developed and spread, agricultural production would be sufficient under the adverse conditions of climate change.

F- Integrate Agriculture whereby the proper crop rotations are applied in the different sites and for different types of production. Pulses and forage production is a major component in different rotations and livestock is essential in many production systems. Integrated agricultural systems would be anticipated to increase production by 30%.

13.2 Mechanism for Implementation

Each of the recommended items needs an action plan which in turn needs a robust and effective implementation mechanism based on institutional coordination and transparency.

The following mechanism is hereby suggested. A national committee should be established and include effective representatives of all stakeholders of all projects and activities related to vulnerability of the agricultural and environmental sectors. The tasks of this committee include:

- Overall coordination of the implementation of all the projects and activities.
- Integrating the priorities and requirements for the implementation of the projects and activities in the strategic planning of each stakeholder's institution/organization.
- Overall supervision and guidance of the implementation of the Action Plan of each related project.

A Scientific Advisory Committee (SAC) is also suggested. The SAC should be composed of 15-20 profound scientists/ professionals selected by merit with proven

experience and updated knowledge on the UNFCCC and other UN conventions, as well as the latest applied technologies in the different fields. This committee will act as a backstopping and advisory body to the National Committee and will be active in the formulation of full proposals based on the project concepts identified in the Action Plan. The SAC will also provide advice and consultation to the related institutions involved in implementation of the activities. According to the above mechanisms the following Monitoring and Evaluation Plan is suggested:

- a- The TOR's of each project and activity should be developed and discussed within these committees.
- b- Develop Indicators for each project; three types of indicators can be developed:
 - Implementation indicators.
 - Performance indicators.
 - Impact indicators.
- c- Reporting system for the different committees and the units of the projects management should be identified.

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15 Annexes

15.1 Annex 1. Agricultural planning policy

Since the 1960s, the Syrian government has applied a central planning system, and started from the 6th Five Year Plan (FYP), 1986-1990, a gradual move towards indicative planning. This has been reflected on the annual plans and characterized for the adoption of the participatory approach in terms of the involvement of all the relevant parties in the preparation and endorsement of the plan. The decentralized approach has been also introduced as each of the governorates is responsible for designing its own annual plan within the context of the general indications. Accordingly, the state role in terms of controlling resource distribution, partial provision of inputs and marketing some main crops has been maintained, while the private sector has been allowed to be involved in the production, marketing and processing activities.

The Annual Agricultural Production Plan of the MAAR dated 2005/ 2006.

The annual agricultural production plan (AAPP) is established according to Legislative Decree no. 59 of 20/7/2005, the production plan endorsement Decision no. 3964 of 25/7/2005 as well as the following conditions:

- Orientations of the Syrian Agricultural Development Strategy (SADS).
- Analysis of the agricultural current situation.
- Problems facing the agricultural sector as well as the relevant policies.
- Economic indicators of the FYP.
- Indications of the project concerned with the institutional and sectoral modernization.
- Continuation of the indicative planning on the plant group level and maintaining the wheat, cotton and sugar beet planned areas.
- Coordination among the public relevant parties.

Impact of the Syrian ADS on the agricultural plan:

The agricultural development strategy (ADS), 2001-2010, has been prepared in the light of the economic changes with the aim of setting the vision for the agricultural sector.

Furthermore, the plan required to realize this vision has been also accomplished taking into accounts the main constraints and problems that negatively affected the sector performance. The main quantitative objectives of the strategy are:

- Increasing the annually cultivated area by 0.8% due to the limited land resources, while that of the rain-fed trees can be increased by 2.1% per year.
- Enhancing the yield of the irrigated crops by 3-5% annually and that of the rain-fed crops by more than 1% during 2001-2005. These rates should reach 2% for irrigated and rain-fed crops, 1% for cotton and 2% for wheat during 2006-2010.
- Improving red and white meat production by 5% per year and milk by 4% during 2001-2005. These rates have been modified for the period 2006-2010 to become 2.4% for red meat, 4.3% for white meat, and 5% for milk.

Plant production policy: Plant production policies aim at the provision of the national staples (wheat, legumes, etc.) achievement of food security by increasing yields, production of products that have comparative and competitive advantages in line with the demand of both national and international markets, adoption of alternative crops programs and conservation of environment and natural resources. The main related programs are:

- Promotion of plant production research;
- Adoption of vertical development by the use of modern technologies, quality improvement, yield increase, introduction of high yielding and drought resisting varieties, enhancement of the use of organic fertilizers and restriction of the use of chemicals to the minimum level;
- Placement of more attention to comparative advantages crops so as to enhance their competitiveness and to discriminate among them in the light of the yield per unit of water;
- Modification of crop structures by increasing the production of edible legumes and fodder grains;
- Introduction of crop structures and rotations that comply with the land use balance, land productivity, reclaimed land increase, soil protection from pollution and balanced use of chemical fertilizers and control materials;
- Use of the integrated pest control management (IPM) and safe chemicals when biological control is not possible so that to reduce the residues to the minimum level possible and supply both local and international markets with safe products;
- Establishment of agricultural quarantine centers and isolation gardens;
- Improvement and modernization of laboratories so as to issue internationally accredited certificates to facilitate the penetration of Syrian products into international markets;
- Integration of plant and livestock production;
- Promotion of the establishment of processing plants in high production areas.

Livestock production policy: Livestock production constitutes a main agricultural income source. Accordingly, it should receive due attention from the government in terms of research, innovation, productivity improvement, and provision of the required inputs. The main government policies implemented in this respect are:

- Conducting research on both local and introduced breeds to improve and to spread out of them;
- Improving the productivity per head (meat, milk, wool, and eggs) by means of improvement, grading, introduction of high yielding races, increase of the productivity of Awassi sheep and production and distribution of improved rams;
- Enhancing the establishment of livestock farms in the 3rd and 4th agro-climatic zones, particularly small ruminants that are adapted to the local environment (goats, sheep, poultry, and rabbits);
- Ameliorating the silk worm and bees breeding for the production of silk and honey and adopting the modern economical methods;
- Encouraging all sectors (public, private, cooperative, and joint) to invest in the fishery sector;

- Increasing the production of horse feed and green fodder, securing feed reserve, developing Al- Badia pastures and regulating natural grazing;
- Providing veterinary medicines and implementing the precautionary programs in terms of livestock vaccination;
- Setting livestock disease inspection programs;
- Promoting the local production of veterinary medicines by all relevant sectors;
- Developing the rural industry of livestock products and encouraging the establishment of processing plants in high production areas;
- Inducing the establishment of refrigerated milk collection centers;
- Supporting the cooperative work among farmers (farmer cooperatives, specialized unions) to coordinate farmers' activities, improve service provision, facilitate management of livestock feed and, consequently, reduce costs;
- Strengthening the integration between plant and livestock productions.

Pricing policy: The price policy aims at directing the executive programs towards production increase and quality improvement. It is used also for the purpose of environmental conservation and resource sustainability. Hence, special attention is given to the production of comparative advantage and profitable crops. Farmers are given price premiums that ensure reasonable income for producers and comply with the product significance for food security, export, and import replacement. The price policies include:

- Central pricing of strategic crops and some alternative crops to motivate plan execution, achievement of food security and farmers' conversion taking into account the following considerations:
 - Economic need for the alternative crops.
 - Natural and human resource sustainability and employment creation.
 - Establishment of strategic and alternative crops subsidy fund.

The agricultural products are classified according to the government intervention in the process of pricing and marketing into strategic and non strategic crops:

Strategic crops: There are seven crops considered as strategic crops, for which the Government sets the price namely: cotton, wheat, barley, sugar beet, tobacco, lentils, and chickpeas. They are further divided into two sub groups in light of the differences of Government involvement in their marketing. Cotton, sugar beet, and tobacco farmers have to sell all the quantities produced in the licensed area at the centrally determined price to public sector agencies that have the monopoly of marketing and processing, while the extra quantities are sold at the international price if it is less than the public price (cotton). Wheat, barley, lentils, and chickpeas farmers have the choice of selling their production either to the public or to the private sector. For the latter group, the procurement price determines to a large extent the share of public and private sector in the market. When the procurement price is above the market price, the public sector retains the main role in marketing (as in the case of wheat), while it acts only as a buyer of the last resort when the procurement price is below parity (this is typically the case of lentils and chickpeas).

Wheat prices have been maintained at the level determined under Decision no. 6797/1 of 10/9/2005 issued by the Prime Minister's Office for the season 2005-2006.

Cotton is considered as the main export product as it ranks first among the Syrian agricultural exports. The production has to be delivered to the General Organization

for Cotton Ginning and Marketing (GOCM), which has the monopoly of cotton marketing and ginning in Syria. The cotton price was determined under Decision no. 6,797/1 of 1/9/2005. This price varies according to the time of delivery.

Policies governing the agro-food industry: The Syrian Agricultural Strategy and the Ten Five Year Plan focus on developing the agro-food industry especially the rural industry in line with the development of agricultural production comprising its both sub-sectors namely vegetal and animal production to increase the value added. Hence, it can be distinguished between two stages of the agro-food industry in Syria namely: before and after announcing Law No. 10 of 1991. The first stage was characterized by an agro-food industry relying mainly on the public sector in addition to some small and simple firms of the private sector. The products of these industries can be described as follows, namely:

- have high quality, and are free of fraud and trustworthy by the consumers because they comply with the national standards;
- Are typical without any creative components;
- Are characterized by relatively administered fixed prices determined according to predetermined prices for raw materials, production costs and a profit margin.

The aforementioned products met the basic needs of the consumers without considering the development in consumers' tastes due to the absence of competition in the market and excess demand. Thus, the main aim of the firms was to produce and to comply with the production plans, while marketing was conducted by other agents such as the General Establishment for Consumption Goods (GECG), the General Establishment for Retail Trade (GERT) and the General Establishment for Military (GEM). Because most of the food industry and its marketing were managed by the public sector, there was no competition and the domestic produce was protected by both the administered prices and import ban.

Since the mid 1980s a new orientation of the economy has been set up to improve the economic environment and to attract foreign capital. Decree No. 10 of 1986 has been issued to found joint-venture companies. Investment Law No. 10 of 1991, which underwent adjustment by Decree No. 7 of 2000 and was replaced by decree No.8 of 2007, has been announced to establish large companies. Small and middle firms were established by law No. 103 of 1952. This development can be identified as the start of the second stage of the agro-food industry, where a vast of firms was established either licensed or non-licensed. Therefore, a dumping of the internal market with variety of products has been occurred leading to an exit of many small firms due to the unfair price competition. This stage is distinguished by the following:

- The established industries were not of a great economic impact such as gum, chips and biscuit, etc.
- Quality cheating due to price competition, excess supply and greediness of the firms' owners led to violation of standards and to unhealthy production.
- There was unclear economic policy to attract investors to different industries relying on statistics about actual needs and required capacities, which led to unbalanced distribution of the firms.

Therefore, it is important to follow a fair economic policy aiming at the integration and coordination among producers and public institutions to realize the following:

- Enhance the middle and large projects of major economic impact on food security and market stability especially those enterprises relying on domestic

raw materials such as vegetables, fruits and dairies without attaining a dumping of the market.

- Ensure the use of advanced technologies by these industries to be competitive, to produce high quality products and to access Arab and foreign markets.
- Adopt both modern and flexible management practices and quality assurance systems (ISO 9000 family and Administration Performance Systems) to accelerate the decision making process and to behave according to market needs and demand.
- Give more attention to the operations of filling and packaging towards diversification into suitable sizes relying on per capita income, purchasing power and social classes.
- Improve of marketing techniques, advertising and customer services towards enhancing the consumption of processed and healthy goods, which are tested against bacterial capacity and standards compliance, instead of the traditional products, which do not comply with standards from both technical point of view and safety requirements.
- Adopt of modern and advanced technologies to increase both the production capacities per unit of time and productivity, to reduce cost and to have competitive fair prices especially in the context of GAFTA and foreign markets the Syrian government tries to enhance the food industry in the context of reforming foreign trade especially in the fields of GAFTA, European partnership and joining the WTO. The government encourages also the social economic development of food manufacturing by encouraging the public, private and joint processing activities.

15.2 Annex 2. Food Security

Since agricultural development is considered as a major factor to attain food security, alleviate poverty and sustain development, Syria has adopted agricultural policies aiming at attaining an agricultural development characterized by an optimized use of the available resources, consistency with population growth and supply of food with reasonable prices.

Accordingly, the general strategy of food security in Syria is clearly expressed through the following:

1. Increasing the potential to meet food needs, through:
 - Developing the production of both staple food commodities and competitive goods.
 - Increasing the capability of marketing agricultural outputs through improving both the agricultural marketing services and the ability to exchange agricultural products.
2. Raising the ability of poor people and people with limited income to get their food needs.
3. Increasing the price stability in the food markets.
4. Achieving high quality levels of the marketed food commodities.

In spite of the high population growth rate which is currently about 2.45%, the above mentioned policies led, during the last decades, to a noticeable economic growth exceeding 4%, which is considered good in comparison with different developing countries' rates. This progress, which the Syrian government proposes, has been achieved through the overall boost in the economy especially in the agricultural and

mining and manufacturing sectors. In this regard, the Syrian government gives due attention for both agriculture and agro-industry because of food security objectives.

Before the mid 1980s the agricultural sector was depending on the central planning regime, but when the Sixth Five Year Plan (1986-1990) started there was a gradual trend towards indicative planning, a participatory approach and decentralized planning of agricultural production to improve the efficiency of this sector and to meet the increasing food demand of the population and the food industry. This has been accompanied with establishing agricultural projects, increasing the irrigated areas, rationalizing of natural resource use (especially water) by adopting modern irrigation technologies, and producing clean agricultural products by using biological and integrated pest control management.

Moreover, several legislations have been issued to attract investments in the agricultural sector (Decree no. 10 of 1986, the Investment Law no .10 of 1991 and its amendment by Decree no. 7 of 2000 and Decrees no. 8 and 9 regarding the new investment law and the establishment of the General Syrian Commission for Investment). As a consequence, the private sector has been allowed to participate in the marketing process on an extended basis. Therefore, its contribution has been increased in the fields of marketing, processing and exports of several products and the provision of agricultural production requirements such as fertilizers and chemicals. Furthermore, the planning process has been simplified to be at the product group instead of the single product. The credits of the ACB have been continued to be granted accompanied with a strict control of these credits to be used for the purpose of the granted credit. On the other hand, the government maintained control on the processing and marketing of cotton, sugar beet, tobacco and wheat exports.

Furthermore, complying with the strategic orientation of the government to develop agricultural production and to support the food security situation, there have been steady efforts to supply rural services, increase the cultivated areas (irrigated and rain-fed), provide the production requirements in time and encourage the production of agricultural products especially the strategic ones and livestock. As a result, self-sufficiency has been achieved in a variety of products such as wheat, legumes, cotton, vegetables, fruits, red meat, raw milk and eggs resulting in a low import dependency with an attempt to enhance self-reliance in the other important commodities (imported ones) according to the principle of economic efficiency, such as sugar, fish, dairy products and a part of the needed feeds for the livestock. Produced olives are used either as table olives, which had a self-sufficiency ratio of 100% in 2005, or for the production of olive oil, which its self-sufficiency ratio amounted to 208% in 2005; the total quantity of milk is used either as fresh consumed milk, which had a self-sufficiency ratio of 100% in 2005 or as processed milk, which its self-sufficiency ratio accounted for 85% in 2005.

Agricultural policies: Agricultural policies have aimed to increase agricultural production, improve its quality, attain food security and food sufficiency of main commodities and enhance exports. These policies focus on production and marketing of agricultural products, the improvement of infrastructure, the provision of basic agricultural services and research, extension services, agricultural support, crop protection, the protection of natural pastures and forests, animal health, veterinary services, water and agro-processing.

Review of agricultural policies and their reforms:

1. Agricultural policies applied in Syria have proposed a series of objectives, the most important of which are the following:

- Attaining a significant contribution of the agricultural sector to GDP and economic stability through increasing production and providing real job opportunities.
- Improving the self-sufficiency of the basic food staples, narrowing the food gap and ameliorating the agricultural trade balance by increasing exports and decreasing imports.
- Achieving adequate integration between the agricultural sector and the other economic sectors of the economy considering inputs and outputs where the agricultural sector provides a significant share of the inputs and raw materials needed for the industrial sector and increasingly consumes the industrial products such as machinery and fertilizers.

In general, the agricultural sector has gradually moved from a centrally planned sector to a one adopt the indicative planning and the participatory approach since 1986 (6th Five Year Plan). At the same time, marketing policies have had a series of improvements resulting from more participation of the private sector in marketing, processing, export of many agricultural products and supply of agricultural production requirements like fertilizers and chemicals. Planning mechanism has also been simplified shifting from crop to group level where the producer can plant his desirable crop through many choices. The ACB has continued providing loans for different terms with an increasing supervision for the credits by their purposes. Marketing and processing of cotton, sugar beat, tobacco, and wheat export, which were restricted and controlled by the government, have been reformed to comply with the general directions of adopting the Social Market Economy.

Positive impacts of agricultural policies and development plans:

- Increase the irrigated and invested areas, mainly those irrigated from ground water, through governmental irrigation projects and invest in new rain-fed areas through land reclamation enterprises.
- Modify farming intensity in irrigated and rain-fed areas consistently with water resource availability diversified by stabilization zones and soil type to sustain soil fertility and to ban rain-fed planting in Al-Badia.
- Attain self-sufficiency in strategic crops (wheat, dry legumes and cotton), vegetables, most of fruits, table olives and olive oil, etc, and surplus for export.
- Achieve significant steps in improving the living conditions in rural and urban areas and increase the per capita share of food commodities and nutrients where the share has increased on average from 2350 kcal/ day in the seventies to 3200 kcal/day in recent years.
- Enhance the value of the agricultural GDP in fixed prices (year 2000) from SP 177 billions in 1995 to SP 292 billions in 2006 to amount to 23- 25 % of total GDP in spite of the achieved developments in the other sectors of the economy especially the Mining and Manufacturing sector.
- Improve the share of processed and raw agricultural products to be 16-22 % of total exports considering that many industrial products of agricultural origin are not included in agricultural exports such as cotton and textiles which account for more than 5% of total exports.
- Develop the infrastructure in rural areas to provide services for the agricultural sector (roads, electricity, water, communication, transport and storage, etc.).

- Ameliorate the services targeting the agricultural sector (research, extension, education, health and veterinary services, etc.).
- Negative impacts of agricultural policies:
- Decrease of the soil fertility in some areas and pollution of land & water resources.
- Shortage in different water sources as a result of the irrational wells digging, unbalanced water pumping, decreasing in ground water level, widening in the deficit between the supply and demand for water, deteriorating water quality and slow shifting toward modern irrigation systems.
- Continuous deterioration of natural pastures in Al-Badia and desertification resulting from the cultivation, overgrazing and random use of machines.
- Fragmentation of agricultural holdings, which constrains agricultural investments and mechanization, without taking active actions to control this phenomenon.
- Inconsistency between regulations and legislations and agricultural production development such as agricultural relation law.
- Discrepancy between marketing, exporting and processing activities and production development, which has resulted in both low productivity of agricultural work and no benefit from value added.

Problems and challenges that constrain the agricultural sector:

The agricultural sector faces many domestic and foreign constraints and challenges, which affect its performance and sustainable development:

- Limited availability of the main agricultural and natural resources, which are affected by climatic and environmental conditions.
- Population growth and employment opportunities of agricultural labor.
- Agricultural holding fragmentation.
- Weak financial resources and investor's fear of investing in the agricultural sector due to risk and long duration of the capital recovery.
- Fragmentation of agricultural and irrigation related institutions, which lack coordinating mechanism.
- World economy changes (trade liberalization, signed agreements and tax exemptions among different countries).
- Support of agricultural products in other countries and high level of competition.
- Constraints related to macro policies which affect directly or indirectly the agricultural sector such as fiscal and monetary policies, interest rate, pricing and support policies, trade policies, etc.

Agricultural contribution to industry: The agricultural sector in Syria is considered as a major and important sector for other economic sectors and a key supplier of inputs needed for many agro industries such as fodder, leather, plant oils, soap, wood, paper etc., which extend the date of expiry for agricultural products and convert them to processed products with an increasing demand in domestic and foreign markets, enable farmers to sell and export their products far away from production and price crises, motivate production to be increased and improved, sustain food security, enhance exports and ameliorate the generation of value added.

The government has stimulated the expansion of agro industries to increase the value added, motivating the private sector to be engaged in such activities through providing

incentives and relaxing obstacles²⁸, and introduced a series of procedures to develop the agro-industrial sector as follows:

- Providing the agro-industry with a significant share of expenditure within the transformation industries.
- Introducing many plans and agricultural development programs to achieve a surplus in agricultural production contributing to the development of agro industries.
- Reducing tariffs on imported raw materials necessary for food industry.
- Decreasing the transport cost for domestic industries by railways.
- Supplying loans with low interest rate for agro processing projects.

Furthermore, Syria has the advantage of producing many varieties and plant and animal products which improve the competitiveness of the Syrian agro-industry such as cotton, sugar beat, olive, wheat, poultry and sheep meat, and an increasing surplus of agro-industrial products.

Hence, during the last three decades the Syrian agro-industry has attained a substantially increasing development to become a pillar in the national economy, an important income source and a significant contributor to the GDP.

Agricultural contribution to foreign trade: Trade allows reaching bigger markets and provides chances for specializing in production. Therefore, Syria seeks to foster its trade and to increase its product competitiveness in foreign markets. Hence, open trade policies that Syria have adopted, helped to increase trade significantly where a remarkable trade flow has started to emerge since 2001 as a result of the enhancement of imports and exports after implementing GAFTA.

Foreign trade growth rate was exceptional in 2004 reaching 46.5 % compared with 2003 but in 2005 it was lower than that of the previous year accounting for 26%. This increase came as a result of the improvement of imports by 64.3% in 2004 and 29 % in 2005 and of exports by 30.6 % in 2004 and 22.6 % in 2005.

In terms of value, Syrian trade in 2005 was highest recording SP 927 billions where total imports and exports valued US\$ 502 billions and US\$ 424 billions respectively. Agricultural trade affects considerably total trade parallel to the fluctuations of agricultural production due to agricultural seasons and climatic conditions. This impact results from the high contribution of agricultural trade in total trade. The share of agricultural trade accounted for 16% during 2003 – 2005, reached a peak of 18% in 2003, and decreased to 14% in 2005.

15.3 Annex 3. The Syrian Environmental Policy

The Syrian environmental policy is based on the close cooperation between different sectors of economy and administration, which is characterized by the team spirit. These sectors work according to final directives defined by the national strategy that must be implemented in a way to be acceptable by all parties.

This policy aims to introduce important changes in the behaviour and positions of the Syrian citizen towards the environment. This is done by informing the public about the importance of the preservation of available natural resources in the country and how to properly deal with it. Also, by encouraging the public to actively participate in the protection of the national resources and in the reduction of their degradation. This will provide the society with a healthier and cleaner environment and will preserve sufficient natural resources for the present and the future generations. This is done by taking into consideration the regional and the international aspects of the global environment.

Moreover, the Syrian environmental policy is based on:

- Taking into account the environmental impacts of developing projects;
- Developing human society and raising the living standard on healthy environmental bases;
- Searching for long-term solutions for the general environmental problems in a way to ensure the continuation of development at the same time;
- Protecting the environment according to the basis and the norms constituting the plan for the protection and the preservation of available natural resources;
- Collecting and analyzing main economical and social information that have direct impacts on the environment and development of the Syrian economy;
- Issuing the necessary legislation, regulations, and pollution Acts for the protection of the Syrian environment;
- Environmental planning which ensures the optimal use of national resources in a balanced way towards the population and environment;
- Setting principles for the safety and the protection of the environment in collaboration with the different national, regional, and international parties. This must be done by defining the current environmental problems, looking for solutions by participating in scientific studies and research and also by reducing the apparition of new problems of environment.

Greenhouse Gas Emission: The total GHG emissions increased from 29 million tons CO₂ equivalent in 1990 to 36 million tons CO₂ equivalent in 1994 and it is expected to reach 74 million tons CO₂ equivalent in 2010.

Syria is considered as an oil exporter country. The consumption of energy in Syria mainly relies on the electrical energy produced from the thermal and hydro power plants, oil products, natural gas where Syria started to use natural gas in electrical energy generation and in industrial processes during past few years and Bio-mass (wood, agricultural and animal wastes).

The effects of greenhouse gases: Scientists have concluded that the huge quantities of CO₂ and other gases resulting from the enormous use of energy have become an important factor in the transformation of the earth to a large greenhouse. When these gases are emitted, they form in the troposphere a cover around the earth that allows the sunrays to get in through the atmosphere but they block the reflected infrared rays by the earth surface to escape to the outer space. This phenomenon produces a rise of the earth temperature, which is known as the greenhouse effect. Indeed, a noticeable increase of earth temperature has been observed during the last century from 0.5 - 1 EC. If greenhouse phenomenon will continue to exist, the earth temperature will rise by another 1.5 - 4.5 EC by the year 2030 or 8.6 EC by the end of the next century. Moreover, it has been observed that a relation exists between the greenhouse effects and the depletion of stratospheric ozone layer (20-50 km altitude).

The temperature of the earth increased about 0.3- 0.6 C, if the GHG emissions continue the temperature will increase about 1.5-4.5 C in 2100.

15.4 Annex 4. Trade Policies

Trade policies have aimed at embracing an export-oriented approach and diversifying exports in addition to establishing the one widow system. Passed regulations have included many trade policy reforms where most agricultural commodities are being allowed to be imported with the purpose of encouraging agricultural production and

exports, most of trade and tariff constraints have been eliminated; tax on exports of agricultural commodities has been abolished to attract national and foreign private sectors to invest in the agricultural sector. Legislations and laws have been modified toward increasing exports and improving its quality to be consistent with world market requirements through regulating control materials use, prohibiting harmful stimulants, motivating organic and bio fertilizers in addition to recommending following the new methods for sorting, packing, and packaging. Reforms have included exempting agricultural production and exports from many taxes and reducing duties on imports of agricultural requirements. Facilities have been provided through air transit with subsidized prices for exporting in addition to promotion of the establishment of specialized marketing cooperative communities.

Dumping regulation has been passed to protect national production from harmful practices in international trade. Law no. 42 passed in 2006 aims to deal with harmful practices like dumping which damages national product and supports exports by other countries. Preparations have started for publishing several laws (competition law, monopoly prohibition regulation, trade law, companies law, food safety law and consumer protection law), establishing commission for developing exports and protecting trade and industry properties, reforming custom law and forming a committee to modify Law no. 151 issued in 1992 related to agencies and foreign companies. There is also a new law project which allows shifting Syrian companies with its present forms (individual or family, etc.) to contributing companies. Such procedures have improved Syrian competitiveness in world markets expecting to reach new markets for its exports and better efficiency for its economy.

The agricultural sector has shifted from a relatively closed market to a more open one where recent changes will lead to an increase in this openness and to fast integration with the world economy. Tariff regime has been significantly simplified through merging many previous duties in one duty "etc" harmonized tariff system". Custom duties have been reviewed and reduced for basic food commodities and primary commodities needed for the industry. Taxes on exporting agricultural products have also been eliminated; financing imports from export earnings has been removed. Moreover, export license for significant share of agricultural food products have been abolished as well as restriction on importing food products which are produced in Arab countries members in the Great Arab Free Trade Area Agreement which has been implemented gradually in 1998 and fully executed early 2005, year of complete elimination of all duties. This reform has been extended to include all participant countries in new trade agreements such as the association agreement with European countries, free trade agreement with Turkey and many signed bilateral agreements to establish free trade zones in order to accelerate the free trade process.

Syria applied for WTO membership in 2001 and the application was formally received in 2003 (Cancun meeting for trade ministers of the member countries). Syrian accession to WTO will have significant implication on the agricultural reforming process because of the compatibility with WTO's rules.

15.5 Annex 5. Marketing Policies

Economic reforms have speeded up in recent years due to economic policies followed by Syria in which Social Market Economy has been adopted to improve competitiveness, to integrate in the world economy and to attain a balance between remarkable economic outcomes and social justice. As a result, local economic policies have started complying with fast economic developments through strengthening the role of the private sector in the national economy and improving the legislative

environment. These reforms have aimed at creating a balanced economic development including all economic and service sectors through accelerating the increase in the Gross Domestic Product (GDP), reducing unemployment rate, improving exports and investments, enhancing productivity, modernizing fiscal regime and ameliorating infrastructure. Reforms have also incorporated issuing many regulations to state the legal framework needed for shifting towards a Social Market Economy. These regulations have dealt with fiscal, monetary, tax, and banking issues, improvement of investment environment, liberalization of foreign trade, simplification of trade constraints, facilitation of currency exchange procedures, achievement of institutional modernization and administrative reform. With the aim of bridging these structural reforms in the Syrian economy to the developments of the world economy, the 10th FYP has set a strategy identifying the main features of the economic and social development process during the next years until 2010:

- Shifting towards the Social Market Economy.
- Encouraging the private sector to be an effective partner in sustaining and implementing the development plans.
- Finding the appropriate legislative environment for competition and consumer protection.
- Improving less developed areas.
- Coupling the macro policies with reducing poverty and inducing income generating programs.
- Reviewing support policies and mechanisms.
- Fostering investment by facilitating licensing, registering and developing free zone regulations.
- Developing the fiscal and monitoring sector.
- Introducing administrative reforms and restructuring public institutions.

Agriculture plays a major role in the national economy because of its multiple contributions to the economic and social development process of the country comprising Gross Output (GO), GDP, employment, its effects on non-agricultural activities such as marketing, processing and providing the raw materials necessary for agro-industry, its influence on the trade of non-agricultural commodities and services, its role in attaining food security and its impact on sustaining the environment.

Macro policies

The following paragraphs preview the most important trends in macro policies affecting the agricultural sector.

Monetary policies

Monetary policies during 2000 – 2006 aimed at liberalizing the monetary sector from one hand and attaining a balance between monetary and commodity flows and stabilization of prices on the other. Many decrees and decisions have been issued with the purpose of improving monetary policies to be consistent with economic reform requirements such as establishing the Credit and Monetary Council which has intended to oversee monetary, credit, and banking policy and to regulate related institutions and administrations according to the state general strategy and national economy needs.

Furthermore, the stability of importing and exporting foreign currency into and out of the country has induced a good investment environment which resulted in reducing the inflation rate to reach 6% in 2005 (review of the 9th Five Year Plan). Also the law of establishing private banks has been issued and the number of licensed private banks has reached 10, including three Islamic banks. A banking security law has been also

passed in addition to establishing the Syrian Commission for Stock and Financial Market (Legislative Decree no. 55 of 2006) and private insurance companies (Legislative Decree no. 43 of 2005 where the Syrian insurance sector has been opened for the private sector and 12 private insurance firms have been licensed, including 3 Islamic banks. Moreover, a suggestion is being discussed to establish agricultural insurance funds.

Finally, as for the agriculture sector, policy has relied on continuity of providing soft loans by the Agricultural Cooperative Bank (ACB) with low interest rates compared with other sectors.

15.6 Annex 6. Fiscal policies

Fiscal policies have aimed at developing fiscal legislations and improving the efficiency of tax regime. The most important regulations which have aimed at reforming these policies during 2000 – 2006 have been:

- Legislative Decree no. 51 to reform income tax. Income tax has been reduced and the exempted minimum level has been raised.
- Reduction of tax rate.
- Law no.25, which eliminated some taxes and duties.
- Decree no 319 related to reforming tariff, reducing custom duties on primary commodities, and simplifying tariffs and the new custom Laws no 37 and 38. Tariff reform process has continued in 2006.
- Legislative Decree no 20 passed in 2006 related to establishing an administration for every border exit.

15.7 Annex 7. Water resources

Syria is located within the arid and semi-arid areas where water is usually scarce in terms of both per area unit and the average per capita share, not well geographically distributed and very difficult to be managed and invested. The average annual per capita share of water amounts to less than 1000 m³ while it amounts to 7500 m³ at the global level. This share is expected to decrease in the future which might drop to 500 m³ in 2025 because of the high population growth rate and the diminishing water quantities received from the common rivers with neighboring countries, which constitute 50% of the available water resources.

Since the water resources are limited, the government plans like the Syrian Agricultural Strategy, five year plans and annual plans aim at improving water resource management, maintaining it by the renewable level, organizing its investment and ameliorating its uses through:

- Setting a comprehensive national plan for the integrated use and sustainable management of the available water resources in order to protect the ground water and to achieve food security.
- Increasing the irrigation efficiency and improving the water returns of all sources, in particular from the public irrigation schemes which need rehabilitation to introduce the modern irrigation methods. It is also necessary to define water rations for each crop to avoid overexploiting water, to expand the irrigated areas to the maximum and to improve the contribution of the water sector to the Gross Domestic Product (GDP). The focus has to be put on the basins of severe deficits (Dejla and Al-Khabour Basin and Barada and Awaj Basin).

- Evaluating all current water establishments such as dams and irrigation & drainage projects to rehabilitate them relying on economic returns, environmental impact and good performance, and choosing the projects that serve the sustainable development.
- Stopping the digging of wells and organizing the unlicensed ones by setting up numerators to organize ground water, to define rations according to renewable water resources and to control the consumption of water.
- Protecting the water resources from all sorts of pollution comprising chemicals, sewage, salinity or others.
- Establishing associations for water users to be involved in the programs and irrigation planning for resource allocation in order to keep the water resources out of overexploitation and deterioration.
- Developing methods for artificial rainfall to ensure an optimal agricultural production.
- Studying the possibility of establishing dams in the privileged basins especially in the Coastal and the Euphrates Basin in light of the results of economic and feasibility studies.
- Putting the irrigation projects in use and maintaining them constantly.
- Raising the efficiency of water use for irrigation from 50% to 80% in modern irrigation areas and minimizing the water loss in all irrigation nets.
- Limiting effectively the overexploitation of ground water.
- Expanding the drainage systems in the areas which suffer from drainage and salinity, especially in the Euphrates Basin.

Through the above mentioned policies, substantial improvement was achieved until 2006 in expanding the irrigated area, irrigation efficiency (about 30% of the public irrigation schemes), defining water requirements for crops and introducing modern irrigation methods. There has been an increase of the irrigated area from all sources, an expansion of the sprinkle irrigated areas and an enhancement of the irrigated areas by modern schemes at a higher rate than the traditional ones. Yet, traditional methods are still prevailing accounting for approximately 83% of the total irrigated area and leading to a high wastage of irrigation water.

Many regulations and rules have been issued to improve the performance of the agricultural and irrigation sectors:

- Law no. 30 of 1964 related to combating water pollution.
- Law no. 3 of 1972 related to small and medium dams construction.
- Law no. 46 of 1972 related to the establishment of public irrigation schemes on dams of rivers and to the determination of fees for water use.
- Law no. 165 of 1985 related to using water in agriculture and to digging and licensing wells.
- Laws for water use fees (Law no. 46 of 1972, Law no. 19 of 1989, Law no. 128 of 1989 and other laws) by which public irrigation schemes fees were raised from 70 SP per hectare in 1972 to 600-3500 SP per hectare currently (600 SP per hectare for winter crops and 3500 SP per hectare for summer crops). In all cases, these fees are still lower than their social values (about 8700 SP/ha).
- Decision of the High Agricultural Council no. 11 in 2000 to transfer all the irrigated areas from traditional to modern irrigation techniques during four years at an average annual rate of 300 thousand hectare.

- Decree no. 90 of 2005, in the context of the administrative reform of water resource institutions, to establish the “General Commission for Water Resources”, which aims at achieving an integrated water resource management and facilitating procedures for the public users.
- A new law, “the Water Legislation Law” which aims at achieving the desired development in transferring to the modern irrigation at national level and sustainable development to initiate the required procedures and funds that guarantee organizing the relationships between the users and the service institutions to avoid water overexploiting.
- Decision no. 2817, issued by the Prime Minister on 15/ 05/ 2005, which is concerned with forming a high committee under the supervision of the Prime Minister for approving the annual plans.
- Decision no. 26, issued by the Minister of Agriculture on 19/ 05/ 2005, which propose the establishment of a national directorate for adopting the modern irrigation techniques.
- The Legislative Decree no. 91, issued by the President on 29/9/2005, which intends to establish a national project fund for the modern irrigation schemes at about 53 billion Syrian pounds (SP) as donations and feasible credits without interests.
- Formation of a central committee headed by the “Deputy Minister” of Agriculture and branch committees in the governorates headed by the governors to follow up the annual plan for the transferring programs and funds to deal with the difficulties.
- Construction of a map for the available water resources by basins and development of an investment plan based on the studies which define the different uses of water.
- Completion of the unstudied basins.
- Establishment of the “Water Research Center” in the Ministry of Irrigation to deal with irrigation and land reclamation research and ground water.
- Foundation of the Directorate of Irrigation at the Ministry of Agriculture for irrigation research. • Increase the projects for the surface water use.
- Establishment of the Directorate of the artificial rainfall at the Ministry of Agriculture to increase the rainfalls.
- Introduction of policies for credits to assist farmers in adopting the modern irrigation systems.
- Establishment of stations for the treatment of sewage water to be used in agriculture.
- Law no. 20 of 2005 to establish the General Commission for Al-Ghab Management and Development comprising the maintenance of irrigation projects.
- Many other projects have been also introduced to improve the water efficiency (achieving the highest rate of production for each water drop) like the projects of: “Developing Natural Resource Research”, “Operating and Maintenance of Irrigation and Drainage Systems” in Al-Ghab, Funds for Adopting the Modern Irrigation and Establishing Weather Forecast Stations in coordination with JICA.
- To support the aforementioned projects, several enterprises were also established with the FAO assistance in the irrigated agriculture aiming at 20:

- Building capacity, training in the field of irrigation and preservation of water resources and providing the supporting services.
- Spreading out the modern irrigation techniques to improve the efficiency of irrigation at the farm level.
- Setting up new strategies and policies to manage the irrigation sector.
- There are various water sources for irrigation in Syria totaling about 62 billion m³, composed of rainfall (45 billion m³) and permanent sources (17 billion m³) including the share of the Euphrates River fixed by the temporary agreement with Turkey. Whereas, the available annual water resources are estimated at 15 billion m³. Ground water increased from 3 billion m³ in 2000 to 5.8 billion m³ in 2005, and similarly, the surface water increased from 6.42 to 7.1 billion m³ for the same years.

15.8 Annex 8. Investment Policies

The government has enhanced investments through:

- Liberalizing exchange rate.
- Simplifying administrative procedures.
- Enabling the transformation of profit and invested assets abroad.
- Providing infrastructure.
- Supplying facilities and introducing tax exemptions.
- Facilitating investment licenses.
- Donating long-term soft loans for investors to establish production assets.
- Providing information about domestic and foreign markets.
- Facilitating the provision of agricultural and industrial inputs.
- Producing and adopting new varieties for processing.
- Providing Arab and foreign investors with information about investment options in projects oriented for export.
- Balancing the distribution of investments among governorates.

The most important regulations that have been issued in Syria related to investments are:

- Decree no. 103 passed in 1902 for promoting investment in industrial sector.
- Law no. 348 passed in 1969 promoting foreign capital.
- Decision no. 186 issued in 1985 for encouraging investment in tourism sector.
- Decree no. 10 passed in 1986 related to establishing, promoting and regulating joint agricultural companies.
- Investment Law no. 10 passed in 1991 and its amendment by Decree no. 7 issued in 2000 which has offered main incentives and advantages to investors.
- Decree no. 8 passed in 2007 to replace Law no 10 passed in 1991 which offers further incentives and advantages the most important of which are the following:
 - a. Investor has the right to shift profits and interests gained by invested foreign capital.
 - b. Projects can import all their needs from origin country without any import restrictions. Imported machinery and equipment are exempted from custom duties.

- c. The project is allowed to open an account in foreign currency abroad if the account value doesn't exceed 50% of the project capital paid in foreign currency.
- d. The project is permitted to exchange a part of its foreign currency deposits in domestic banks to Syrian currency at current prices prevailing in neighboring countries.
- Legislative decree no. 9 passed in 2007 about establishing "The General Commission for Investment" in Syria to implement investment national policies. It has included founding "The Single Window" to provide services to investors and forming a higher council for investment to run the commission. In this regard, Syria has worked and reforming investment related legislations, facilitating needed procedures for licensing projects, developing the basic structure promoting investment and providing adequate information about investment options.

Policies have identified investment priorities, provided facilities, support and special treatment such as land and tax exemption on business profit, promoted investment that take care of sustainable agricultural development and given priority to establish projects that supply agricultural requirements.

The most important determinants of project approval are the following:

- Consistency with the development plans.
- Use of domestic resources as much as possible.
- Contribution to fostering the national economy and employing domestic workers.
- Increase of exports and reduction of imports.
- Introduction of modern techniques that fit national economy needs.
- The projects approved by investment Law no. 10 of 1991 are classified as follows:
 - e. • Agricultural and animal production: include crops, fruit trees, livestock and related processing projects (olive trees and olive oil, olive trees and sheep production).
 - f. • Animal production and fattening: comprise livestock projects, dairy products and related processing units (e.g., milk and processed milk products).
 - g. • Irrigation, wells digging and agricultural services: incorporate agricultural equipment, production inputs and services.
 - h. • Livestock fodder: some projects focus on processing of production requirements, animal breeding and agricultural services.
- The remarkable increase in the number of included projects between 2004 and 2005 is due two reasons:
 - i. • Improvement of the investment environment in Syria as a result of continuing implementing the economic reform policy in addition to the change in world environment and its effect on changing investors' preferences.
 - j. • Reform of Law no.10 passed in 1991 by Decree no.7 of 2000 and subsequent decrees

Suggestions to develop and promote agricultural investments: The existing regime for investment in Syria, including the agribusiness sector, has several drawbacks that have so far impeded a more vigorous and sustainable process of investment and growth. The general problem is that the regime grants special temporary benefits for

new investments, without altering much the general macroeconomic and institutional environment, or making those benefits permanent. This encourages the pursuit of short-term advantages, but hardly promotes long-term growth.

Consequently, recommendations are made on three major areas namely: procedural and micro reforms, improving the macro environment and promoting agricultural investments.

Procedural and micro reforms:

- Simplifying the authorization process for new projects by eliminating various steps in the procedures. “The single stop window” at the Investment Office can be considered a step towards simplification.
- Revising the minimum size of eligible projects. Priority should be given to projects oriented to modernizing farming.
- Facilitating access to land, especially publicly owned land, including the development of industrial zones provided with all basic services (mainly electricity and water).
- Facilitating the development of cooperative enterprises for joint development of farming projects (not necessarily involving joint production, but chiefly joint input procurement and joint processing and marketing). This implies improving the recently existing cooperative sector.
- Facilitating the development of rural micro-finance institutions to expand the use of credit in the countryside, and introducing further flexibility in the banking system to improve credit conditions for private investors.

Improving the macro environment:

Reforms should be gradual but integrated, advancing on all fronts at once. The following are the main aspects to be included in the process of reform:

- Resource allocation policies, implying taxes, trade, prices and subsidies;
- Money and banking, implying foreign exchange liberalization and currency convertibility, banking reform, independence of monetary institutions and policy and establishments of stock markets; simplification of financing procedures by public and private banks and establishment of new advanced banks to comply with the transactions of trade; and
- Reduction of inefficiencies and overhead costs, implying administrative reform of the public sector, simplification of administrative procedures, and improvements in basic infrastructure and services.

Promoting agricultural investment:

- Improving and decentralizing agricultural planning.
- Introducing more initiative and innovation in the strategic-crop sector.
- Promoting foreign investment in agricultural export products. Foreign capital and technology are needed to expand production of specific high quality agricultural products, especially fruit and vegetable, for export to the European Union and other markets.
- Developing improved rural finance.
- Promoting marketing of agricultural products.
- Fostering on-farm investment for modernization of irrigation systems.
- Providing governmental studies about the projects required for economic growth, which are beneficial for investors, and provisional studies related to these projects to help investors in the decision making process.

- Adjusting the laws of agricultural relations and property should be flexible to comply with the needs of domestic and foreign investments.
- Improving the information system and the provision of investment studies to comply with the international standards of marketing agricultural products.
- Attracting foreign, Arab, and Syrian (abroad) capital by providing more incentives.