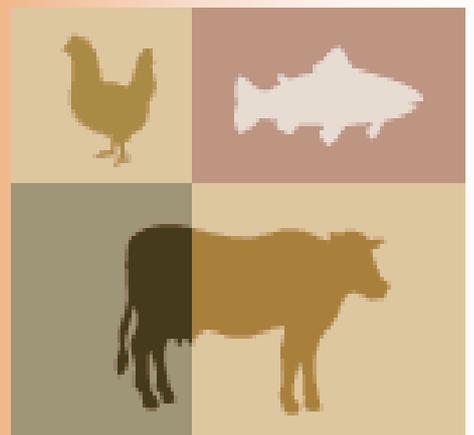
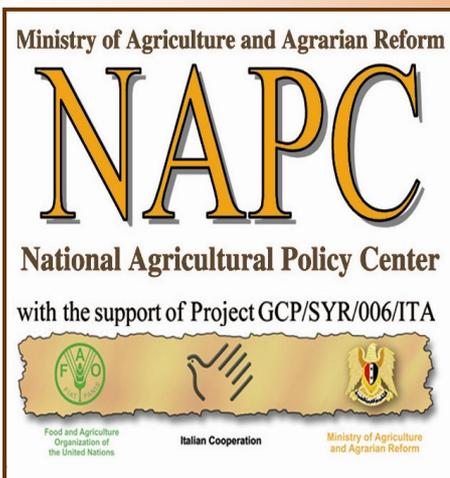


2002

# The State of Food and Agriculture



## in the Syrian Arab Republic





**The State of Food and Agriculture  
in the Syrian Arab Republic  
2002**

**National Agricultural Policy Center**

**With the Support of the FAO Project  
GCP/SYR/006/ITA**

Damascus, January 2003



## ACKNOWLEDGEMENTS

*This report was produced by the National Agricultural Policy Center (NAPC) as one of the outcomes of the effective international co-operation realized under the Project GCP/SYR/006/ITA "Assistance for Capacity Building through Enhancing Operation of the National Agricultural Policy Center".*

*The Project is executed by the Food and Agriculture Organization of the United Nations in close coordination with the Syrian Ministry of Agriculture and Agrarian Reform, counting on the generous financing provided by the Italian Government.*

*The Ministry of Agriculture and Agrarian Reform gratefully acknowledges the support extended by the Project and especially the long term training and the daily technical assistance which allowed establishing and making operational the NAPC.*

*Last but not least the NAPC wishes express warm gratitude to the Ministry of Agriculture and other Institutions and individuals that made possible this publication by providing data and information.*



## Foreword

*Agriculture is a leading sector of the Syrian economy, contributing for more than one fourth to employment and income. Agriculture also plays crucial functions in achieving food security, enhancing inflows of hard currency through export, and stimulating economic activities in marketing, processing, and input supply.*

*Recognizing the essential role of the sector for Syrian economic development and modernization process, the National Agricultural Policy Center (NAPC) is committed to make available information and studies that can contribute in enhancing knowledge and information on agriculture.*

*The report on the State of Food and Agriculture (SOFAS) in the Syrian Arab Republic is part of this endeavor. It aims at providing, every two years, researchers, policy makers and stakeholders with an updated overview of agricultural issues and a comprehensive source of data useful for debating and enhancing agricultural plans and policies.*

*The present issue of SOFA was produced by a team of five NAPC researchers, namely Samir Jrad, Widad Shehadeh, Akram Shaideh, Basima Atieh, and Samira Al Zoughbi, working under the joint supervision of the Director of the NAPC, Mr. A. El Hindi, and of the Chief Technical Advisor of the FAO Project GCP/SYR/006/ITA, Mr. C. Fiorillo. The FAO Project made also available the technical support of two international consultants, Mr. F. De Filippis and Mr. F. Santucci, and the translation services of Ms. Asma Matar.*

*The NAPC management wishes to extend compliments to the readers of this report, apologizing for inaccuracies that might have been overseen in this first issue. On this ground, the NAPC welcomes any critic and suggestion useful for improving future editions.*



# Table of Contents

<b>Acknowledgement</b> .....	<b>3</b>
<b>Foreword</b> .....	<b>5</b>
<b>Table of Contents</b> .....	<b>7</b>
<b>List of Abbreviations</b> .....	<b>9</b>
<b>Introduction</b> .....	<b>11</b>
<b>Chapter 1 Geographic Features and Natural Resources</b> .....	<b>15</b>
1.1. Climate .....	15
1.2. Water Resources .....	16
1.3. Land Resources and Use .....	17
1.4. Agro-climatic Zones .....	17
1.5. Forestry .....	18
1.6. Fisheries .....	18
<b>Chapter 2 Agriculture in the National Economy</b> .....	<b>19</b>
2.1. Agricultural Contribution to GDP .....	19
2.2. Population and Employment .....	20
2.3. Employment in Agriculture .....	20
2.4. Food Consumption .....	21
2.5. Food and Inflation .....	21
2.6. Agriculture in Foreign Trade .....	21
2.7. Exchange Rate .....	22
<b>Chapter 3 Structural Aspects</b> .....	<b>25</b>
3.1. Land Tenure .....	25
3.1.1. <i>Public and Private Ownership</i> .....	25
3.2. Farm Structure .....	26
3.3. Agricultural Labor .....	29
3.4. Agricultural Machinery .....	31
<b>Chapter 4 Water Use and Environmental Issues</b> .....	<b>33</b>
4.1. Land Degradation .....	33
4.2. Water Availability and Use .....	34
4.3. Drought and Its Effects on Agricultural Production .....	37
<b>Chapter 5 Agricultural Inputs</b> .....	<b>39</b>
5.1. Introduction .....	39
5.2. Seeds and Seedlings .....	39
5.3. Plant Protection Products .....	40
5.4. Chemical Fertilizers .....	41
5.5. Feed .....	42

<b>Chapter 6 Agricultural Production .....</b>	<b>45</b>
6.1. Value of Agricultural Production, Value Added, and Productivity .....	45
6.2. Crop Production .....	46
6.2.1. Area .....	46
6.2.2. Yields .....	48
6.2.3. Production .....	48
6.2.4. Area, yield, and Production by Governorates .....	49
6.3. Animal Production .....	51
6.4. Wood Production .....	53
<b>Chapter 7 Food Industry .....</b>	<b>55</b>
7.1. Public food industry .....	55
7.2. Private food industry .....	56
7.3. Joint-venture food processing .....	57
7.4. Employment in the food industry .....	57
<b>Chapter 8 Agricultural Support Services .....</b>	<b>59</b>
8.1. Agricultural Research .....	59
8.2. Agricultural Extension, Training and Education .....	60
8.3. Plant Protection Services .....	60
8.4. Veterinary Care and Vaccination .....	61
8.5. Public Projects in Support of Agricultural Production and Rural Areas .....	61
<b>Chapter 9 Agricultural Policies in Syria .....</b>	<b>65</b>
9.1. The Planning System .....	67
9.2. Price and Market Policies .....	69
9.3. Credit and Inputs Policies .....	72
9.4. Taxation .....	75
9.5. Agricultural Investment Policies .....	76
<b>References .....</b>	<b>79</b>
<b>Annex Tables by Chapter .....</b>	<b>81</b>

## List of Abbreviations

°C: degrees centigrade

AAD: Agricultural Affairs Department

ACB: Agricultural Cooperative Bank

ACSAAD: Arab Center for Studies on Arid Areas and Deserts

AEC: Atomic Energy Commission

avg: average

bod: biological oxygen demand

CA: Chamber of Agriculture

CBS: Central Bureau of Statistics

CFPI: Consumer Food Price Index

CPI: Consumer Price Index

DAE: Department of Agricultural Economics

DAH: Department of Animal Health

FAO: Food and Agricultural Organization

FD: Forestry Department

GADO: Gross Agricultural Domestic Output

GADP: Gross Agricultural Domestic Product

GCASR: General Commission for Agricultural Scientific Research

GCRS: General Commission for Remote Sensing

GCVF: General Company for Vegetables and Fruit

GDP: Gross Domestic Product

GEF: General Establishment for Feed

GEM: General Establishment for Meat

GEP: General Establishment for Poultry

GES: General Establishment for Sugar

GOCFPI: General Organization for Chemical and Food Products Import

GOCGM: General Organization for Cotton Ginning and Marketing

GOCTP: General Organization for Cereals Trade and Processing

GOFI: General Organization for Food Industries

GOSM: General Organization for Seed Multiplication

GPF: General Peasants' Federation

ha: hectare

HP: Hecto Pascal

hrs/d: hours per day  
JICA: Japan International Cooperation Agency  
Kg: Kilogram  
MAAR: Ministry of Agriculture and Agrarian Reform  
mb: millibar  
MCM: Million Cubic Meter  
ME: Ministry of Environment  
MH: Ministry of Health  
MHU: Ministry of Housing and Utilities  
MI: Ministry of Irrigation  
mm/d: millimeter per day  
mm: millimeter  
MNR: Management of Natural Resources  
mt: metric ton  
NAPC: National Agricultural Policy Center  
NGO: Non-governmental Organization  
PPD: Plant Protection Department  
PSF: Price Stabilization Fund  
SAC: Supreme Agricultural Council  
SP: Syrian Pound  
SPC: State Planning Commission  
Std. dev.: Standard deviation  
t: ton  
tds: total dissolved solids  
UNDP: United Nations Development Program  
US\$: United States Dollar  
WB: World Bank  
WHO: World Health Organization

# Introduction

The agricultural sector is at the top of the Syrian Government's policy agenda for its central role in ensuring food security and in fostering economic development. Indeed, it supplies many local industries with the required raw materials and stimulates many other activities, such as marketing, transportation, input supply, and foreign trade. Last but not least, agriculture is a main source of employment. The number of persons fully engaged in agriculture was 1,3 million in 1999, counting for 29% of the total labor force, compared to almost 1,2 million (28.6%) in 1995.

The contribution of the agricultural sector to the Syrian GDP has ranged between 27 and 32% in the last 10 years. The high variability was mainly due to climatic circumstances, affecting all crops and specially the rain-fed ones, which account for 75% of the cultivated area. Increase in land and animal productivity, especially in the rain-fed areas resulted in increased food production for domestic consumption and export.

Self-sufficiency has been achieved for some crops, such as wheat, legumes (chickpeas and lentils), cotton, vegetables (potatoes and tomatoes), and fruit (citruses and olive). There have been even cases of surplus production. However, domestic production of some crops is still not sufficient to meet domestic demand. This is the case for sugar, vegetable oils (with the exception of olive oil), some kinds of red meat, and dairy products (cheese, butter and dried milk). Moreover, maize imports for chicken feed have increased.

Natural resources and ecological factors vary among regions. The same is true for annual average rainfall, which reaches 1,100 mm in some western regions but can be as little as 50 mm in most of Al Badia. There are also wide differences in average annual maximum and minimum temperatures, and wind speed and direction.

Syria can be divided into five main agricultural regions, namely Southern, Central, Coastal, Northern, and Eastern.

The Southern region corresponds to about 15.7% of the total area of the country. It includes Damascus, Dar'a, Al Sweida, and Quneitra. It is famous for its fruit production, especially apricots, apples, and grapes; although it also produces chickpeas, tomatoes, and cattle. Between 1998 and 1999, regional contributions to national production were 35.8% for chickpeas, 50.7% for apples, 31.2% for grapes, and 62.5% for apricots.

The Central region accounts for about 27.6% of total area and produces mainly sugar beets, dried onion, potato, and almonds. In the average 1998-99, regional contributions to national production were 57.2% for sugar beets, 52.6% for dried onions, 31.3% for potatoes, and 14.3% for irrigated wheat.

The Coastal region on the Mediterranean Sea includes the cities of Lattakia and Tartous. Although this region is relatively small, it significantly contributes to the national agricultural production, with 98% of citrus, 42% of olives, 55% of tomatoes, and 56% of tobacco.

The Northern region covers 12.6% of the country's total area and includes the cities of Aleppo and Idleb. Its main products are lentils (55% of the national output), chickpeas (51%), olives (56%), and pistachios (69%). Local farmers breed about 20% of the total sheep population of Syria.

The Eastern region is the largest in the country, concentrating the national cereals and cotton production. In order to enhance productivity through irrigation many networks have been built in this region, especially on the Euphrates and Al Khabour rivers, in addition to

the many wells that have been excavated. Farms tend to specialize in irrigated wheat (64% of the national production), rain fed wheat (38%), cotton (63%), and lentils (29%).

Aggregate national agricultural production witnessed a considerable development. The index number (1995=100) of agricultural production at constant prices reached 211 in 1998, then fell to 185 in 1999 due to the long waves of drought that hit the country in the late 90s.

During the last decade, agricultural policies have sought to maximize the utilization of natural resources, secure production of the strategic crops, and use extension and scientific research to improve productivity. Government's agricultural planning aims at organizing the production process and improving the quantity and quality of the output. Planning has shifted towards a more indicative approach, which increasingly relies on price policies.

Agricultural price determination has been gradually liberalized. Indeed, the price fixing based on production cost plus a limited profit margin has been progressively restricted to few strategic products (cotton, cereals, sugar beet, tobacco, and few others). The determination of other prices is largely left to market forces, even though they are regularly monitored, and indicative prices periodically announced, to serve as reference for producers and consumers and to prevent price surge

Marketing has been liberalized for all non-strategic products and, more recently for some strategic products too. Only marketing of cotton, sugar beet, and tobacco is still restricted to the public sector. For these products and wheat, foreign trade is still restricted to public sector companies, but both public and private firms are now allowed to import agricultural inputs and encouraged to establish agro-processing activities. All taxes and fees on agricultural exports have been cancelled by the Law no. 15/2001.

Provision of agricultural credit is still an exclusive responsibility of the Agricultural Cooperative Bank (ACB), which increased its disbursement in the sector from SP 8,594 million in 1990 to SP 10,209 million in 1999.

In the future Syrian agriculture will face several challenges, resulting from population growth, urbanization, and new food habits. These will require that Syrian farmers improve quantity and quality of their production, while coping with emerging shortage of water and declining quality of soils and grazing land. Farmers' revenues are also at risk, due to the limited size of most farms and growing competition from import, which will also challenge domestic agro-industry in its ability to meet a rising consumer demand for better-quality products.

In this volume, an in-depth analysis of the state of food and agriculture in Syria is presented. It is organized into nine chapters that provide the reader with the most recent information and data available. Chapter 1 offers an overview of the main geographical features of the country. Chapter 2 provides essential information on the role of agriculture in the national economy, focusing on its contribution to employment and GDP. Chapter 3 reviews structural characteristics of farms by looking at land tenure, farming structures, mechanization, irrigation and animal production. Chapter 4 focuses on the crucial issue of water: its use in agriculture and the effects of its scarcity on production. It also gives an overview of other environmental issues. Chapter 5 reviews issue related with farmer's access to agricultural inputs, focusing on seeds, fertilizers, pesticides, and other inputs. Chapter 6 analyses crops and animal production both at national and local level, giving detailed information on areas, yields, and outputs. Chapter 7 focuses post-gate components of the food chain, providing hints on the structure of the food companies operating in Syria both in the public and private sectors. Chapter 8 reviews the public

services that support farmers, such as research, extension, and veterinary service, as well as public investment project in support of agricultural production and rural areas. Finally, Chapter 9 provides an overview of Government policies in agriculture, with special reference to the planning system, and policies related to price and markets, credit and inputs, taxation and investments.



# Chapter 1

## Geographic Features and Natural Resources

The Syrian Arab Republic lies on the eastern coast of the Mediterranean Sea, between Turkey and Lebanon. It has a total area of 185 million ha, one third of which is arable land or forest. The remaining part consists mainly of steppe (Al Badia) or rocky areas.

Topographically, Syria can be divided into four main regions. The Coastal region runs from north to south along the Mediterranean coast, between the mountains and the sea. The Mountainous region includes mountains and hills that run from north to south along the Mediterranean Sea. The Interior region, including the plains of Damascus, Homs, Hama, Aleppo, Al Hassakeh, and Daraa is located to the east of the mountainous region. Al Badia, which consists of semi-desert plains, is located in the southeastern part of the country along the Jordanian and Iraqi borders.

### 1.1. Climate

The Mediterranean climate, characterized by rainy winters and dry and hot summers, prevails in Syria. Autumn and spring are only two short transitional seasons. From a climatic point of view, Syria can be divided into four regions. This classification reflects different rainfall levels, which are influenced by the Syrian mountainous ranges and the Western Lebanese Mountains. The Coastal area is characterized by heavy rainfall in winter and moderate temperature and high relative humidity in summer. Rainy winters and hot and dry summers, accompanied by large differences between daily maximum and minimum temperatures, characterize the Interior area. The Mountainous area, with an altitude of 1,000 meters or more, is characterized by rainy winters (rainfall level may exceed 1,000 mm) and moderate climate in summer. Low levels of rainfall in winter and hot dry summers characterize the Desert region. Table 1.1 provides detailed information on rainfall and rainfall incoming water by agro-climatic zones in the period 1995-2000.

Syrian weather is characterized by a high rate of relative humidity in winter and a low rate in summer. That applies to all regions in the country, except the Coastal area, where the reverse is the norm, i.e., low relative humidity in winter and high in summer. The Desert and semi-desert areas are those with the least relative humidity. During summer, the rate of humidity varies from 20% to 50% in the Interior region, and from 70% to 80% in the Coastal region. In the winter, it varies from 60% to 80% and from 60% to 70% respectively.

During winter, the prevailing winds in the eastern part of the country are easterly, while both in the northern and northwestern parts they are northerly. Other parts of the country are subject to westerly and southwesterly winds. During summer, prevailing winds in the northeastern part are northerly. They are westerly and southwesterly in the remaining parts of the country. Both in summer and winter, some local winds blow temporarily over a number of regions. Northeasterly winds are observed over the northeastern and southeastern regions. Southeasterly winds blow over the middle part of the desert. During summer, the Coastal region is subject to sea winds that are westerly in the day time and easterly at night. The Damascus region, in particular, is subject to northwesterly winds that blow continuously in the afternoon.

During winter, Syria is affected by high atmospheric pressure formed in the central part of Siberia and by low pressure formed either in the Mediterranean or northeast of the country.

This may cause snowfall if they meet air masses coming from the Mediterranean. Those air masses are largely responsible for rainfall in winter.

The daily difference between maximum and minimum temperatures (Tables 1.2) is generally quite high for most of the country. The difference is greater in the Interior and desert regions, where it can reach 23°C. The Coastal and Mountainous regions are more moderate, with a difference of 13°C. December and January are the coldest months and July and August are the hottest ones. In winter the temperatures frequently fall slightly below 0°C (in all regions except for the coastal areas), but rarely drop below -10°C (North Aleppo and North Hassake). In summer, temperatures frequently rise up to 48°C (Al Badia and Al Hassake).

Syria is generally characterized by limited rainfalls, which are further and dramatically reduced during the recurrent periods of drought, heavily affecting agricultural production, as in the years 1998–2000 (Table 1.4). During winter, snow falls over all regions with altitude exceeding 1,500m above the sea level. Regions with an altitude of 800-1,500 meters are subject to both rain and snow. Other regions with lower altitude receive rain, but rarely any snow. In the desert regions, however, rainfall is very scarce. Thunderstorms accompanied by heavy showers occur frequently in winter. Their intensity can exceed 80mm in 24 hours in some regions (Table 1.5).

The Mountainous and Coastal regions have the heaviest rainfall in the country, followed by the Northern region (North Aleppo, Kamishly and Malikieh). Most of that rain is due to depressions accompanied by fronts coming from the Mediterranean. When those fronts meet the mountains, they are forced to rise and precipitate as snow or rain over the Coastal, Mountainous and Interior region. The southeastern and desert regions are those with the least amount of rain.

## 1.2. Water Resources

The Syrian Arab Republic has limited water resources. The average annual availability of water is estimated to be 66.9 billion cubic meters. Rainfall represents the main water source, accounting for 68% of the total. Other sources are rivers (23%), springs (6%), and underground water (3%).

Annual rainfall in Syria amounts to 45 billion m<sup>3</sup>, but most of it either evaporates or descends into the aquifers. Only 9% of the rainfall flows as surface water. The country is endowed with 16 rivers and tributaries. The Euphrates is the largest river, which runs through Syria for 680 km and has an average flow of 1,037 m<sup>3</sup> /sec. The second largest river in Syria is the Al Khabour. It extends for 552 km and has an average flow of 22.4 m<sup>3</sup> /sec. The total amount of water available for irrigation is 22,491,000 m<sup>3</sup>, including surface, springs, and underground water.

Depending on the topography of the country, seven main hydrographic basins can be identified: 1)Al Jazeera, 2)Aleppo (Quaick and Al Jabbool sub-basins), 3)Al Badia (Palmyra, Khanaser, Al zelf, Wadi el miah, Al Rassafa, Al talf, and Assabe'biar sub-basins), 4)Horan or Al Yarmook, 5)Damascus, 6)Al Aassi or Orontes, and 7)Al Sahel. Rainfall and snowfall represent the major water supply for the basins, except for the Al Jazeera and al Aassi, whose main sources are located in the neighboring countries.

The major rivers (Table 1.6) are the Euphrates (2,880 km), the Al Aassi and its tributaries (485 km.), the Al Khabour and its tributaries (442 km), and the Al Baleekh (202 km).

The largest lakes (Table 1.7) are Al Assad Lake (674 km<sup>2</sup>) and Jabboul Lake (239 km<sup>2</sup>), while the extension of other lakes do not exceed 61 km<sup>2</sup>.

The Euphrates dam is the largest one in the country, with a storage capacity of 14.1 billion m<sup>3</sup>. The most important middle-size dams are Al Rastan, Katteeneh, Mhardeh, Zeizoun, Al Kabeer, Al Shemali, Ballouran, Neissan, Athar, and Al Saffan (Table 1.8).

### 1.3. Land Resources and Use

As shown in Table 1.9, out of the total country area of more than 18.5 million ha, in the year 2000 steppe and pasture counted for more than 45%, forest for only 3% and almost 20% of the country's total area was unproductive (towns, roads, industrial areas, and wide desert extensions). The remaining 31.9%, equivalent to almost 5.91 million ha, was classified as cultivable. Out of this, 552,926 ha were not cultivated, 805,857 ha left fallow, and the rest actively cultivated as irrigated (1.21 million ha) and rain-fed land (3.33 million ha).

As shown by the comparison between average values in 1999-2000 and 1990-1991 (Table 1.9), over the last decade there was a significant increase of the area for steppe and pasture (+5%), resulted from a substantial decrease of the forest area (-24%) accompanied by decreases in both uncultivable (-2%) and cultivable (-3%) land. The slight decrease of total cultivable land (-3%) was accompanied by substantial changes in land use. Indeed, area left fallow doubled (+100%) to cope with the drought of the late 90s, irrigated land increased substantially (+62%) as investment in irrigation came into use. This corresponded to a decrease of almost one quarter of the rain-fed land (-24%)

According to the Arab Center for Studies on Arid Areas and Deserts (ACSAAD, 1996), Syrian soils can be classified into five main types (Table 1.10): Desert, Gypsum, Yellowish brown, Red, and Reddish. Desert and Gypsum soils are the most frequent, counting for 51% of the total country area and are distributed over most of the northeastern, eastern, and southeastern parts of the country. The Yellowish brown soil covers about 25% of the area, mainly on the western region along the border with Turkey. The Red and Reddish soils cover about 16% of the territory and are present mainly in the western and central parts of the country.

### 1.4. Agro-climatic Zones

Five agro-climatic zones can be identified on the basis of rainfall patterns. These zones are numbered as shown in Table 1.11. The First Zone has an average annual precipitation of over 350 mm. It extends for over 2 million ha and represents 15% of the total area of the country. It includes around 28% of the total cultivated land and 60% of pastoral land. It is subdivided into two sub-zones. The first sub-zone has an annual average rainfall of over 600 mm, allowing for low risk cultivation of rain-fed crops. The second sub-zone has an annual average rainfall that lies between 350 and 600 mm, allowing for only two low risk seasons out of three. This zone is cultivated mainly with wheat, legumes, and various summer crops.

The Second Zone presents an average annual rainfall ranging between 250 and 350 mm. In this zone, only two out of three seasons are secured. Its total surface (247 million ha) represents 13.3% of the total country's area and includes 30% of the total cultivable land, corresponding to 1,358,000 ha, out of which 143,000 ha are used for fruit trees and 1,215,000 ha are planted mainly with field crops (barley, wheat, legumes, and summer crops).

The Third Zone has an average annual rainfall of 250 mm. This is also the minimum quantity of rainfall in half of the seasons. The total area under this zone is 1,3 million ha, representing 7% of Syria's total area. The main crops are barley and legumes.

The Fourth Zone has an average annual rainfall ranging between 200 and 250 mm. This area corresponds to about 1,8 million ha and represents 10% of the country's total area. Cultivable area reaches 592,000 ha, out of which 7,000 ha are planted with trees and 585,000 ha devoted to field crops (barley, lentils, and chickpeas).

The Fifth Zone has an average annual rainfall of less than 200 mm in more than half of the seasons. This zone consists of rangeland and desert areas, extending over more than 10 million ha and representing about 55% of the country's total area. This zone includes 86% of the total pastoral land and is not suitable for rain-fed cultivation.

For each agro-climatic zone, crops and cropping patterns are determined centrally after extensive consultation between local civil authorities and representative bodies of the farming community, as part of the agricultural plan. Decisions are not based only on agro-climatic factors, but also on other criteria related to national objectives and policies, such as self-sufficiency in staple food commodities and adequate supply of raw materials for existing agro-processing plants.

### **1.5. Forestry**

As mentioned above, Syria has a very limited forest area with natural and artificial woods covering only about 547 thousand ha, equivalent to 3% of the country's total area. Natural forests occupy 232,000 hectares, while the rest are man-made. Syrian natural forests are not dense. Maximum tree coverage is about 83% of the areas for some forests in Homs and Lattakia, while in most other regions it ranges between 30-60%, and can be close to zero in some others.

A long term deterioration process put Syrian forestry under tremendous encroachments, especially during the 19th century. After independence, necessary steps were taken to restore the cover of these forests. A huge reforestation program has been implemented for many years with the objective of replanting 24,000 ha annually, but high mortality rate and the periodical drought waves have limited the positive impact of the program.

### **1.6. Fisheries**

The Syrian coast extends over 183 km and the continental shelf covers 1,373 square miles. Fish stock is estimated at 0.9 t/mile<sup>2</sup>, which is very low compared to other countries. Syria is relatively poor in fish production, also due to the limited extension of lakes and internal rivers. The total area covered by lakes is estimated at 1017 km<sup>2</sup>, out of which only about half is used for fishing or fish farming. Accordingly, the role of fishery in the traditional Syrian diet is minor, with a per-capita consumption that is estimated to be less than 1 kg/year.

## Chapter 2

# Agriculture in the National Economy

Agriculture has traditionally been one of the most important sectors of Syrian economy, as reflected by its contribution to GDP and employment, as well as by its crucial role in meeting the increasing food demand of a fast growing population. It gives a significant contribution to the balance of payments, as agricultural exports are second only to the export of crude oil. Also important is the linkage to the development of other economic sectors, as it stimulates industrial and commercial activities through both the supply of raw materials for processing and the demand of industrially produced inputs<sup>1</sup>.

Agriculture, together with the oil sector, remains the driving force of the national economy. During recent years its contribution to GDP fluctuated around 30% and a similar share was observed in terms of contribution to employment. These simple evidences highlight two important features of Syrian agricultural development. On one hand, the comparability of the contributions to GDP and employment demonstrate the “rural orientation” of government policies, which support agriculture in such a way to allow it achieving “comparable incomes” with other sectors. On the other hand, the persistently high contribution to GDP demonstrates that agricultural growth is not yet outperformed by other sectors, as result of both slow developments of the latter and good progresses in agricultural production stimulated by domestic support, public investments and protection from international competition.

### 2.1. Agricultural Contribution to GDP

In 2000, agriculture contributed to GDP for more than SP 229 billion (Table 2.1). Valued at constant prices (base 1995), this corresponds to a share on real GDP of 30.4% (Table 2.3). Accordingly, agriculture is by far the largest sector of Syrian economy, followed by wholesale and retail trade (20%), mining and manufacturing (17%), and transportation and communication (13%).

During the last decade, the sector grew on average by 5.7% yearly (Table 2.2), slightly above the overall GDP growth (5.5%). The latter was unevenly distributed over the decade, fluctuating between -2 and +8% in absolute and between -4.6 and 4.8% in per capita terms. Two main sub periods can be distinguished:

- I. from 1990-1995, GDP growth was high, and the share of agriculture in GDP decreased slightly, from 30% to 28%. This was a healthy trend, as it was registered in presence of an annual average agricultural growth of +6.8 % per year, outperformed by the very positive growth of most non-agricultural activities and, especially, of the financial (+10.6) and transportation and communication (+10.4%) sectors. The main exception was the public services' sector, which only grew by 2.5%. The positive agricultural performance was the result of the cropping intensification stimulated by positive price developments and substantial expansion of the irrigated land.
- II. from 1996 to 2000, economic growth was sharply oscillating around a decreasing trend (Table 2.2). Agricultural performance, contributed to instability, due to the adverse climatic condition and, especially, the harsh drought, that seriously affected

---

<sup>1</sup> *Agricultural inputs and agro-industry are discussed in chapters 5 and 7 respectively.*

the agricultural output during some of these years. Nevertheless, the average agricultural growth over this second sub-period was 5.7%, compared to the 3.2% of the entire economy, showing that the causes of the economic slowdown were mainly outside the agricultural sector.

The long run analysis also shows that structural articulation of the Syrian economy has remained quite stable over the decade. The agricultural contribution to GDP remained almost constant during the 1990s, fluctuating between 28-32% with no clear long-term trend. Among other sectors, there is evidence of an increasing importance of mining and manufacturing and, to a more limited extent of transportation and communication.

The high rate of population growth has absorbed more than half of GDP increase registered over the past decade, resulting in a modest average annual growth of per capita GDP (2.4%) (Table 2.2).

For a cross-country comparison, the value of agricultural output in year 2000 at 1995 constant prices is slightly over US\$ 18 billion if the official exchange rate is used (Table 2.4). However, if the market exchange rate is applied, the value of agricultural output drops to almost US\$ 4 billion.

## 2.2. Population and Employment

Syrian resident population is estimated to be more than 16.7 million in 2001, with an increase of 400,000 units in one year. Indeed, the annual rate of growth was estimated to be at the still high level of 2.45%, despite the persistence of a long-term decreasing trend. The high rate of demographic growth imposes a heavy pressure on the economy and its natural resources (Table 2.5).

Syria is a “young country”, with almost three quarters of the population that are below 30 years of age. This implies a rapid growth of the labor force and a constant increase of its share on total population: more than 300,000 units per year in the late 90s, corresponding to an average annual growth rate above 7%, over the last 20 years. The increasing labor force participation rate is accompanied by an unbalanced gender distribution of employment between females (18%) and males (82%), which is much more balanced in agriculture, where female count for 32.8% of the total (Table 2.9).

The private sector employs the overwhelming part (73.7%) of the total labor force, followed by the public sector (25.3%) and a minor share of the co-operative and joint ventures' sector (1%). The educational level of most workers is relatively low as only 67% of them completed elementary school. They are mainly concentrated in the private sector, where most farmers can be included. Conversely, the public sector has the highest share of skilled workers. (Table 2.10)

## 2.3. Employment in Agriculture

Population is quite evenly distributed between urban and rural areas. Consequently, subsistence of almost half of the population still depends mainly on agricultural and related activities. Indeed, agriculture is the main source of employment for Syrian labor force, but its share on total employment shows high variability both in the medium and long run (Table 2.5). In the long-term, this share decreased from almost 51% in 1970 to almost 26% in 1981, and strongly recovered in the following decades, reaching almost 36% in 1994 and oscillating around 30% thereafter. The substantial inversion of the commonly observed outgoing labor flow from agriculture to other economic sectors is a result of the structural changes characterizing Syrian economy and policies in the second half of the 80s and

early 90s. These changes include the adoption of quite rigorous macro policies in the second half of the 80s, followed by the availability of substantial financial resources from the oil sector and external assistance. These resources were used to raise agricultural prices and realize public investments in rural infrastructures.

In the medium term, the share of agriculture on total employment showed a slowly decreasing trend and higher variability, remaining on average slightly above 30% during the last three years. This trend can be interpreted as result of the limited capacity of the sector to generate further employment, also due to the adoption of technological innovations. The high variability is mainly related to the varying climatic conditions, which have substantial impact on the seasonal labor force required by important productions like cotton and cereals.

## 2.4. Food Consumption

Total per capita expenditure in 1996-1997 was SP 2,095 per month, out of which SP 1,253 was spent on food, beverages and tobacco, and SP 842 on non-food items and services (CBS, 1998). Per capita expenditure was SP 2,224 in urban areas, about 13% higher than in rural areas (1,968 SP), reflecting the higher cash income available in urban areas. Nevertheless, the share of expenditure for food and related products counted for nearly 60% of total expenditures for both urban (60.2%) and rural consumers (59.4%).

Table 2.8 shows that over a 25 years period, food consumption increased its share on per capita private expenditure from 51% in 1971-72 to 52% in 1985-86 and to 60% in 1996-97.

A closer look at the structure of food consumption shows that in 1996-97 expenditure on meat, fish and eggs was the highest, (about 19.5% of total food expenditure), followed by vegetables (16.3% of total food expenditure), and cereals (15.6%).

Table 2.9 summarizes information on the quantities of main food items consumed monthly per person. It highlights the overwhelming role in the Syrian diet of cereals and, particularly bread, with an average per capita consumption of 12.9 Kg per month in urban and 15.8 Kg in rural areas. Significant is the consumption of fruit and vegetables, and particularly tomato (almost 4 Kg per capita in urban areas and 4.2 Kg in rural areas) and citrus (1.3 Kg in urban areas and 0.8 Kg in rural areas). Concerning meats, in urban area is prevalent the consumption of mutton (0.6 kg against 0.3 Kg in rural areas), while in rural areas chicken prevails (0.9 kg against 0.7 Kg in urban areas). More broadly, the diet seems more varied in urban areas, with lower consumption of bread, chicken, tomato and potatoes, and higher consumption of mutton, eggs, cheese and fruits. It is also noticeable the higher consumption of oils and fats characterizing rural areas.

## 2.5. Food and Inflation

The inflation rate, as measured by the Consumer Price Index (CPI), was on average 8.3% over the period 1990-2000. However, it varied significantly, increasing from 9 to 17% in the interval 1991-94 and decreasing thereafter to -1% in 2000, with a minimum of -7% in 1999 (Table 2.10). The growth of food prices was significantly lower, on average 5.9% per year over the same period, exceeding the average price growth in 1994 only.

## 2.6. Agriculture in Foreign Trade

In 2000, agricultural and food products contributed for 14.6% to the total value of Syrian exports and represented 21.6% of total imports. Considering the overall period 1998-2000, it is possible to state that the two shares tended to equalize on average, reaching 20.7%

for export and 21% for import. This was a result of an increase of 13.4% of the share on export accompanied by an increase of 36% of the share on import, compared to the average shares registered over the period 1993-1995. (Table 2.11<sup>2</sup>)

In 2000 Syrian foreign trade showed a positive balance of US\$ 667 Million, after many years of persisting deficit. This was the result of a very large increase of the export value (from US\$ 3,477 millions in 1999 to 4,700 in 2000), mostly due to the price increase of oil on the international market.

In the same year the agricultural trade balance remained in deficit (US\$ 185 million), continuing the negative trend started in the previous year as result of worsening exports, mainly due to adverse climatic conditions, in presence of continuously increasing imports.

Table 2.11 allows a comparison between the average performances of two periods of three years (1993-95 and 1998-2000), in order to identify the main trends and smoothing out annual variations that might result from exceptional conditions on domestic and international markets. The variation between the average performance in the two years shows that the total trade deficit reduced by 81% as result of a significant decrease (-18%) of the import value, in presence of a limited increase of the export value (+3%).

Agricultural trade balance improved too. Indeed, a reduction of 29% of agricultural trade deficit resulted from an increase of exports (+17%) significantly larger than the increase in import (+12%).

## 2.7. Exchange Rate

Syria has implemented a system of multiple and fixed exchange rates. In agriculture, different exchange rates have been applied for imports and export of different inputs and commodities. Furthermore, the use of foreign currency has been restricted by the controls on access to currency to finance imports, and by the constraints on the destination of export proceedings.

Foreign currency earnings from exports, for instance, could be used in one of the following three ways: i) to import products not included on the list of prohibited imports; ii) to be saved in a foreign currency account and used later on; and iii) to be sold to other dealers or to the Commercial Bank of Syria on the export proceedings market at a rate usually above the market rate in Lebanon. The exporter was obliged to exchange a share (usually 25%) of its foreign currency earnings at the neighboring country exchange rate, which was below the free market rate during most of the 90s. Agricultural exporters have been progressively exempted from this restriction and allowed to retain 100% of their revenues in hard currencies.

On the import side, each importer had to prove that the foreign currency needed for imports was earned from exports, which explains the premium for the hard currency negotiated on the export proceeding market. Another peculiarity was applied to imports of important food staples imported only by public agencies, such as wheat, sugar, and rice. While the exchange rate at which the foreign currency had to be bought was the market exchange rate, the calculation of import tariffs was based on the so called "custom dollar" exchange rate which, for agricultural imports, was equivalent to the official exchange rate (11.25 SYP/US\$ between 1990 and 1999). Hence, the product-specific tariffs were calculated on a much lower import value in SP. This effectively reduced the level of import tariffs and

---

<sup>2</sup> In the table the values in SP have been converted back to US\$ applying the official exchange rates, so to ensure homogeneity between data for 2000 and other years, smoothing out nominal variations due use of different exchange rates for accounting procedures.

thereby effectively subsidized agricultural imports.

During the last years, substantial progresses have been made in reducing the exchange rate distortions by progressively unifying the various exchange rates, devaluating most of them towards the prevailing market rate, and simplifying the restrictions on access and use of foreign currencies.

The unification of the exchange rates relevant for agriculture started in the early 90s, and in the year 2000 almost all exchange rates were adjusted to 46 SP/US\$ (see Table 2.4). This resulted in a significant nominal devaluation. Further devaluation took place during 2001, when Syrian banks were authorized to buy US\$ at a rate close to the market rate in Lebanon. Because of relatively moderate inflation rate, the substantial nominal devaluation also resulted in the devaluation of the real exchange rate.



## Chapter 3

# Structural Aspects

### 3.1. Land Tenure <sup>3</sup>

The land tenure system currently prevailing in Syria was historically influenced by the mass peasant uprisings during Ottoman and French rules and, later, by the Agricultural Relations Law (no. 134) and the Agrarian reform law (no. 161), both passed in 1958, during the union between Syria and Egypt. About 22% of the cultivable land was confiscated according to land extension ceilings and partly distributed to the peasantry, which acquired owners' like possession rights.

Nowadays, the management of much of the land is in the hands of the private sector, although the State has still an important role as owner and regulator. This applies to land use rights in Al-Badia as well as to the coordination of land reform beneficiaries. Improved monitoring systems and further delegation of responsibility to the direct users of the land may decrease the administrative burden of the state without impairing its ultimate function of control.

#### *3.1.1. Public and Private Ownership*

From the tenure point of view, cultivable land (see chapter 1 above) is to a large extent private, while the uncultivable land is both private and public, with a slight prevalence of the latter. There is some overlapping between the pasture and steppe lands and the pastures and uncultivable land. This explains some of the differences in the statistical breakdown of the different sources. Communal pastures and forests are mainly controlled by the state.

In terms of property and tenure, it is estimated that 11.5 million ha (62%) out of the country's total 18.5 million ha are controlled by the State. The remaining 38%, (about 7 million ha) are privately owned and operated. This includes cultivable as well as some uncultivable land. Under the general term of "State land" are included natural resources and utilities for collective use, e.g. wells, land cultivated for agricultural purposes, and land distributed under various titles or rented under land reform programs. Due to the relevant differences in terms of management and individual rights, a distinction among "state land", "agrarian reform land", and "private land" is commonly adopted. However, the first two types are often unified under the generic term of State land.

The breakdown in terms of land use and ownership (private or state) is only partially coinciding. In particular, cultivable land is under both state and private control. Some pastures have come under private control. Uncultivable land, including lakes, buildings, and roads, is still nominally private, even when allocated to public use.

Private land includes cultivated land, in rain-fed or irrigated conditions, in addition to fallow and some uncultivated land. Due to increasing population pressure, the areas left fallow have been in sharp decrease since the late 80s. Private land is used for crop and animal production in holdings owned and/or operated, either by individuals or companies. It occurs under a variety of tenures and systems of management, with

---

<sup>3</sup> This section draws from Forni, 2001.

a predominance of direct operation by owners or through sharecroppers. Meanwhile, crop and animal production is also taking place under different categories of what is defined as “state land”.

State land includes the following types of farm organization:

- I. privately-operated agricultural land, rented or allocated to individuals, for instance to land reform beneficiaries;
- II. state farms land, which is presently being distributed to farmers, with a minor retained under direct public use by agricultural research stations;
- III. forests;
- IV. pasture land in the steppe, used by herders under traditional rights of access;
- V. state land used for roads or any other public purpose as well as uncultivable areas, such as wastelands, rivers and lakes.

The first two categories above mentioned tend to coincide with cultivable land registered as state properties (3,789 thousand ha), while the other three are unregistered open access and communal resources (7,675 thousand ha). State registered properties include the areas registered before or independently from the land reform of 1958 (2,399 thousand ha), part of which was distributed through land use rights or rented to individuals, and the areas expropriated under the land reform (1,390 thousand ha) and subsequently rented or transferred to beneficiaries.

Land in i) and ii) is used for well-defined agricultural production purposes and managed as holdings, i.e., each production unit is included under the total number of holdings in censuses and other statistics, irrespective of the systems of management and ownership. Land in iii) is managed by the State with limited rights of use for some population groups. Land in iv) amounts to as much as 45% of the total land area. It includes the desert and semi-desert areas (Al-Badia), where mobile herders have traditional rights of access, and some marginal agricultural areas in zone 4.

### 3.2. Farm Structure<sup>4</sup>

With the practical disappearance of traditional large-scale farms in the aftermath of the agrarian reform, in Syrian agriculture full-time small and medium farmers prevail, as well as small owners who do not directly manage their farms.

Census data show that there has been a considerable increase (26%) in the total number of holders (farmers) in that period (485,691 in 1981 to 613,657 in 1994). Given that the total cultivable land has not changed significantly in the period, it can be concluded that there has been considerable fragmentation and subdivision of farms.

Tenure in the cultivated areas is characterized by the important role played by holders whose main occupation is not farming. This group includes absentee owners as well as part-time farmers who have an off-farming occupation. Census data indicate that in 1981 only 63.8% of all farm owners were full-time farmers, while in 1994 that proportion increased to 71.4%. Due to a growth in the total number of farms, the actual number of holders who were full-time farmers increased from 261,000 to 409,000 (Table 3.1). The number of owners who had off farming jobs also increased from 148,000 in 1981 to 164,000 in 1994. Mostly absentee owners make up this group.

---

<sup>4</sup> This section draws from Sarris, 2001.

The number of holders without land was 15.7% of total holders in 1981 and 6.6% in 1994. Holders without land, according to the census, are mainly livestock holders without a fixed land base, especially in Al-Badia. The number of this type of holders has declined substantially since 1981. It is still not clear whether the policies implemented in Al-Badia have helped to cause that decline.

Several waves of migration have increased the number of absentees. This group includes not only members of the urban middle classes in possession of some agricultural property, but also relatively poor farmers attracted by better opportunities in neighboring cities or countries. They cannot be compared to the absentee owners of the past, who relied on a chain of intermediaries. They are directly involved in the management of their farms, thereby promoting more innovation and investment. Owners often compete for control of their farms with sharecroppers and tenants, who are actually in charge of managing the farm. This situation creates conflict and calls for the improvement of the relevant legislation.

In the 80s, the increasing availability of infrastructure, such as electrification and road links, improved livelihood in rural areas. This encouraged many people to return to rural areas as part-time farmers. They regularly commute to the cities, sometimes traveling long distances. Such phenomenon is typical of all pre-urban areas in the country. Part-time farmers enjoy all the benefits of full-time farmers in terms of Government services and subsidized inputs.

The proportion of holders whose main occupation is in agriculture varies considerably by region (Table 3.2). Proportions are generally higher in rural regions, such as Al-Rakka, Deir-Ezzor, and Al-Hassakeh, supporting the thesis that proximity to urban areas leads to more part-time farming. The educational status of farm holders is very low. More than 83% of them have not gone beyond elementary school and 44% are functionally illiterate. The lowest levels of education are found in the *Muhafazat* of Aleppo, Al-Rakka, Deir-Ezzor, and Al-Hassakeh.

While the total number of farm holders with or without land is known, there are many categories within these broad groups. It is possible to group households participating in farm operations and agricultural production into functional categories:

- I. land holders whose main occupation is not farming (mainly absentees);
- II. land holders with farming as a main occupation, i.e. owner-operators;
- III. landless holders<sup>5</sup> whose main occupation is not farming (mainly absentees);
- IV. landless holders with farming as main occupation, i.e. owner-operators without land;
- V. sharecroppers and tenants on private land by a written or oral agreement with the owner of the land;
- VI. land reform beneficiaries and state land distribution beneficiaries that do not yet fully own their land (these are owners like possessors of holdings assigned to them, for which they pay a yearly fee up to concurrence of one fourth of the value of the assigned land);
- VII. tenants of public land, renting in parcels belonging to the old state land establishment or to the expropriated land reform areas not distributed to beneficiaries;
- VIII. squatters on public land, a category of workers aiming at becoming legal tenants and for which regularization is on-going;

<sup>5</sup> Owners of livestock and/or agricultural machinery.

- IX. squatters on private land, who are mainly sharecroppers whose contract has expired and whose rights are awaiting arbitration;
- X. laborers in state farms, joint ventures, or larger private farms with a permanent contract – this is a very small category, under contracts for short-term casual labor;
- XI. landless and near landless laborers, mainly those coming from small owner or sharecropping households with an inadequate land base to redistribute to their children;
- XII. agricultural entrepreneurs, who rent or own large areas of land, especially in the northeastern part of the country..

Despite the sub-division above, categories overlap. For instance, members of the same household can be owners in one holding and sharecroppers or farm laborers in another. Therefore, the interests of the different groups can also overlap. From the management point of view, all categories include farmers with different degrees of autonomy from the owner of the land. Exceptions are the absentee owners and the permanent and casual laborers working under instructions.

The importance of different types of tenure is exhibited in Table 3.3. It shows that the overwhelming proportion (90%) of land holders owns all of its land. The average size of land differs according to the types of tenure. The size distribution of holdings operated by other than fully owned land is much more skewed towards the larger classes. This probably reflects the importance of the farming entrepreneurs and other joint stock farming companies (Table 3.4).

### *3.2.1. Size Distribution of Holdings*

The number of holdings in Syria has increased along with population and consequent pressure on land. More than a third (35.7%) of all holdings has an area of two ha or less (Table 3.5). These holdings account for only 4% of the total area. The notion of holding stretches across private and public land and includes a large number of small farms, large-scale State farms, and commercial joint ventures. Seven joint ventures with mixed private and public financing existed in year 2000, with a total of 7,242 ha and an average of 1,035 ha. Nonetheless, the bulk of holdings are small in scale and traditional in system of management.

The average size of holdings has been decreasing over time, but there is some discrepancy on the actual size levels reported in different sources, all derived from elaboration of census data. The area of holdings can, in fact, be measured in terms of total area, cultivable area, or actually cultivated area. The choice can lead to different results. In addition, the total number of holdings may or may not include holdings without land. However, in order to illustrate general trends, the direction and level of change is more important than the precise average size.

The data derived from the three existing censuses on holding size evolution are summarized in Table 3.6.

The geographical size distribution of holdings is quite marked, with Tartous and Lattakia being characterized by distributions concentrated on small units, while Aleppo, Al-Rakka and Al-Hassakeh are characterized by distributions that are markedly skewed toward larger size farms. Average farm size decreased over the three censuses (1970, 1981 and 1994). There are examples of dramatic decreases, such as those in rural Damascus, Homs, Hama, Deir-Ezzor, Al Hassakeh, Sweida, Dara'a and, Quneitra. In these regions, average holding size decreased substantially

between 1970 and 1994. Conversely, in the Coastal region, very small holdings continue to prevail. In Lattakia, for instance, the already small average holding of 2.4 ha in 1970 decreased to 1.9 ha in 1981, but remained at the same level in 1994, meaning that some sort of minimum threshold had been reached. There are, however, also cases such as Rakka, where the average size of 22.1 ha in 1970 increased to 30 ha in 1981, returning to 23.6 ha in 1994, probably as result of some land reclamation followed by fragmentation by inheritance.

The size distribution of holdings in different *Muhafazat*, as well as in Syria, and the percentage of land operated by each class, is shown in Table 3.7. The size distribution of holdings is not homogeneous. As already mentioned, in 1994, 35.7% of holders operated less than two ha, but they accounted for less than 4% of the total surface. By contrast, 2% of the largest holdings, namely those with farms larger than 50 ha, operated 23% of total land. The next largest class, operating land sized between 10 and 50 ha, while constituting 20.7% of all holders, controlled almost half the land.

Table 3.8 presents distribution of different size classes across different geographical regions in 1994. It confirms that the bulk of small farms are in rural Damascus, Tartous and Latakia, while the bulk of the largest holdings are in Aleppo, Al-Rakka, and Al-Hassakeh.

According to 1981 data, a small proportion of public agricultural lands was cultivated by eight production co-operatives (about 3,000 ha). These were established by the Government through relocation of farmers displaced by the filling of Asad Lake. In 2001, twelve State farms occupied another 112,420 ha, of which 70,977 ha were cultivable, 50,588 ha were actually cultivated, and 19,904 ha were irrigated. Other 12 State farms occupied 6,340 ha in 1993 with livestock productions. Seven joint ventures with mixed private and public financing existed in year 2000, with 7,242 ha. The total area of the above classes, which are usually not included in the census, amounts to 168,000 ha, of which about 85,000 ha are cultivated.

This still leaves a large gap between reported official total cultivable and cultivated area, and land operated by various types of holders. The discrepancy suggests that there is a considerable amount of public land, which is farmed under some type of unspecified tenure (squatters, etc), or that the number of those who have leased public land is much larger than what was reported above.

### 3.3. Agricultural Labor <sup>6</sup>

Employment in agriculture is important for many categories of workers, such as owner operators, permanent laborers, and occasional farm workers, but also for landless agricultural workers. Agriculture employs a considerable number of workers. Table 3.9 shows that the total family members employed in private agricultural holdings are almost 2 millions, of which an overwhelming proportion (96%) is unpaid family labor. This number constitutes about 40% of total Syrian labor force, even though it must be stressed that many family members are employed only as part-timers. The table indicates that the average number of family members per holding is relatively stable over different land size classes.

The table also indicates the number of permanent workers, as well as the number of full-time equivalent temporary workers (computed by dividing the number of days worked by all temporary workers by 250). It shows that hired labor of all types

<sup>6</sup> This section is mainly based on Forni, 2001 and on Sarris, 2001.

accounts for only about 88,500 full-time equivalent person-years, of which permanent workers constitute 58%. The reason is that, while there are 1.6 million temporary workers employed by all holders, the average number of working days for each of them is only 5.9.

Not surprisingly, the amount of hired labor increases with the size of holdings. However, the amount of both family and hired labor per ha of cultivated land decreases as farm size increases. This suggests that larger farms are more capital intensive than smaller ones, and that labor productivity is much higher on larger size farms.

Availability of employment opportunities either for full-time workers or in terms of occasional labor varies throughout the country and is affected by seasonality factors. In many parts of Syria, in the Hama countryside for example, a situation of labor shortage during harvests co-exists with relative labor abundance throughout the year. The number of landless laborers in that Governorate is said not to exceed 10%, but is constantly increasing because of population growth, insufficient development of non agricultural employment opportunities, and continuing fragmentation of holdings through inheritance. However, in view of the active labor demand during the peak agricultural seasons, open unemployment of agricultural labor exists mainly for only about two months in the slack season.

Landless laborer households are those households that do not operate land under any form and do not have non-agricultural employment. Only limited information is available on landless laborer. They were recorded in Forni's (2001) field survey as accounting for between 6% and 36% of total households in the eight villages surveyed. This category does not necessarily coincide with the poor households and, usually, has peculiar attitudes, as it participates in multiple activities within and outside agriculture.

The landlessness situation in some parts of central Syria, e.g. Idlib, is critical, as it is characterized by limited numbers of totally landless laborers, but an overwhelming presence of near-landless households. 80% of the households cultivate less than 1 ha of land and another 15% cultivate between one and three ha. This means that the minimum subsistence security provided by the land base is such that with next subdivisions through inheritance, the social balance may be toppled. Furthermore, in such situation, potential employers of agricultural labor force, namely those with a land base large enough to require labor in addition to household resources, are limited. This explains the presence of many organized labor groups in this *Mohafaza*, which bring to other areas the surplus labor of Idlib. There are, however, some complementarities between the different labor peaks, i.e. Idlib's labor migrates after the local peak demand and moves to work with other crops in other areas.

More generally, in Syria, agricultural labor organization works in accordance with local and non-local demand. Traditional labor contractors, the *chawesh*, perform these functions. They pool mainly female labor and make it available in different Governorates according to market demand. Another phenomenon that is relevant for labor organization is the inter-household cooperation among farmers, producing different crops, and having different labor requirement peaks. For instance, cotton-producing farmers may establish cooperation with onion-producing farmers and exchange their family labor.

The scarcity of land, coupled with insecurity of income, creates a tendency among workers to occupy land permanently, whenever possible. Laborers are said to want to become sharecroppers, who are more difficult to evict, while all employers would like

to continue using casual unprotected labor. Currently, however, laborers with no production base of their own are unlikely to be able to become squatters, and hence slowly acquire rights to stay on the land. This is because laborers are employed for short periods and specific tasks only, just in order to prevent any possibility for them to settle on the land and claim any right to it.

The minimum wage for agriculture, 75 SP per day, is lower than the base market rate of 100 SP for unskilled labor. Surveys have shown that the actual agricultural wage in 2001 ranged from 80 to 150 SP per day, depending on the type of activity, and do not vary by gender. Most of the hired labor is said to be composed of women and poorer pastoralists. In general, the increasing supply of labor is not matched by similar increase in demand and results in stagnation of daily rates. For instance, rates slightly decreased in Al-Hassakeh in 2000 for cotton picking, a relatively well paid activity for female seasonal migrant labor.

It should, however, be noted that Syrian agricultural labor moves also abroad. Findings from a field survey conducted in the Idlib and Hama Muhafazat in early 2001 indicate that workers compare the local daily rates with the ones prevailing in Lebanon or in the Gulf. In the case of Lebanon, rates would be about five times higher for comparable work. Proximity allows laborers to move out easily. It is mainly women, more constrained by social custom, who are restricted to the national market. They constitute the bulk of the migrant labor force that the *Chawesh* mobilize to provide the needed number of laborers at the right place and time for all the major agricultural operations, particularly harvest.

The distribution of labour by type according to governorates is presented in Table 3.10, which shows that the Hama Governorate has the highest total number of workers (770,520, or 21.5% of the total), while Quneitra has the lowest (14,282, or 0.4%). Aleppo has the highest total number of family workers (335,787, or 54%) and Quneitra has the lowest total number (13,398, or 94%). Al-Hassakeh has the highest total number of permanent workers, while Quneitra has the lowest. Hama has the highest total number of temporary workers and Quneitra the lowest.

### 3.4. Agricultural Machinery

Table 3.11 indicates the pattern of ownership of different types of machinery. It can be seen that the ownership of a water-raising pumps seeder, modern plough, thresher, and tractor are all heavily skewed toward the larger holdings, while sprayers seem to be better distributed. Table 3.12 also shows that the number of machines owned per household is evenly distributed and close to one for most types of machinery. This suggests that there might be considerable inefficiencies in machine use in smaller holdings, as both smaller and larger size holdings seem to utilize on average the same number of machines. On the other hand, this is also consistent with the reported pattern, whereby machine owners that have surplus capacity make them available for rent from other holders.

Table 3.13 indicates the number of different types of machines per ha of total operated land (namely by all holdings and not only those owning the machines) for different sizes of holdings. There appears to be an inverse relationship between size and number of machines per ha, for most machinery. Also taking into account that those with excess machine capacity could make them available to other farmers of the same size class, the numbers suggest that either there is considerable capital intensity in smaller farms or that there are inefficiencies in machine use in smaller farms.

Table 3.14 explores the issue further by indicating the ratios of the three most prevalent types of capital (water-raising pumps, modern ploughs and tractors) per family worker and full-time equivalent hired worker<sup>7</sup>. If the prices of labor and capital faced by different types of farmers are the same, then the capital labor ratios, namely the so-called capital intensity, should be similar across different types of farms. The table indicates that they are not, with larger holdings being generally more capital intensive than smaller holdings.

The higher capital intensity seems to hold for all capital types and family labor, which is the prevalent type of labor in agriculture in Syria. However, it does not seem to hold for hired labor, showing an inverse pattern for water pumps. This is evidence that while the prices faced by farmers of different size for capital and hired labor in the open markets are similar, they are not for prices imputed to family labor. Therefore, the generally lower capital intensity (or equivalently higher labor intensity) of smaller farms implies that the opportunity cost of family labor (the *shadow price* of labor) is lower for smaller holdings compared to large ones. This is consistent with excess supply of labor in smaller holdings, as indicated earlier.

Table 3.15 shows an increase from 1990 to 2000 of almost all types of machinery. Tractors have increased, particularly tractors below 50 HP from 17,146 to 32,551 (+89%). Also, there is a steadily expansion in the number of modern ploughs, from 81,463 to 108,459 (+33%). The number of seeders has also risen from 8,021 to 15,652 (+95%), reflecting the impact of government encouragement toward crop production. The same evolution can be observed for other machinery: fixed threshers (56%), combines (56%), pumps less than 10 inches (50.7%), pumps over 10 inches (139.3%). A similar pattern can be observed also for smaller equipment used by farmers for protection against pests and insects: hand sprayers (52%, mainly in fruit trees areas), motor sprayers (10%), and hand Dusters (32%).

---

<sup>7</sup> As previously mentioned, this includes both permanent and the full-time equivalent of temporary workers

## Chapter 4

# Water Use and Environmental Issues

A recent assessment of the environmental situation in Syria (WB/UNDP, 1998) ranked the relative importance of environmental issues as follows:

- I. soil degradation;
- II. contamination and depletion of water resources;
- III. poor air quality;
- IV. inappropriate solid waste disposal;
- V. growth of illegal settlements.

At least the first two of these problems are directly linked to the intensification of agricultural activities, which has given rise to increasing environmental impacts. These problems have arisen because past policies have not taken adequately into account environmental implications of economic activities and because planned actions have been only partially implemented due to institutional factors and lack of resources for investment.

Meanwhile changing patterns of consumption, production and lifestyle associated with urbanization have put the fragile Syrian soils and the limited water resources available under tremendous pressure, leading to increasing competition between agricultural and non agricultural uses of the available resources. In particular, limited availability of land has led to increasing competition between agricultural and urban growth, while the development of irrigation is reflected in a share of agriculture of 85-90% on total for water use.

### 4.1. Land Degradation

More than 17% of Syrian land suffers from some degree of degradation (Table 4.1). Although agricultural land is in principle protected from chaotic development, a considerable area has been built on, either with or without legal permits. Areas of agricultural land around industrial cities have been polluted by the discharge of industrial waste and polluting emissions. In particular, areas close to oil refineries (Homs and Baniyas) and parts of the green area around Damascus have been severely polluted.

Although contaminated area is relatively small, remedies are costly and urgently needed to prevent additional environmental problems, such as groundwater pollution. Table 4.2 summarizes some findings from a study estimating the costs of land degradation in the country.

The main effects of land degradation and pollution are the contamination of groundwater and food grown in polluted soil, the loss of soil and fertility due to erosion and salinization, the degradation of natural range land, and the loss of forests and recreational resources.

Official reports consider soil pollution in agricultural land as one of the main environmental problems in the country (MH, 1995). There are no systematic data to support this argument, but some important evidence is available. Polluted soils from lead smelting and other industries and factories have led to food contamination. High levels of lead, cadmium, chromium, and arsenic have been found in food grown in the area around Damascus. Soil pollution from heavy industry is found around Homs, especially phosphate fertilizer

industries. This is a particularly vulnerable area, due to the permeability of soils above shallow drinking water aquifers. Vegetables irrigated from polluted water of the Quaik river near Aleppo showed levels of arsenic many times above the permitted threshold (MH, 1995). Agriculture is a source of nitrate and phosphate contamination where fertilizers leak into watercourses and many public supply wells have been closed for this reason in the recent past.

Wind erosion, caused by the removal of natural plant cover for cultivation (especially in Al Badia), overgrazing, and deforestation, are responsible for around 75% of soil degradation. Causes include the expansion of cultivation in Al Badia, the over exploitation of forests, overgrazing linked to the expansion of animal herds, and general mismanagement. Wind erosion is most severe on the lighter soils in Eastern Syria, where sand drifting and high background particulates in some settlements are a serious problem. Sand drifting resulted in the loss of irrigated land and some houses in the Euphrates Valley, affecting up to 2,000 km<sup>2</sup>.

Inappropriate irrigation leads to water logging and salinity problems. Accumulation of salts in irrigated lands (Table 4.3) is frequent, especially in the Euphrates basin. A recent survey (Directorate of Irrigation/MAAR, 2000) showed that 50% of soils have some degree of salinity, and more than half of these are severely affected, significantly depressing crop production.

The degradation of natural rangeland is mainly due to overgrazing, which, in turn, is caused by excessive stock, inappropriate ploughing of marginal soils, open access, and transformation of the nomadic way of life. A survey of 4.2 million ha of the Syrian Al Badia in 1994 showed that most of the natural productive cover of the area, which provided good grazing for livestock, has been replaced by less palatable and less useful species. The deterioration of plant cover creates strong short-term economic pressures on farmers, who respond by letting an excessive number of animals grazing on the land.

The loss of forests, which are mainly located in northwest parts of Syria, is due to a number of factors, including fire (which destroyed 8,000 hectares between 1985 and 1993), over-exploitation by nomadic people, and overgrazing by goats. Additionally, 2,440 ha of forest were cleared to make way for agriculture between 1985 and 1993.

The underlying causes of land degradation are the use of inappropriate farming methods. This makes it urgent to integrate land use and development planning, which, in turn, results from a number of policies and institutional factors, including the land ownership system, agricultural policy and pricing, institutional coordination, and effective implementation of land use planning regulations. The increasing fragmentation of farms contributes to land degradations, as small holders normally tend to over-exploit their land. Moreover, both in small and large holdings, overexploitation can result from policies oriented to achieve self-sufficiency in basic foodstuffs through price support, since they might encourage production of staple crops in unsuitable, marginal areas and the excessive intensification of farming practices on suitable soils.

## **4.2. Water Availability and Use**

Information on water is scarce due to the difficulties involved in quantifying availability and in monitoring its use. Some qualitative evidences are summarized in Table 4.4, providing examples of contamination of ground and surface waters from various sources occurring all over the country, which are due to both agricultural and non-agricultural impacts.

Table 4.5 summarizes data on water availability by aquifers, while Table 4.6 presents the current and projected demand disaggregated for three main water-consuming sectors,

assuming an annual demand growth of around 2% over 20 years. This is a very conservative assumption as it is below the projected population growth and based on a growth of agricultural use of only 1.7% per year. Table 4.7 summarizes present water use by basin. However, it is unlikely that Syria's current water sources could meet even such low demand. Many estimates of water balances have been made in the past 10 years. JICA (1997) estimates that water deficits are more likely to occur in central basins (Table 4.8). Assuming a minor drought in one out of every five years, all basins would be in deficit. Other data (e.g. groundwater levels) indicate that this situation probably applies to most water basins in Syria. Water shortages in Syria have so far had the following consequences:

- I. declining water levels in wells (15 to 20 meters in some areas in the last five years) resulting in reduced cultivable land, wells' relocation, and increased commuting time for rural people;
- II. declining output or drying of freshwater springs, which are used for potable supply in many areas;
- III. increasing salinity of groundwater, a clear indicator that aquifers are being overused;
- IV. declining river flows (except in the Euphrates), resulting in poorer water quality and reduction of the ecological and recreational value of riverside areas;
- V. acute shortages of drinking water in some areas, usually during summer, resulting in the need for water-supply tankers;
- VI. declining health standards and increasing economic costs due to poor-quality water or expensive water-supply alternatives;

An alternative estimation of water resource shortage in key basins is included in Table 4.9 (WB/UNDP, 1998), which also provides an estimation of the costs of alternative supplies. Indeed, depletion of water supplies imposes a number of direct and indirect costs so that access to water becomes increasingly expensive. For example, in the case of underground water, it is necessary to dig deeper and deeper to reach the water table, and treatment costs are needed as deeper water is often saline.

A recent study from the FAO Project GCP/SYR/006/ITA (2001), focusing on water use for irrigation, estimates a national water balance in deficit of 3,104 million m<sup>3</sup>/year (Table 4.10). This is based on a conservatively assumption that the Syrian share of water from the Euphrates river is 210 m<sup>3</sup>/s, i.e. 6,622 million m<sup>3</sup>/year. If that estimate is correct, total water resources for the country are 14,589 million m<sup>3</sup>/year, while total uses are 19,162 million m<sup>3</sup>/year. The desegregation at basin level shows that only the Euphrates, Coastal, and Al Badia basins have a positive balance. The deficit is dramatic in Al Khabour basin (-3,151), and substantial for Orontes (-856), Barada and Awag (-311 million m<sup>3</sup>/year), and Yarmouk (-206).

Recognizing water resources as a key factor in the development process, Syria water policy aims at preserving water resources from pollution, while increasing attention is given to maximizing water use efficiency.

Water resources are under public ownership ever since 1925. Thereafter water resource control was entrusted to several public institutions. Nowadays the Ministry of Irrigation is entrusted with monitoring, managing and planning water use, as well as coordinating all other institutions involved. As regard to water for agriculture, the Ministry of Irrigation is responsible for establishing the public irrigation infrastructures and licensing wells, while MAAR regulates on-farm water utilization. Other key legislation can be summarized as follows:

- I. law no. 30 of 1964, on water pollution, dictating prohibitions and preventive measures;
- II. law no. 3 of 1972, concerning the establishment and functioning of medium and small size dams;
- III. law no. 46 of 1972 on the establishment and use of public irrigation systems on river dams, including determination of the water use fees;
- IV. law no. 165 of 1985 on water use in agriculture, including the rules for well digging and underground water-pumping licensing.

At present, more than 90% of the irrigated land uses traditional technologies, due to their lower costs and skills with respect to modern ones. Surface irrigation is the prevailing irrigation system in Syria, covering 95% of the irrigated area. Basin irrigation is the predominant technique used in surface irrigation and most of the wheat and barley farms are irrigated by this method.

Total area irrigated by wells is 710,716 ha (Table 4.11), of which about 44% are in Al Hassaka (Khabour basin). The total number of wells used for agricultural purposes is 201,259, out of which 53,078 were not licensed. Today, most of them have been licensed under decision no. 17 of 1/8/2000, related to the adoption of modern irrigation. About 75% of the wells use fuel as primary energy and only the remaining 25% use electricity. Data for well depth and discharge rates vary considerably, due to the lack of reliable statistics.

Following the huge expansion of irrigated areas realized during the last decade and the crisis generated by the recent drought, the MAAR adopted a plan to transform traditional irrigation. Implementation of the plan is supported through credit for modern irrigation technology, technical assistance to farmers (designing, implementation, and training), complete programming in order to increase awareness about proper use of water, and improvement of the quality of irrigation materials.

In the first quarter of 2002, the area irrigated with modern technology was 153,700 ha, 11.4% of the total irrigated area (1.374 million ha in 2002), showing a great improvement since 2000, when it was only 90,000 ha (7.4% of the total irrigated area). Out of the actually irrigated area with modern technology, 116,500 ha use sprinkler irrigation and 34,400 ha use drip irrigation. Table 4.12 provides details on the distribution by Governorate, while Table 4.13 summarizes the plan concerning areas to be converted to modern irrigation in 2002.

The modernization of irrigation technology should take into account multiple technical and economic factors, such as water, soil, climate, cropping pattern and holding size, farming structures, and economic incentives.

In recognition of the importance of research and extension, specialized research stations have been established. Their focus is on determining sustainable levels of water use at basin level and the most appropriate cropping patterns. Intensive efforts are also paid to train technicians and farmers in order to facilitate technology transfer.

Critical factors in the improvement of water distribution and use are also the efficiency of the institutional setting and the availability of appropriate infrastructure and adequate financial resources. Last but not least, it is worth mentioning the importance of policies determining an incentive system to optimize water utilization in terms of cropping pattern and to promote the adoption of modern technologies.

### 4.3. Drought and its Effects on Agricultural Production

Drought is a complex phenomenon and it is considered one of the most dramatic environmental problems recurrently affecting Syria. Its impact on agricultural production is particularly severe in rain fed areas. Considering that this counts for almost 75% of total cultivated land, its overall impact is dramatic. However, drought also affects irrigated areas as all irrigation sources are to various extents fed by rain. Livestock production is also seriously affected, as sheep graze on rangelands and on crop residues, and use mainly barley, which is essentially a rain fed crop, as complementary feeding. All these sources of feeding are dramatically reduced during drought.

The last wave of drought hit Syria in the period 1998-2000, and it was particularly severe during the agricultural season 98/99, especially in the northern, eastern and southern regions. Annual rainfalls dropped to levels never observed during the previous 25 years. Furthermore, the rainy season was short, starting later by more than a month and ending earlier than usual. Agro-climatic zones 3 and 4 (the area cultivated mainly with barley) and 5 (rangelands) were the most badly hit, so that production of cereals and forage was almost non-existent. Rainfalls distribution created additional problems in agro-climatic zones 1 and 2, which are the areas where wheat and legumes are grown. Temperatures were around the average for the year except few months, but temperatures above average by 3-4°C at intermittent periods during May and June 99 in some areas of the northeastern region had additional adverse impacts on the irrigated wheat yield. Moreover, reduced water availability affected ground water level and the spring and river discharge with impacts persisting over the following years.

The rangelands (Al Badia) cover around 8.2 million ha in Syria, and usually provide around 60% of the annual feed requirements for the sheep population. With the drought and the inadequate growth of forage plants, herders were forced to consume the complementary feeds offered by the government at subsidized prices at the beginning of winter. The Government distributed additional feeds to herders as soft loans and freely provided veterinary medicines and vaccines. However, herders incurred huge and, often, unrecoverable losses. Indeed, most of them accumulated huge debt, while sheep meat prices deteriorated, due to the increased supply deriving from the massive slaughtering.



## Chapter 5

# Agricultural Inputs

### 5.1. Introduction

One of the main objectives of Syrian agricultural policy is to ensure the availability of inputs to farmers through a comprehensive planning process involving different Government levels, from the center down to the Nahia<sup>8</sup> and extension units near the villages. Until 1986, the Government subsidized most inputs, such as pesticides, fertilizers, irrigation water and fuels, in order to stimulate agricultural production, and meet the national demand for food commodities. Different tools were adopted for subsidizing different types of inputs. For example, locally produced inputs, such as seeds, were sold at prices below their domestic cost of production, whereas imported inputs, such as some kinds of fertilizers or pesticides, were subsidized through an overvalued official exchange rate. Farmers received most inputs (such as fertilizers, seeds, and pesticides) through the Agricultural Cooperative Bank (ACB), as in-kind credit.

Although this policy succeeded in promoting the adoption of modern inputs, it imposed a huge burden on the State treasury as the Government financed the losses incurred by State agencies responsible for inputs production and distribution, such as the GOSM (General Organization for Seed Multiplication). Therefore, explicit inputs subsidization has been progressively removed, and in 2000 the residual net implicit subsidy to both farmers and public establishments could be estimated at SP 4.2 billion, including SP 3.2 billion accrued to farmers (Table 5.1). The Agricultural Bank still plays an important role in inputs' distribution as in kind credit, but there is an increasing involvement of the private sector in both import and domestic marketing of most inputs.

### 5.2. Seeds and Seedlings

The GOSM was established in 1970 as the public agency responsible for securing seeds and seedlings. GOSM produces the seeds for all strategic crops like wheat, barley, lentils, chickpeas, cotton, and sugar beet. Distribution takes place directly through its branches as well as through the ACB and, nowadays, through private traders. The latter also control importation of Hybrid seeds for vegetables, which are marketed through a countrywide network by private companies, which must be authorized by the Ministry of Agriculture and Agrarian Reform (MAAR).

GOSM production plan for each season is determined on the basis of the annual cropping plan, which states crops to be produced and seed rates to be adopted. Table 5.2 provides a comparison of planned and actual seed production.

Production of seeds for the most important crops over the period 1990-2000 shows very different trends for the various crops (Table 5.3). Wheat seed production has increased by 51.6%, while cottonseed increased by only 16.3%. The production of corn, barley, and potato seeds has actually decreased. In fact, wheat seeds represented 65.8% of the total seed production in 1990, and their share has climbed to 80.9% in 2000. More recently, from 1999 to 2000, cottonseed production decreased by 13.3% while potato seeds

<sup>8</sup> The Nahia is an administrative unit coordinating a few villages. Nahia are coordinated by Mantika, which are aggregated in Mohafazat (Governorates).

production increased by 3.4%. The GOSM reduced the production of cottonseeds, in response to the contraction of the cultivated area, and expanded the production of potato seeds to substitute the seeds previously imported from the Netherlands, which were affected by various pathologies. As result, in 2000 GOSM's production accounted for the following shares of national seed use: 66% for wheat, 107% for cotton (including stoking), 38% for potato, 32% for corn, and 8% for barley. It is noticeable that for some crops, notably for barley, farmers prefer the use of self-produced seeds.

The quality of the seeds produced by GOSM is tested and approved by its own quality control department. In the present system, private processors are not responsible for the genetic purity of their production, which is tested on the farmers' fields by the technical staff of the GOSM. Private processors are also not involved in germination, as they do not have access to adequate facilities.

According to Parthasarathy (2000), the unprofitability of the seed production sector is a major problem. Taking into account the cost of production at market rates and present prices, all seeds analyzed (hard wheat, soft wheat, barley, lentils, and chickpea) were recording a net loss of several SP per kilogram. This was reflected in GOSM yearly losses estimated at about SP 4 billion. One important reason is the large capacity of GOSM processing plants, which increases capital costs (about SP 80-90 million each). Moreover, taking into consideration the seasonal nature of the operation, which leads to unavoidable under-utilization of capacity, a system of smaller decentralized units seems to be a more practical proposition, also encouraging the participation of private entrepreneurs. (Parthasarathy, 2000)

Fruit tree seedlings are produced by private nurseries that distribute directly to farmers as well as by 70 state nurseries operating a combined area of 50,000 dunoms under the control of the Agricultural Affairs Department (AAD) of the MAAR. These seedlings are distributed to farmers directly and through the extension units at nominal prices that include a subsidy of about 50% (for instance, olive seedlings are sold for SP 13 when its actual cost is SP 25). The seedlings are sold both for new plantings and replacement. The objective of the subsidized supply backed up by soft loans is to encourage planting in hilly regions that constitute the largest part of the 500,000 ha reclaimed. Support is needed as most of this area is located in Zones 2 and 3 where rainfall quantity and reliability is low, frequent re-seedling is required, and the first yield takes 4 to 6 years, depending on the variety, while 10-15 years are needed to reach full productivity. As consequence of the drought, seedlings sold by the Government fell from six million in 1998 to 4.5 million in 1999, but in 2000, more than 11 million seedlings were produced and distributed.

The Government also encourages social forestry by supplying free seedlings produced in 40 nurseries coordinated by the Forestry Department (FD) of the MAAR. These seedlings are sold to public organizations at the very nominal unit price of 1 SP against an average cost of SP 15. The object of the program is to encourage community forestry, produce a green cover across the country, avoid wind erosion, and improve the environment. The plan is to cover about 24,000 hectares a year. Due to the non-profit nature of this activity, the participation of the private sector in the forestry sector is negligible.

### **5.3. Plant Protection Products**

Although detailed figures for the last few years are unavailable, experts estimate that market demand for plant protection products has been growing at 15-25% per year, corresponding to an increase from SP 1.124 million in 1997 to about SP 1.700 million in 2000. For the next 10 years, an annual growth rate of 7.5% seems to be a reasonable estimate (Parthasarathy, 2000).

The supply of these products involves both private and public sector. The private sector presence in the market for plant protection inputs has registered a steady growth resulting in a reversal of shares in favor of the private sector starting from 1987. The private sector is adequately organized to smoothly move goods from importer to the farmers through an articulated dealers' network. In broad terms, public procurement covers the strategic crops (wheat, barley, lentils, chickpeas, cotton, and sugar beet), while the private sector covers the non-strategic crops. As a result, public participation in import and distribution is concentrated in specific segments of the market, so that herbicides, especially for wheat, account for about 60% of the public sector share.

The local departments of agriculture through their extension units distribute hormones, attractants and trap devices freely. Distribution under special programs is also carried out through the ACB network.

While individual farmers are responsible for the protection of their products, the Government implements a pest control system on a community scale and takes responsibility for the protection of crops against migratory pests. Indeed, some insects cannot be controlled on an individual scale, as they require speedy and large-scale intervention capacity. Table 5.4 shows Government intervention in some cases of pest control. For example, the area treated with insect and weed pesticides increased by 5.6% and 181% respectively from 1990 to 2000. Conversely, the areas treated against spider and field mouse decreased respectively by 22% and 56% from 1990 to 2000. This was due to extension programs offered to farmers, which enabled them to protect their crops without public intervention.

#### **5.4. Chemical Fertilizers**

Only the Government carries out import, domestic production, and distribution of this kind of input. For that purpose, it uses a long and detailed planning process that involves several stakeholders and considers both the quality of the soil and the cropping patterns in each Governorate.

During the last few years, around 40% of the demand for nitrogen fertilizer and 50% of the demand for phosphate fertilizers has been met by local production (NAPC, 1999; and Parthasarathy, 2000). The exceeding demand for nitrogenous, phosphate, and potash fertilizers is met with imports, which are determined by the Fertilizers' Committee (FC), on the basis of estimated domestic production, and are carried out by the General Organization for Chemical and Food Products Import (GOCFPI). There has been an increase in the availability and consumption of all kinds of fertilizers, while the gap between planned and actual availability has been reducing (Tables 5.5 and 5.6). Imported and domestically produced fertilizers are delivered to the ACB for distribution to farmers as credit in kind, according to the quantities determined by the Bank itself, the MAAR, and the General Peasants' Federation (GFF).

From 1990 to 2000, the use of fertilizers increased by 63% for nitrogen, 24% for phosphor, and 79% for potash. This increase is the result of a) the expansion of the total cultivated area, particularly the irrigated area, and b) farmers' awareness of the benefits of fertilization.

In a recent study, an estimate of fertilizer demand was made, taking into account population and income growth, and expenditure elasticity. Plant nutrient requirements were translated into fertilizer types. Import needs were estimated for two possible scenarios. The first scenario assumed the current level of production at Homs. The second one assumed 90% capacity utilization. The difference between those two possible situations shows that

exploiting comparative advantage in producing nitrogenous and phosphoric fertilizers can bring about an annual saving of US\$ 50-70 million in foreign exchange, thereby reducing import dependence in the final year from 73% to 29%. (Parthasarathy 2000).

### 5.5. Feed<sup>9</sup>

The major sources of livestock feed in Syria are natural pastures and rangelands, cultivated greens and conserved feed, crop residues, crop products and by-products, agro-processed by-products, and slaughterhouse and hatchery residues. Grazing is the most important source of feed for ruminants. In the western higher rainfall zones it takes place on crop stubble and pastures on the borders of the cropping areas, while in the drier eastern areas the extensive rangelands provide the major source of grazing. As the livestock population increases and production intensifies, an increasing portion of the dietary requirements of ruminants are met with supplementary feeding, such as cereals, crops, and agro-processed byproducts. The main sources of animal feed can be summarized as follows.

*Green Feed:* The area used for green feed production is about 63,000 hectares. Most of the output comes from irrigated feed crops, predominantly barley. That area has increased only marginally since 1990, giving a small contribution to the livestock feed budget.

*Concentrates:* Barley, which is produced in dry areas, accounts for over 85% of cereal and legume grains sown for livestock feed. About 20% and 8% of the area planted with barley and wheat, respectively, is grazed as a standing crop. Crops that are not economically harvested are an important source of feed for ruminants in years of low rainfall.

*Crop Residues:* The main agricultural stubbles are wheat, barley and cotton. Cotton seed cake is a major source of supplementary protein to grazing animals. Wheat bran and straw are the most important crop residues/by-products used in livestock feed production.

*Agricultural Residues:* Agricultural residues consumed by livestock consist mainly of wheat and barley straw. It is customary to collect residues immediately after the harvest for stall and supplementary feeding during the dry season.

*Industrial Residues:* Only an estimated 30% of the residues from the processing of sugar beet, cotton, and peanuts are currently used as feed.

Due to the increasing intensity of animal production in all classes of livestock, the market for feeds and fodders is well developed in both the public and private sectors. The public sector procures, stores, and markets feeds and fodders through the General Establishment for Cereals Trade and Processing (GECTP) and the GEF. The cooperative sector, through the GPF, is the most important vehicle for distribution. Until recently, the major focus of public sector activities in the marketing of feed had been the provision of feed and fodders on concession. Sheep herders and participants in government-sponsored dairy and cattle development programs were the main beneficiaries of that policy.

The marketing of poultry feed is dominated by the private sector. Most of the inputs for the poultry industry are imported. Both the private and public sectors supply concentrate (grain) feed. The role of the private sector is mainly concentrated in the manufacture of poultry feed, which uses imported ingredients. Cattle and sheep feeds are produced from local

---

<sup>9</sup> This section owes much of its content to Cummins (2000).

ingredients. Three factories belonging to the GEF produce pellets and mixed feed for cattle and fish.

Estimates of the availability of feed are about 8.9 million tons of dry matter per year. Based on 1998 livestock population and production data, estimated demand is about 10.7 million tons. The deficit in livestock feed is expected to grow in the future, given that the gap between domestic production and livestock sector demand is widening. If the sheep population remains unchanged at its estimated level of 15 million and the other animal populations maintain their present rates of growth, demand for livestock feed dry matter will increase to 11 million tons by 2010. This implies an increase of 24 percent over the current domestic level of feed and feed production

Table 5.7 illustrates the development of the GEF activities between the years 1990 and 2001. Purchasing, selling, and manufacturing increased by 37.4%, 46.3%, and 87.6%, respectively, while imports and exports were nil after 1999. This is explained by an increasing involvement of the private sector in feed trade, which is more responsive to changing profitability of international trade according to prevailing conditions on domestic markets relative to international ones. Indeed, imports by private operators increased from 458,188 tons in 1990 to 1,679,824 tons in 1999, when the private sector currently distributed twice the quantity supplied by the GEF.



## Chapter 6

# Agricultural Production

In a country like Syria, characterized by a fast growing population, limited natural resources, and difficult climatic conditions, it is essential to conjugate efficiency and sustainability in the use of the available resources in order to ensure sustainable economic development. In agriculture, this requires production policies based on the assessment of the marginal productivity of the resources, especially land and water, in order to ensure maximum economic return to resources while preserving their productivity.

Accordingly, Syrian production policies aim at achieving the highest possible output from the available resources at the minimum possible cost by a) avoiding losses as well as bottlenecks at the farm, local, and national levels, and b) realizing the optimal integration between plant and animal production. These objectives, combined with the constraints emerging from regional and international agreements, require that Syrian farmers and Government orient their choices toward higher competitiveness and sustainability.

In this chapter performance of agricultural production is documented at the aggregate level in terms of production value and value added, and in more detail for crops (considering cultivated area, yields, production and geographical location), animal products and wood.

Self-sufficiency ratios are provided for major food staples.

### 6.1. Value of Agricultural Production, Value Added, and Productivity

The aggregate economic result of agricultural activities is reflected in the gross value and value added of agricultural production, which also allow calculation of summary indicators of productivity. These are summarized on Table 6.1, which also shows the desegregation of values by plant and animal productions as well as the value of intermediate consumption, i.e., purchases of inputs used in agricultural production.

The table shows that over the period 1995-2000 agricultural production at constant prices of 1995 increased by 24%. The growth was faster for animal products (+27.5%) than plant products (+23.1%), so that the former increased its contribution to the value of gross agricultural production at purchaser's (market) prices of almost one percentage point. The improvement was remarkable over the last available year (1999-2000), reflecting the production recovering at the end of the drought. The impressive performance of plant (+14.6%) compared to animal production (+3%) reflects the different extent to which the two sub-sectors were affected by the drought.

Efficiency improvements are clearly pointed out by the increase in land productivity measured in terms of gross value of production (24.1%) and value added (+25.9%) per ha. The difference between the two indicators is due to the intermediate inputs use growing less than production. This is reflected in a growth of value added (+25.9%) higher than in gross agricultural output, which can be interpreted as a result of improved efficiency in the use of purchased inputs. In short, over the period 1995-2000, the performance of the agricultural sector has improved in terms of both value and efficiency of production.

## 6.2. Crop Production

The main elements to assess crop production are area, yield, and output. Each one will be discussed on the national and governorate levels. At the national level, crops were classified into main groups: cereals, legumes, feed, vegetables, and fruit. At the governorate level, only main crops were considered.

In order to expand production, the cropping area can be expanded both horizontally and vertically. Horizontal expansion indicates the enlargement of the area actually cropped. This alternative is very limited in Syria because after the increase of the cultivated land realized in the past decades, further expansion can only take place on marginal land. The other alternative is vertical expansion, i.e. increasing the output per unit of land. This can be achieved by adopting optimal production mix, a better integration between plant and animal production, and improved technologies.

To increase productivity, the Government is implementing indicative planning trying to maximize the country's comparative advantage. It is using mathematical modeling of crop compositions, taking resource scarcity as well as possible environmental impacts into account. At the national level, cropping is carried out on irrigated and non-irrigated land. Thus, increased efficiency requires raising the effectiveness of cultivation on both systems, taking into account the trade-offs between them. For this reason, the Government tries to transform rain-fed areas into irrigated ones, whenever possible.

### 6.2.1. Area

Tables 6.2-6.5 trace the development of the irrigated area and the crop composition for the period 1990-2000. The irrigated area cultivated increased from 825,677 ha in 1990 to 1,334,265 ha in year 2000<sup>10</sup>. This enormous increase (62%) has allowed the expansion of production, its diversification, and the increase of employment opportunities in rural areas.

The irrigated area devoted to wheat increased dramatically: from 274,179 ha in 1990 to 694,469 ha in 2000 (+153%). This means that the wheat share in the crop composition (Table 6.4) increased from 33.2% in 1990 to 52.0% in 2000, corresponding to a growth of 57%. This group includes two strategic crops, i.e. soft and durum wheat. The area of soft wheat increased by 23 times, from 13,209 ha (1.6% of irrigated area cropped in 1990) to 318,037 ha (23.8%), while the area devoted to durum wheat increased by only 44%, from 260,970 ha (32%) in 1990 to 376,432 ha (28%) in 2000.

Quite relevant is also the expansion of the irrigated areas devoted to industrial crops: from 217,839 ha in 1990 to 323,828 ha in 2000 (49%), but their relative importance reduced by 8% remaining close to one-fourth of the total irrigated area. Area planted to summer crops was reduced because of its high water consumption. The most important industrial crops are cotton and sugar beet. In 1990, 21,444 ha were devoted to sugar beet and 156,358 ha to cotton. These areas increased in 2000 by 28% for sugar beet and 73% for cotton. The third most important industrial crop under irrigation is peanut, which in 2000 occupied more than 10,000 hectares, but in slight decline.

A smaller expansion was registered for the irrigated area devoted to fruit trees (Table 6.3), which covered 114,060 ha in 1990 and currently covers 120,215 ha (+5.4%). However, the relative importance of fruit trees on total irrigated areas fell by more than one third from 13.8% in 1990 to 9% in year 2000 as result of the restriction of these trees planting to the

---

<sup>10</sup> Note that the cropped irrigated area is larger than the available irrigated area (see data on land use in chapter 1) because more than one crop can be cultivated on the same land in some regions for selected cropping patterns. Other minor discrepancies between data on cropped areas (irrigated and rain-fed) might have resulted from the counting and aggregation process.

reclaimed hilly and mountainous areas. The most important fruit trees receiving irrigation are olives, with almost 29,000 ha and citrus, with 27,338 ha in 2000.

Overall, in 2000, wheat, cotton and sugar beet used almost 75% of the available irrigated area. Wheat (soft or durum) occupied more than half of the irrigated land in 2000, compared to less than one third in 1990. The increase absorbed a substantial part of the irrigated area expansion, so that all other crops reduced their importance. In particular, the irrigated area devoted to vegetables (Table 6.3) decreased from 101,478 ha in 1999 to 87,508 ha in 2000 (-13.8%), as result of a decreasing trend prevailing since 1995 and the increase in yields due to the use of improved varieties. Almost all crops in this category show a negative trend, with the exception of green peas (+133%), musk melon (+217%), pumpkins (+78%), okra (+52%), and garlic (+51%). Tomatoes and potatoes are the most important commodities in this group, showing two opposite variations: irrigated areas to tomatoes decreased by 19.4%, whereas potatoes increased by 6%. In relative terms (Table 6.5), the evolution is similar, with the vegetable group reducing by 46.6% its relative importance in terms of irrigated area cropped (from 12.3 to 6.6% of the total).

Irrigated area devoted to legumes also decreased (Table 6.2) from 8,336 ha in 1990 to 7,271 ha ten years later (-12.8%), causing their share in crop composition to fall from 1% to 0.5% in 2000. The major crops in this group are haricot and broad beans, followed by chickpeas and lentils. Importance on irrigated land increased only for chickpeas (+663% since 1990), while lentils show a tendency to recover during recent years.

The area devoted to irrigated feed (Table 6.2) decreased from 109,785 ha in 1990 to 100,974 ha in 2000 (-8%), after a peak above 130,000 ha in 1995. Consequently, the relative importance of this group has declined in 2000 up to 7.6% (Table 6.4). The major crop grown for feed is maize, whose relevance has decreased from 60,151 ha (7.3% of total irrigated area) in 1990 to 55,310 ha (4.1%) in 2000 due to the prevention of intensive cropping in well-irrigated land. The importance of irrigated barley as feed is variable, but shows an overall increasing trend over the period.

With respect to rain-fed agriculture, Tables 6.6-6.9 show the development of the area cultivated and the relative importance of each crop for the period 1990-2000. The rain-fed area decreased from 4.8 to 3.4, million ha between 1990 and 2000 as result of the complete ban of cultivation in Al Badia and the prohibition of intensive cropping in the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> agro climatic zones (Table 6.7).

Fodder is the most important group of products in terms of rain-fed land use. Indeed, despite its share decreasing from 58 to 42% of total rain-fed land, it still used almost 1.4 million ha in year 2000. The single most important crop is barley, which was cultivated over more than 1.3 million ha in 2000 (-52% compared to 1990). Conversely, green fodder production area expanded by almost 44% between 1990 and 2000, but still occupies only 42,233 ha (1.3% of total cultivated rain-fed land).

Second in terms of cultivated area is wheat, which occupied 984,328 ha, corresponding to 29.4% of the rain-fed land cultivated in 2000, down from 1,066,418 ha (22.2%) in 1990. In particular rain-fed land cultivated with soft wheat increased in share by more than 26%, whereas durum wheat fell by 24%.

Area cultivated with legumes has increased by almost 11% from 203,221 ha in 1990 (4.2% the area) to 225,155 ha (6.7%) in 2000. Traditionally, this group has been dominated by lentils, but during the last decade the importance of chickpeas has substantially increased (+44.9%).

Fruit trees are increasing their importance also on non-irrigated lands, from 634,825 ha in 1990 (13.2% of rain-fed area) to 677,424 ha (20.2%) in 2000. In this group, olive trees

clearly occupy the leading position (almost 450,000 ha in 2000 and a continuing growth), followed by grapes (59,000 ha), pistachios (56,000 ha), almonds (41,000 ha), and apples (32,500 ha). Diverging trends can be observed, with some species in sharp reduction and others with good performance over time.

Industrial crops, including some spices, still occupy only slightly more than 1% of the total rain-fed area, despite their expansion from 27,070 ha in 1990 to 43,840 ha in year 2000 (Table 6.6). In this group, the dominant crop is cumin with about 25,500 ha cultivated in 2000, as result of an expansion of almost 5 times over the last decade in response to an increasing demand for export. It was followed by tobacco, which is relatively stable on about 10,000 ha. Aniseed and black cumin occupy a limited area but it is worth noticing their rapid expansion.

Vegetable production on rain-fed land has sharply decreased (-50%) from 62,628 ha in 1990 to 31,319 ha in year 2000. All crops show a negative trend (Table 6.7), with the exception of the sub-group classified as "others," which includes medical herbs and other spices

Combining the data about irrigated and rain-fed agriculture (Tables 6.10-6.13), it is possible to observe that cultivated areas expanded for wheat (+25%), industrial crops (+50%), legumes (+10%), and fruit (+6.5%) and contracted for feed crops (-49%) and vegetables (-29%).

### 6.2.2. Yields

Significant improvements in yields of many crops have been registered over the last decade as the effect of three main factors: 1) the use of improved seeds, taking into consideration the weather conditions in the various governorates; 2) the increased and improved use of water; 3) the improvement of extension and research services.

Yields have improved on both irrigated and rain-fed crops. However, fallbacks have resulted from the drought of the few last years. Tables 6.14 and 6.15 illustrate the development of the yield for irrigated crops through the period 1990-2000. Yield increases that are worth to be mentioned are the ones of soft wheat (+58%), chickpeas (78%), sorghum (+133%), sugar beet (+117%), tomatoes (+129%), and almonds (+131%). Only in few cases the evolution has been negative, and it can be mainly explained by the impact of the drought. Still, in many cases yields are far from being at their possible maximum. Moreover, some increases were only made possible by the use of costly or scarce inputs, such as water.

Tables 6.16 and 6.17 provide data for the yields of rain-fed crops. They show a different scenario, much more affected by the scarcity of rainfall that has characterized this last period. The yield of main rain-fed crops actually decreased. This is the case for soft and durum wheat (-31%), barley (-51%), lentil (-29%), maize (-41%), and haricot beans (-100%). The yields of other crops have increased: cumin (+250%), dry broad bean (+84%), millet (+55%), and chickpeas (+22%). Fruit trees without irrigation have generally performed positively, with an impressive performance of almonds (+229%). The only exceptions are apricots (-34%), peaches (-23%), apple (-20%), and plums (-19%).

### 6.2.3. Production

The combined effect of land use and yield developments is reflected in the production trends summarized in Table 6.20 and 6.21 for totals of rain-fed and irrigated cultivation in the period 1990-2000. Impressive progresses are registered over the decade for almost all strategic products. Wheat production increased by 50% as a result of dramatic growth in

soft wheat (+316%) production, accompanied by a reversal of durum wheat production, which returned to the 1990 level after the impressive growth registered in 1995. Sugar beet increased by 179%, cotton by 145%, tobacco by 99%, and chickpeas by 78%. Conversely, for the other two strategic products, barley and lentils, production contracted by 75% and 34%, respectively, even though reduced production of dry barley was at least partly compensated by the increase of grazing barley (+23%), accompanied by the rapid growth of other fodders.

Trends registered for vegetables highlight the variability and adaptability of cropping patterns for these products. Indeed, the rapid growth of products such as green peas (+144%), tomatoes (+75%), pumpkins (+63%), dry garlic (+63%), potatoes (+22%), and lettuce (+19%), was accompanied by the decline of many other, and a diversification highlighted by the rapid growth of the category "other products" (+66.7%), mainly including vegetables traditionally not grown in Syria.

Fruit production registered a positive trend, with a rapid expansion of those traditionally grown on large areas, such as citrus (+121%), olives (+88%) and apple (+40%), and others which have traditionally occupied only limited areas, such as almonds (+381%), pistachios (+208%), cherries (+190%), and pears (+50%). Conversely, production contracted for peaches (-36%), plums (-39%), green plums (-49%), and, slightly, for grapes (-3%).

Tables 6.22 and 6.23 provide an overview of the development of production in irrigated areas. They reflect the positive development registered for strategic crops, such as wheat (162%), and particularly soft wheat (+3,701%), chickpeas (1,257%), sugar beet (179%), cotton (145%), tobacco (+125%), and barley (38%), but also for vegetables and fruits such as olives (240%), citrus (121%), muskmelon (+453%), and green peas (+162%). For many other crops, the evolution was not so remarkable, due to contraction of area and/or poor harvest. Only in few cases, a contraction of total output in irrigated conditions was recorded.

The evolution of the total output of rain-fed crops has been quite variable (Tables 6.24 and 6.25). It was severely affected by the recent drought season so that the negative long term production trends registered for crops such as durum wheat (-48%), dry peas (-43%), barley (-76%), lentils (-33%), and sunflower (-31%), should be assessed considering the negative performance of recent years, which also guided the reallocation of land use. However, a positive trend prevailed for crops such as cumin (+1,901%), grazing maize (+284%), and chickpeas (+76%), as well as fruits such as almonds (+412%), cherries (+249%), pistachios (+197%), and olives (+82%).

#### 6.2.4. Area, Yield, and Production by Governorates

As it has been described in Chapter 1, Syrian landscape is not homogeneous and there are marked differences in agro-climatic characteristics, reflected in a variable distribution of agricultural production over the various regions. This geographical differentiation is documented in Tables 6.26-6.39, which trace the development of area, yield, and production for the period 1990-2000, disaggregated according to the classification by Governorates adopted for agricultural planning. A brief overview for most relevant products is provided in the following paragraphs.

*Wheat* is the most important winter crop. Due to its importance for national food security and the lack of alternative crops, it has been cultivated wherever possible, without fully taking into account its competitiveness. Wheat can be cultivated in irrigated and rain-fed areas, as tables 6.26 and 6.27 show. Table 6.26 contains data related to irrigated wheat during the period 1990-2000. The most important production areas are located in Al-Hassake (42% of the area and 38% of the production in 2000) followed by Aleppo, Al-

Raqqa, Hama, and Ghab. During the period 1990-2000, the cultivated area increased dramatically (155.3%), except in G.A.D.E.B. Table 6.27 includes data for rain-fed wheat, which is even more concentrated in Al-Hassake and Aleppo, followed by Idleb, Dara, and Homs. It is worth noticing that 87% of the area devoted to wheat in 2000 was concentrated in Al-Hassake, compared to a share of 55% of production. Other regions demonstrate higher efficiency in land use, as shown by yields for both rain-fed and irrigated wheat.

*Barley* is by far the most important rain-fed crop in terms of cultivated area, occupying 39% of non-irrigated land in 2000, down from 58% in 1990. It is a very important source of animal feeding and is mainly cultivated in agro-climatic zones 3 and 4. As shown in Table 6.28, about three quarters of the cultivated land is concentrated in Aleppo (34%), Al-Raqqa (23%), and Al Hassake (19%), but it is also important in Hama, Homs, and Idleb. As all rain-fed crops, its production was seriously affected by the drought of the late 90s, so that the yields registered in 2000 were still below the long-term increasing trend. Moreover, high dependency on weather condition is reflected in high yield variability among regions.

*Lentil* is both staple food and an export commodity. They are cultivated both as rain-fed and irrigated crop. However, cropping area for the latter is insignificant (see Tables 6.4). Table 6.29 shows that rain-fed lentil is mainly cultivated in Aleppo and Al-Hassake, followed by Idleb and Hama. However, over the last ten years cultivated area almost halved in Al-Hassake (-50%) and increased by 59% in Aleppo. Furthermore, there was a dramatic yield decrease in Al-Hassake as result of the drought (from 1,236 kg/ha in 1990 to 193 kg/ha in 2000). This was partly compensated by the yield improvements registered in both Aleppo (from 542 kg/ha to 870 kg/ha) and in Idleb (from 293 kg/ha to 966 kg/ha). As a result, in 2000 more than three quarters of total lentils were produced in Aleppo (51%) and Idleb (26%).

Similarly to lentils and barley, *chickpeas* are cultivated almost exclusively on rain-fed land. Table 6.30 shows that production is concentrated in Dara (counting for 32% of land allocated to this crop), Sweida (24%), Aleppo (22%), and Idleb (11%). Except for Sweida, in all these regions cultivated area has been growing quite fast, as it has been the case for areas where chickpea was traditionally less relevant, such as Quneitra, Hama, and Homs.

*Cotton* (Table 6.31) is an irrigated summer crop and has traditionally been very important as a source of employment opportunities, export revenues as well as source of raw materials stimulating domestic industrial activities. Cultivated area is mostly located in Al-Hassake (36%), Al-Raqqa (24%), Aleppo (14%), and Deir-Ezzor (11%), which counted for more than 85% of total production in 2000. The large increase in cultivated areas registered over the last decade (+73%) took place in all these regions, and was particularly rapid in Al-Raqqa (+122%) as well as in Idleb (+381%) and Ghab (+100%). Increase of the cultivated area was accompanied by significant improvements yields registered in almost all Governorates. In 2000, higher yields were registered in Idleb and Al Hassake. As a result, the latter counted for almost 40% of national production.

*Sugar beet* (Table 6.32) is another important irrigated crop, whose production is mainly motivated by the need to supply input for national sugar factories, despite its domestic production being often uncompetitive at international level. Almost one third of cultivated area and production for the year 2000 was registered in Ghab. Also important are Aleppo (17% of total cultivated area), Al-Raqqa (14%), Deir-Ezzor (13%), and Hama (9%). Over the last decade, cultivated area has expanded quite rapidly in Idleb, while an opposite trend was registered in Homs.

*Potatoes* have traditionally been cultivated on irrigated land and in rain fed land with high rain fall, but as shown in Tables 6.7 and 6.9, rain-fed cultivation has been declining and is now almost insignificant. The cultivation under irrigation (Table 6.33) expanded, registering significant improvements in yield, reflected in improved profitability and growing export. Irrigated potatoes cultivation is concentrated in Homs, Hama, Ghab, Idleb, and Aleppo. Area planted has been decreasing in the first three Governorates and concentrating in Idleb and Aleppo, which produced almost half of national production for 2000, occupying a similar share of the total land cultivated under irrigation.

*Tomatoes* are mainly cultivated on irrigated land (Tables 6.5 and 6.9), occupying only 0.1% of the cultivated rain-fed area. However, as shown in Table 6.35, during the last decade also the area cultivated under irrigation has decreased. Nevertheless, production has almost doubled (+85%) as result of the use of improved seeds that led to a significant improvement in yields, accompanied by a changing geographical distribution of production. In particular, the costal areas (Tartous, Lattakia), while reducing their share on area cultivated from 58% to 30%, increased their production by more than 70%, maintaining a share on national production close to 50%. Also important is Dara with 19% of the area cultivated under irrigation and 20% of production, followed by Aleppo and Al Hassake. In these three Governorates, and especially in Aleppo, cultivated area expanded, while yield improvements are not comparable to what has been registered in Tartous, thanks to the exceptional expansion of cultivation in greenhouses.

*Olives* are the most important tree grown in Syria, with 478 thousand ha planted in 2000. It is an important source of employment and income for the rural population, and contributes to activate a large processing industry, which is trying to penetrate the international market. As olive trees are mainly planted on rain-fed land (more than 95% of planted area), they also contribute in protecting the environment in hilly areas. Table 6.36 shows that the rain-fed area planted increased by 19% over the last decade, from about 379 ha to 449 thousand ha. Almost 80% of it is located in Aleppo (35%), Idleb (24%), Tartous(13.6%), and Lattakia(7.7%). Olive tree plantation has been rapidly expanding in Homs, Hama, and Ghab, while it is virtually non-existent in Raqqa, Dair-Ezzor, and Hassake. Due to positive yield development and increased number of producing trees, production has grown much faster than area planted (+82%). Table 6.35 shows that irrigated olive tree cultivation grew very fast in terms of both area (+131%) and production (+240%), especially in Aleppo, where it was virtually non-existent.

*Citrus* trees are mainly planted on irrigated land. Tables 6.37, 6.38, and 6.39 show the development of total citrus, lemon, and oranges. Citrus production is concentrated on the costal area, where almost 97% of the irrigated area is located, and particularly in Lattakia. Production has grown very quickly (121%) as result of positive yield developments. Lemon planting has been expanding in the costal region as well as in Ghab, while area planted with oranges tended to contract in Tartous and to expand in Homs, Hama, and Lattakia.

### 6.3. Animal Production

Livestock and animal productions constitute a very important component of the agricultural output, an important nutritional source, a form of saving, and contribute to improve farming efficiency when optimal integration between plant and animal production is achieved. Moreover, sheep breeding plays a central role in the subsistence and social organization of the Bedouin population.

Table 6.40 provides an overview of herd development for most animals over the last decade. The large sheep population, mainly located in Al-Badia, shows a trend that is periodically inverted by the recurrent droughts. In particular, it has declined by almost one third in the year 1999, resulting in a slight decline over the entire decade, despite the important growth registered in 2000. Also relevant is the goat population, which shows a more regular growing trend (5% in the decade). Apart from buffalo, which is limited in size and geographically concentrated in Ghab, the faster growing animal population is cattle (+25%), which is approaching one million heads. Poultry population grew by 4.5% in the last decade, being bred in public establishments as well as by large private companies and individual farmers.

From Table 6.41 it can be seen that there is a positive trend for almost all types of animal production. Over the decade, cow milk production increased by 50% and meat output has grown by almost 46%. Sheep meat production increased even more (62%). Very positive results have been achieved also by the poultry sector for both eggs and meat.

Table 6.42 depicts the evolution of animal productivity, which has generally been positive, with the exception of cow (both foreign and local) and sheep milk. These poor results have been compensated by the good performance of the "improved cows" category, leading to a total average increase of milk productivity, estimated at 8%. The average egg productivity increased from 153 eggs per hen in 1990 to 180 eggs in year 2000 (+17%). Table 6.43 shows that cow milk production trend is positive (at national level in most Governorates) and that the major production areas in 2000 were Damascus, Homs, and Dair-Ezzor.

Table 6.44 shows that cattle meat production increased by almost 50% over the last decade and that major producers are again located in Damascus, Homs, and Dair-Ezzor. It can be seen that the production growth was impressive in Idleb (+212%), Homs (178%), and Quneitra (173%), and that a positive trend prevailed in most Governorates.

Sheep milk production (Table 6.45) takes place in almost all Governorates, and especially in Homs, Aleppo, Hama, Al-Hassake, and Al-Raqqa. The aggregate production trend is negative and widely differentiated among different Governorates. Moreover, it should be mentioned that traditional technologies, often inefficient and unsafe, prevail in storage, collection, transportation, and processing. Sheep meat is a core element of the Syrian diet. Its production (Table 6.46) is scattered all over the country and is characterized by a widespread increasing trend, partly resulting from the reduced size of the flocks. Increases in production were larger in G.A.D.E.B. (+248%), Sweida (+345%), Damascus (+227%), Dara (+176%), and Lattakia (+109%).

Also chicken meat production (Table 6.47) is spread over many Governorates, especially in areas close to the largest towns. The production trend is positive at the aggregate (+78%) and local level. Growth has been remarkable in Homs, Hama, Idleb, Al-Hassake, and Tartous. Since this kind of meat is cheaper than cattle and sheep meat, it represents an especially important source of animal proteins for the lower-income population.

Eggs production registered a very positive development (+68%). More than one third of the production is concentrated in Damascus, while Homs and Aleppo have share of 17% and 13%, respectively (Table 6.48).

Another potentially important source of animal protein for nutrition is *fish*. Table 6.49 shows data on fish production over the last decade, distinguishing between marine fish, capture in inner waters and fish farming, and the contribution of the various sectors (public, private and co-operative). Production increased in the aggregate (+71%) and particularly in fish farming (+109%), where growth has been concentrated in the private sector. Fish catch in inner water has registered the slower growth (+27%), and a reduced role of the private

sector in favor of the co-operatives. Table 6.50 shows that the three types of production are geographically concentrated: marine catches in the coastal areas (especially Lattakia), farm fishing is concentrated in Ghab (where a large number of private enterprises have developed on the Orontes river, while catches on inner waters are concentrated in Al Raqqa where the Assad Lake is located).

#### **6.4. Wood Production**

Three products derive from forest exploitation: industrial wood, fuel wood, and charcoal. Due to the limited extension of woodlands in Syria, they do not constitute a very relevant economic activity. In some areas they generate relevant employment opportunities and provide raw materials for the small timber industry.

Table 6.51 shows that industrial wood production is concentrated in Lattakia (55%), Tartous (29%), and Homs (6%) and that an impressive improvement was registered over the period 1990 to 2000: from 7,236 tons to 33,717 tons (+366%). Production of fuel wood (Table 6.52) and charcoal (Table 6.53), being largely complementary to industrial wood, follows a similar geographical pattern. However, production trends are opposite. Fuel wood output decreased from 23,249 tons in 1990 to 8,551 tons in 2000 (-63%), while charcoal output decreased from 5,811 to 3,355 tons (-42%). It is noticeable that a relevant share of charcoal production takes place in Aleppo and that rapid growth took place in Homs.



## Chapter 7

# Food Industry

Food industry contributes in many ways to the development of a modern agro-food sector. It enhances incomes by adding value to raw agricultural products. It promotes modernization of the farming systems in terms of technological innovation (crop produced and cropping technologies) as well as in terms of relations with the market (coordination and integration among the farmers and between farmers and other agents). Moreover, it responds to consumers' demands for variety in type and quality of food and contributes to smooth out seasonal variability of food supply, reducing its negative price effects on consumers and farmers. Finally, food processing activities provide labor opportunities, reducing migration from rural areas if they are located close to agricultural production areas.

Syrian food industry is composed of three sub-sectors according to their different ownership: the State-controlled, the private sector, and the joint-venture companies. In the 70s, the Syrian government encouraged both the agricultural sector and the food industry to cover the increased demand for food. In that period, the main purpose of public sector companies was to complement the small private sector in transforming the surplus of agricultural production into processed products, and to establish the infrastructure required for the industry.

During the 90s, the expansion of public sector processing capacity was accompanied by the promotion of private-sector participation, especially through investment Law no. 10/1991, so that the public sector had to face private competition in an increasing number of sub-sectors with positive effect on the overall efficiency of the food processing industry.

### 7.1. Public Food Industry

The General Organization for Food Industries (GOFI), part of the Ministry of Industry, affiliates 22 companies corresponding to 27 factories in several food chains. It deals with processed fruit and vegetables, oil, dairy products, biscuits, pasta, dried onions, sugar and sweets, water, beer, and spirits. All these companies were established or nationalized during the 60s and 70s, and most of them operated as state monopolies in the relevant market segments until 1991.

The public food industry strictly applies the Syrian specification for food products and its main customer is the public sector. Consequently, public companies do not invest in marketing and the development of new products. Indeed, only two of them introduced new products in the last five years and only one carried out promotional activities other than participation in expositions and common advertising organized by the GOFI. Only recently, due to progressive market liberalization, these companies were assigned responsibility for selling their product, so the management started facing market competition and the problems deriving from the lower flexibility and higher costs compared to private sector companies.

Table 7.1 shows the distribution of public food-processing companies according to governorates and sales. The dominant public firms are involved in the processing of sugar, oil, milk, jams, and beverages. Table 7.2 shows that there has been an increase in capacity

utilization for almost all factories in 1999-2000, but that underutilization is still widespread, as for the plants processing peanut and apricots.

The most important public sector industry operates in sugar beets processing with quite high revenues (Table 7.3). Second is the cottonseed processing with two companies located in Aleppo and Hama. Table 7.4 shows the evolution of quantities processed (an increase of 36% from 1990 to 2000) and output produced for all main products, except hydrated oil.

In the dairy sector there are three public companies, which produce sterilized and pasteurized milk, yogurt, cheese, butter, ghee, and labneh. They are located in Damascus, Homs, and Aleppo and their annual capacity is 12,500 t, 8,000 t, and 11,000 t, respectively. The possibility to expand the capacity of the Damascus Company to 33,500 tons is presently being considered.

Other public food industries produce conserves, with six plants mainly involved in tomatoes, green peas, and apricots processing (Table 7.5). Beverages are produced in Al-Sweida and Homs in plants counting on an annual capacity of 11,000 t each.

## 7.2. Private Food Industry

According to information supplied by the Ministry of Industry and the Investment Commission, total registered food firms in 2000 were 3,234, out of which 327 were approved under law No.10/91 (Table 7.6). It can be seen that olive oil manufacturing plays an important role. Among these firms, there are many small and medium-size units, especially in traditional industries like bakery, sweets, oil, and beverage. They are intermediaries between market leaders and the typical "informal" sector. Moreover, 26% of the companies are partly or totally financed by foreign capital.

Despite their generally limited size and their recent establishment, private food firms are very active in the export market, with a dominant position in some key sectors like dairy products, olive oil, vegetable oil, processed fruits and vegetables, and sweets. The evolution of the licensed production capacity for processed fruit and vegetables and for dairy products confirms the dynamic phase characterizing private food companies, whose capacity is rapidly growing.

The most important private industry is dairy processing, where modern plants compete with a large number of traditional and home processors that still transform most part of the raw milk. Information on private sector production is not available. Table 7.7 summarizes information on total milk, dairy, meat, and other animal products. During the period 1990-2000, milk production increased by almost 26%, mainly as result of a 50% increase of cow milk. This is estimated to have allowed significant development of all cow milk based products, especially cheese (+123%), yogurt (+59%) and ghee (+46%). Slaughtering houses' activity significantly increased, as indicated by the increases of beef (+46%) and sheep meat (+62%) production.

Another industry that is important for its influence on farmers' income is olive milling. Indeed, preserving olive and olive oil price levels in presence of a rapidly growing olive production will require a significant growth of export during the coming years. This, in turn, requires a modernization of olive oil milling and marketing able to enhance competitiveness on foreign markets of the Syrian production. Significant investments in milling have increased the number of olive presses, which is currently estimated to be 808. Out of them, 201 are modern central presses and 546 are modern hydraulic presses, with an estimated milling capacity of 11,733 t in 24 hours. The number of pirine plants, which process the by-product of the milling plants mainly producing soap, amounts to 25. Table 7.8 review

production and utilization of fruits during 1990-2000, showing that production of olives has increased by 88%, resulting in an increase of olive oil production of 98%. Domestic production of other vegetable oils (cotton seed oil, soybean oil, sun flower seed oil, coconut oil, etc.) has increased in recent years, so that nowadays 35 plants with a total processing capacity of 403,000 tons operate in Damascus, Aleppo, Idleb, Homs, Hama, and Tartous.

For other fruit processing, Table 7.8 shows a significant increase of grape processing (wine, molasses, and resin) despite the reduced production of grapes. Conversely, processing of apricot and figs has reduced in all cases, except dried sheets and fresh apricot marmalade.

### **7.3. Joint-Venture Food Processing**

Two types of joint-venture processing companies have been established in Syria. The first type involves the Government, normally contributing with 25% of the capital, and private investors. The second type is the result of the co-operation between the Syrian Governments and various foreign agencies, aiming at developing production and promoting employment opportunities. Under the first type of joint venture, seven companies are presently operating with a capital of SP 1,045 million on 7,214 thousand hectares. This type of company comprises agricultural production and processing. Main products are conserves, dried sheets, cheese, sweets, and ready food like chickpeas and broad beans. In the second group, three companies are presently operating in the production of milk, yogurt, and cheese. The biggest processor among them is the Syrian-Finnish company, with an annual milk processing capacity of 1,700 tons.

### **7.4. Employment in the Food Industry**

According to information supplied by the Investment Commission and the Ministry of Industry, the number of total employees in food processing is 28,072, out of which 8,024 are employed in the public sector and 20,058 in the private sector. On average, state food companies employ about 230 workers, from a minimum of 77 to a maximum of 1,238, while private companies have an average of six employees, from a minimum of one person to a maximum of 58 people.



## Chapter 8

# Agricultural Support Services

The public sector, and particularly the MAAR, provides the largest part of the agricultural support services, including agricultural research; extension, training, veterinary care, and pest control. Under the broad heading of agricultural services are usually also included the agricultural and rural improvements executed by the MAAR such as construction of agricultural roads, land reclamation, tree planting, and forestation. These are partly financed by the public sector, e.g. rural roads, and partly by the private landowners, receiving long term credit from the ACB, for improvements such as land reclamation and tree planting.

However, delivery of agricultural services also involves the cooperative and private sector. For example, the GPF provides the agricultural cooperatives services with input distribution, credit, and output marketing. Private sector is involved in the production and distribution of veterinary medicines and vaccines as well as in the provision of chemical inputs. The Agricultural Chambers delivers to its associate, mainly private farmers and other entrepreneurs operating in agriculture, various services aiming at improving their production and marketing abilities, such as dissemination of information, marketing extension and promotion, livestock insurance, etc.

This chapter provides an overview of the main services provided by the public sector and especially by the MAAR.

### 8.1 Agricultural Research

The General Commission for Scientific Agricultural Research, established under Law no. 42 of 2001, coordinates agricultural research in the country and directly undertakes basic, applied, and adaptive research in both crops and animals. The general commission is articulated in 7 directorates carrying out research on Natural Resources, Crops, Horticulture, Cotton, Plant Protection, Livestock, and Economic Research.

In the field of plant production research, about 600 researches are implemented every year through 40 experimental stations in collaboration with international research institutions. Main results achieved in recent years include the following:

- I. 15 high yielding hard and soft wheat varieties presently cultivated in different regions according to their water needs, which increased irrigated yield from 1.9 ton/ha in the 70s to 3.8 ton/ha in 90s, and rain-fed wheat yield from 0.7 to 1.5 ton/ha;
- II. 7 high yielding varieties of cotton increasing yield from 1.6 ton/ha in the 1970s to 3.8 in 1990s. Moreover, colored cotton was produced successfully;
- III. high yielding varieties of barley (4), chickpeas (3), lentils (1), and beans (1);
- IV. maize varieties suitable for intensive farming, with a productivity of 6 tons/ha;
- V. new varieties of apple (15 ), quince (5 ), pear (12 ), and apricot (10);
- VI. experimental research on best practices for main crops and fruit trees such as olives and citrus, as well as on plant protection and pest management.

In the field of livestock, eight specialized research stations were established for improving animal productivity. Among the many results obtained in race selection and conservation, it

is worth mentioning the following. A new sheep race (Al Awwas), with a higher twin-generation capacity; the improvement of “al Shami” goats and cows; the establishment of a research station on buffalos and camels, contributing to increase heard sizes and productivity; the gradual hybridization of local cows, which has increased cow productivity of meat from 750 to 3500 kg/year over three generations.

In the field of land research, Syrian lands were classified in soil maps at scales of 1/50,000 and 1/250,000. Laboratories and research activities improved significantly after the establishment of 13 specialized labs and 14 land research stations, contributing to the estimation of optimal fertilizer requirements for each crop in different soils.

In the field of water, 14 irrigation research stations, scattered over the various *Muhafazat*, work on the improvement of irrigation methods and the determination of water requirements for each crop. The most important researches carried out include water rations for wheat, maize, cotton, and sugar beet; supplementary irrigation for wheat varieties; laser irrigation technologies for wheat, maize, sugar beet, and cotton; and wastewater treatment for irrigation.

## **8.2. Agricultural Extension, Training and Education**

Agricultural extension is essential to enhance farmers’ efficiency by promoting the adoption of modern technologies and enabling them to compete on the markets. In Syria, extension services concentrate on transferring information and results of research to farmers and informing research stations on the problems faced by farmers with the aim of finding appropriate solutions.

Government extension services are provided free of charge through a countrywide network of extension units. This is centrally coordinated by the Extension Directorate of the MAAR, through the Extension Divisions established at the Governorate level. The extension units include agronomists, agricultural supervisors, veterinarians, and veterinary supervisors. The staff is responsible for pest and disease surveillance and prevention, implementation of the agricultural plan, as well as for carrying out statistical surveys and field trials, in order to estimate production and gather the information required to guide extension activities, the agricultural planning process and other Government interventions.

The number of extension units increased from 740 in 1990 to 885 in 2000, employing more than 6,000 people. Out of these units, 305 include housing for technicians working in the extension service. Extension services are provided through TV and Radio broadcasting, field days, mobile theater, posters, and extension leaflets.

Agricultural education and technical training are receiving significant attention. Vocational education has been linked to the development plans. 40 agricultural high schools including 6,500 students are scattered around the country. Moreover, 5,000 students are studying in 17 intermediate agricultural institutes. Around 100 technical training courses for 2,500 participants are conducted every year by 15 training centers. In addition, farmers are trained on the use of modern technologies with the supervision of agricultural technicians. Around 10,000 students and technicians and 20,000 farmers were trained in 2001.

## **8.3. Plant Protection Services**

The Plant Protection Directorate maintains regular contacts with the plant protection sub-directorates in the Governorates and extension units in the villages. While in the past the Government directly distributed pesticides, nowadays it is only responsible for the provision of plant protection products that farmers are compelled to apply under pest control

programs, such as *suneh* bug and locust pesticides; herbicides; and fungus and field rat control materials as well as seed sterilization materials.

Needs are estimated by the Committee for Pesticide Demand Assessment chaired by the Minister of Agriculture and composed of representatives of the GEF, ACB, Party leadership, directors of relevant MAAR departments, and the GEZA, which is responsible for importing the required chemicals. For pests that can be controlled on individual scale, the agricultural engineers working in the extension units help farmers in identifying the disease and the required pesticide and doses to be applied. Farmers can buy pesticides from the shops of the Agricultural Engineers' Syndicate, from the GEF or from private traders, which presently cover about 70% of the demand.

The Government discourages the use of pesticides in order to preserve the environment and human health and to save on foreign currency needed for pesticide imports. Consequently, the application of chemicals was only allowed when the infection reaches the economic threshold. Citrus white fly control program is an example of successful biological control that is being also adopted for olives, apples, and cotton.

#### **8.4. Veterinary Care and Vaccination**

Veterinary care and vaccination services are provided through the Department of Livestock Health and its branches scattered in all Governorates. A network of veterinary clinics supports poultry, cattle, and sedentary sheep breeding, whereas moving clinics provide treatment and vaccination services to transient sheep. Overall, 422 stable and moving clinics have contributed to the development in veterinary care documented in Table 8.1 for the period 1990-2000. The number of vaccinations refers to the foot and mouth disease as well as to other plagues affecting small ruminants. The injections referred to in the table include 17 types of vaccines produced by the MAAR laboratories, which also imported vaccines for other disease such as foot and mouth, pasteurella, and brucellosis. Starting from 1998, internal and external parasite medicines were distributed freely as one of the drought combating measures.

In addition to veterinary care, since 1984 the MAAR has been conducting a cattle improvement program. Table 8.2 indicates the development of spermatic and nitrogen liquid production and the number of artificial inseminations, registered under the program in the period 1990-2000.

#### **8.5. Public Projects in Support of Agricultural Production and Rural Areas**

Improvements of rural infrastructure in general and rural roads in particular are receiving significant attention from the government with the aim of facilitating agricultural production and marketing as well as improving living conditions in rural areas. Table 8.3 summarizes quantitative evidences on progresses made in road construction and area served since 1991, when the MAAR took over from the Ministry of Local Administration responsibility for execution of these public works and financial allocation were significantly increased.

MAAR also contributes to the development of natural and artificial forests with the objective of environmental preservation, enhancing natural tourism, and supplying local communities with wood and other products. Three projects are being implemented in this area: forest development, forest improvement, and forest conservation. The forestation process also includes forest roads and fire lines building (Table 8.4). Between 30 and 35 million of forest seedlings have been produced each year during the last decade. These have been only partly used for public forestation programs, with the rest sold to farmers at symbolic fees for planting as wind blocks. Over the last decade public planting oscillated between 22 and 27

thousand ha per year (2000 represents an exceptional low level due to the drought), out of which about 50% consists of new plantings and the rest represents replacement and improvement of the existing forests.

Starting from 1977 a group trees planting project has been implemented in mountainous rain fed areas, with the aim of helping farmers in reclaiming land to plant fruit trees, with the threefold objective of generating rural employment, increasing farmers' income, and contributing to the preservation of the land. Tree planting is executed by the MAAR on request of private landowners, who apply to the ACB for long term loans to be repaid after the trees become productive. Table 8.5 indicates the areas reclaimed and planted with fruit trees and field crops over the last decade. This has been done under a number of projects, using imported heavy machinery counting on financial resources made available by various sources of international development assistance. A summary of the main projects executed and on going is provided hereafter.

#### *Fruit Trees Project*

It started in 1977 in Dara'a, Al Swidaa', Al Qunaitira, Rural Damascus, Homs, Hama, Tartous, Aleppo, Edlib and Al Hassakeh. The project's objective was the reclamation of 386 thousand ha in the first and second zone where the annual rainfall exceeds 300 mm. The future annual plan of the project aims at reclaiming 8,000 ha.

#### *Green Belt Project*

It started in 1980, with the aim of establishing a green belt comprised of fruit bearing trees and forest trees between the desert and the inhabited areas with the length of 1100 km and width of 8-20 km. The belt will extend between the Syrian-Iraqi borders in the north and the Syrian-Jordanian boarders in the south. Some areas were planted with fruit bearing trees in Aleppo, Edlib, Hama, Homs, Rural Damascus, Dara'a, and Al Sweidaa'. The reclaimed area reached 131 thousand ha. in 2000. Future plans aim at reclaiming 5300 ha per year.

#### *Fruit Trees Development Project (Martyr Ali Al Ali Project)*

The project started in 1986 with the objective of land reclamation, soil and water preservation, and fruit trees planting in Rural Damascus, Homs, Hama, Lattakia, and Tartous. At the end of 2000, about 67,000 hectares were reclaimed. The plan aims at reclaiming around 4700 ha per year.

#### *Southern Area Development Project (first and second phases)*

The first phase of this project started in 1986 with the aim of land reclamation and fruit trees planting in Dara'a, Al Sweidaa', Rural Damascus, and Al Qunaitira, where the annual average rainfall ranges between 280-650 mm. The second phase started in 1993 with the objective of conducting other development activities such as rural women development, agricultural extension enhancement, small-scale industry loans provision, etc. The reclaimed area was 44 thousand hectares for fruit bearing trees and 61 thousand ha for field crops. Future plans aim at reclaiming 3200 ha/year for fruit trees and 4300 ha/year for field crops.

#### *Agricultural Development Project in Jabal Al Huss*

The project aims at the reclamation of 22 thousand hectares in Jabal Al Huss, Aleppo. It started in 2001 with several components in addition to land reclamation such as establishment of extension units, provision of drinking water and soft loans for small holders and support of rural women in the project area.

### *Development of the Middle and Coastal Regions Project*

The project aims at the reclamation of 80 thousand hectares in Lattakia, Tartous, Homs, and Hama with an annual average of 20 thousand hectares. Other activities include rural women development, soft loans provision, agricultural extension, honeybees breeding, household industries and others. Land reclamation has not yet started, due to delays in machinery delivery.

### *Al Badia Development Project*

Due to the importance of Al Badia as a natural grazing source for sheep and as a region in which enhancing population settlement and preserving biological diversity, several projects have been implemented such as: Al Badia Development Project, Al Badia Wells Renovation, Al Badia Wells Establishment, and Al Tanf Project. The following steps have been executed:

- I. 13 pastoral nurseries were established in different areas to produce 9 million seedlings per year to be planted in an area of 15 thousand hectares;
- II. 7 collection centers of pastoral seeds to be used in direct (artificial) sowing were established. 50 tons of seeds are collected annually;
- III. three sites, namely Al Muthallath, Abi Thar El Ghifari, and Al Deffa, have been planted with pastoral and forest seedlings to control sand dunes effect on Dier Ezzor;
- IV. 4 green oases to be used as rest houses for passengers and extension units were established along Damascus-Deir Ezzor highway, including fruit trees and forest trees;
- V. 110 artesian wells were dug up to secure water for both inhabitants and farm animals. Around 15-20 new wells are dug up annually;
- VI. several nurseries were established to preserve pastoral plants adapted to the Syrian environment, giving attention to the varieties used in animal feed;
- VII. a natural conservation was established in Al Taleela (near Palmyra), with the support of a FAO Project funded by the Italian Government, to protect some plants as well as some wild animals such as deer and antelope;
- VIII. a new project has been approved for Al Badia development with external funding of \$ 105 million. The project aims at increasing the production capacity of an area of 3 million hectares and restoring the vegetation cover by planting 100,000 hectares and sowing 170,000 hectares. In addition, 100 new wells will be established and 45 old wells will be rehabilitated. Moreover, 80 water reservoirs for water will be established and 550 km of roads will be built. The project also foresees the establishment of veterinary clinics.



## Chapter 9

# Agricultural Policies in Syria

Syrian economy has been operating under a system of centralized planning, for the last four decades. While the earlier five-year plans were formally issued, later, starting from the sixth one (1986-90), the plans have gradually shifted toward an indicative status. In the mean time, annual plans, which became the reference document, have been prepared adopting a more participatory and decentralized approach. Within this general orientation, while the State retained a central role in the direct coordination of resource allocation, space was gradually opened for private activities in production and trade.

The long-term objectives of Government intervention in agriculture over the last decades can be summarized as following:

- I. securing a high degree of food self-sufficiency for staples;
- II. utilizing fully and improving productivity of natural agricultural resources;
- III. achieving equitable levels of income distribution, of satisfactory targets of poverty alleviation in rural areas, and of containment of rural-urban migration;
- IV. securing adequate levels of employment to the agricultural labor force;
- V. guaranteeing adequate and affordable levels of food consumption to urban and rural populations;
- VI. providing adequate supply to domestic processing plants;
- VII. increasing agricultural exports;
- VIII. promoting investments as a major instrument for achieving development.

These objectives have been gradually evolving over the last decade and, particularly, over the last few years, modifying and integrating the original set of objective as follows:

- I. gradually shifting from the strict self-sufficiency to a broader objective of self reliance;
- II. recognizing a central role to the development of marketing and processing capacity adequate to compete at international level;
- III. giving increasing consideration to the environmental constraints specially in terms of necessity to preserve and promote the efficient use of scarce natural resources including land and, first of all, water.

The selection of instruments to pursue the above objectives has been driven by the option to assign a central role to the State in guiding both the allocation of resources and the distribution of agricultural output. In a situation in which private management of factors of production is largely dominant at farm level, the State exerted his guiding role assigning quantitative targets from the farm level upwards, and through a direct intervention on farming technology.

The fundamental instrument of Government intervention is institutional setting, which has preserved for a long time the original features of the framework established in the 60s and 70s. Two main organizational and functional features essentially characterized this setting.

*i) The articulation of the decision-making process and policy implementation.* With regard to agriculture, the MAAR retains a central but not exclusive role, in deciding and implementing public actions related to the production and distribution of agricultural goods. Quite a few

economic and social interventions come in fact under the technical and operational domains of other Ministries or Government agencies, comprising the Ministries of Irrigation, of Industry, of Supply and Internal Trade, of the Economy and Foreign Trade, of Finance, and the State Planning Commission.

*ii) The crucial role of a certain number of governing bodies (the Supreme Councils) in which the decision making process occurs through a participatory re-aggregation of responsibilities and interests.* The highly articulated internal composition of the Councils provides the institutional guarantee of both recombining, in a unified framework, the previously fragmented responsibilities, and reconciling conflicts and different interests through the involvement of various stakeholders, such as the General Peasants' Federation. The original institutional framework has been increasing its articulation over time with the purpose of extending a participatory involvement in the decision making process.

A main breakthrough of this institutional setting took place in connection with the appointment of a new Cabinet in the late 2001, when the functions of the Supreme Councils were transferred to the relevant Ministries under the co-ordination of the Prime Minister. As a result, the adoption of sectorial plans, or the approval of the procurement prices of strategic agricultural products, are presently adopted by the Cabinet on the basis of proposals by the relevant Ministries. Meanwhile, the consultative and participative process that previously took place through the formal involvement in the Supreme Councils of various political and social bodies, such as the General federation of Peasants, now takes place through consultations at the various levels.

The second main instrument for pursuing agricultural policy objectives has been the early and widespread adoption of the planning mechanism for the allocation of resources in the agricultural sector. Central planning has been seen as the appropriate coordinating mechanism, in a closed economy, for mobilizing available resources and modernizing the production system, as well as for centrally and dynamically controlling adoption and diffusion of farming technology. In other words, central planning was seen as the appropriate policy decision making-framework for securing simultaneously a large set of objectives; namely:

- I. the achievement of self-sufficiency in staples;
- II. the control and the promotion of technological change;
- III. the control of a rational use of natural resources;
- IV. the achievement and conservation of adequate levels of employment and income in rural areas; and
- V. the sustainable internal coherence of the economic and social systems.

The third instrument employed to achieve the long term objectives is an articulated set of integrated policy measures, meant to provide operational strength to the planning mechanism, whose conception and application has taken place in the closed and highly protected context, prevailing at the time they were adopted. The central guiding principle of this policy set might be found in the notion of identifying the modernization of agriculture with an efficient process of diffusion and incorporation of technological change.

In its original version, until the mid 80s, this set of policies consisted of the integrated application of the following forms of intervention:

- I. compulsive production targets and allocation of areas at the farm level for strategic crops;
- II. subsidies for farm inputs;

- III. measures to facilitate access to land and water through legislative action (distribution of public land), price measures (public land renting at symbolic rates), investment programs (collection of water resources and public irrigation schemes);
- IV. favorable fiscal regime for agricultural production;
- V. institutional and financial measures to secure short, mid and long term credit to farmers;
- VI. legislative regulation of land and agricultural labor markets;
- VII. public systems of agricultural research and extension, which has been established in the '60s and strengthened during the 90s and in the nearest past.

Within the ongoing process of domestic liberalization, started in the second half of the 1980s and substantially accelerated during the last few years, the above policy regime has undergone a certain number of non-marginal modifications, namely:

- I. the restriction to strategic crops of the central pricing system and the determination of these prices on cost of production and profit margins proportional to the importance of each product in terms of food security and export potentiality,
- II. the partial but consistent elimination of input subsidies and the gradual involvement of the private sector in the import of inputs;
- III. the evolution of the planning mechanism from the rigid pursuit of quantitative targets to a vision of indicative planning, accompanied by the gradual liberalization of domestic marketing, allowing, for instance, freedom to market outputs, even for most strategic products, either to public agencies or in the private market and to decide independently from agricultural plan provisions the utilization of up to 0.5 ha of cultivable land per farmer.

However, in spite of this evolution, it should be noted that the long established interlinked processes of exogenous land allocation among crops, determination of the inputs required with the strictly related grant of short term credit, and its repayment procedure through the selling of output to public agencies, is still today widely and strongly entrenched in farmers behavior and expectations. As result, the functioning and implementation of the original planning scheme remain largely unaltered for most part of the so-called strategic crops, such as cotton, sugar beat and tobacco, and, to a more limited extent, for wheat.

### **9.1. The Planning System**

As already mentioned, the planning process established in early 1960s was based on five-year plans supplemented by annual executive plans. The 6th, 7th, 8th and 9th Five-Year Plans covering the period starting in 1986 have been only indicative, and not officially released. The basic aim of the annual executive plans is to steer farmers towards the pattern of land use that the Government perceives as the best one, in order to meet national objectives. The switch to indicative planning reflects the move to a more open economy and the consequent need for greater year-to-year flexibility.

Plans are developed through an iterative participatory process that culminates in the MAAR submitting a consolidated production plan for the agricultural sector to the Prime Minister Office for approval (earlier to the Supreme Agricultural Council). This plan is the basis for issuing farmers with licenses to plant specific areas of rain-fed and irrigated land with specific crops. Farmers are legally bound to comply with the planting program specified on their licenses that, in turn, allow them to obtain government-supplied credit, inputs and services.

The overall objective of the five-year plans for agriculture is set as a government growth target for the sector, within the aggregate and sectorial targets set by the State Planning Commission. For the current 9th Five-Year Plan, the target growth rate for domestic agriculture is 5.8%.

Plan implementation targets include targeted annual growth rates for the area, yield and production of major crops and production, and yield targets for livestock products. In addition, the plan also show the growth that is planned in irrigated land and in various types of non-irrigated land, and also contains projections of the implications of the planned production for national self sufficiency.

The current five-year plan for agriculture employs notional rather than actual data for the base-year, in order to take into account the annual variability in weather conditions. Therefore, a normal base-year data is used, to reflect the areas that would be likely to be planted and the yields that would be likely to be achieved with current technology and capacity in a year of adequate but not exceptionally good weather conditions. The notional data is derived by calculating the average of five years for rain fed land and three years for irrigated land.

The five-year plan for agriculture is developed taking account of the investment planned by the Ministry of Irrigation and of the new land that is to be brought under irrigation. In addition to data from the irrigation plan, other inputs for the development of targets for the agricultural sector come from the projects and programs concerning the expansion of rain-fed land and/or to yield increases on both irrigated and rain-fed land. For example, high rates of growth in the area of olives and pistachios are targeted in recent Plans, to reflect major on-going projects aimed at reclaiming hilly areas. The potential changes in the area that can be devoted to different crops are restricted by a number of factors, namely water availability, the necessity to rotate crops to foster soil fertility and to prevent the accumulation of pests and diseases, specific target outputs determined on the base of specific objectives such as producing enough wheat to achieve national self-sufficiency or adequate agricultural inputs for the national processing plants.

The annual planning process normally starts in April. Licenses are issued in September, just before the formal beginning of the official Agricultural Year. More specifically, the annual planning cycle is as follows<sup>11</sup>:

- I. April: the indicative planning figures are sent by MAAR to its Governorate-level office to be reviewed at various local levels, according to a participatory bottom-up approach;
- II. June: each office sends to MAAR its tentative plans produced in May;
- III. July: MAAR consolidates local plans in consultation with Governorates;
- IV. August: MAAR submits a national plan to the Prime Minister for approval;
- V. September: licenses are issued to farmers;
- VI. September (end): starting of the agricultural year;
- VII. October to December: winter field crops are planted;
- VIII. mid-March to June: summer field crops and intensive crops are planted;

Plan implementation starts in September, when production licenses are issued and given to farmers, granting permission to plant specific areas of rain-fed and irrigated land to specific crops. Within each village, farmers agree among themselves to allocate the land to different crops in consultation within the cooperative, according to the indicative figures of

---

<sup>11</sup> For a detailed account of main activities during each one of the planning stages see Westlake (2000) on which much of this section is drawn.

the village plan. In the case of rain-fed land, the village is divided into sectors, each of which is allocated to a particular crop group or to fallow. The proportions of land allocated to each sector differ according to agro-climatic zone. For example, in 2000/01 villages in zone 1 must allocate 50% to wheat and barley, 40% to other crops and 10% to fallow, whereas villages in zones 2, 3 and 4 must allocate different percentages. Farmers must grow the crops specified for the zones into which their rain-fed plots fall. Production licenses show the irrigated and rain-fed area that the farmer will plant to each crop, including each minor crop that is not included in the planning process but that they intend to grow.

Once farmers have obtained license, they are legally bound to comply with it. In turn, they can use their license to obtain government-supplied credit, inputs and services. Farmers with less than 0.5 ha may also apply for a license to get access to state-provided support. The right to government support can be withdrawn if farmers deviate from their licensed areas by significant amounts without a good reason. The law also provides for more severe penalties should these be deemed necessary, including the destruction of illegal plantings through ploughing. In practice, such measures are taken only when the violation is expected to lead to excessive production that may seriously affects the market.

The plan is monitored in two separate ways. First, the plantings of farmers relative to their license are monitored by Plan Monitoring Committees that operate at the level of individual extension units. This work serves both as a basis for enforcement and for MAAR to obtain first-hand information on areas planted. Second, MAAR undertakes comprehensive random sample surveys of planted area and of yield in collaboration with the Central Bureau of Statistics. These cover wheat, barley, lentils, chickpeas and cotton. Less formal assessments are made for minor field crops. Planted area is surveyed immediately after completion of the planting season. Yields are assessed through crop cutting immediately before the harvest.

## 9.2. Price and Market Policies

Agricultural prices, together with the exchange rate and the base interest rate, are crucial in affecting a wide range of other key variables, including:

- I. the income of farm families and therefore their welfare and their fulfillment of basic needs;
- II. the relative living cost in rural and urban areas influencing both the rate of rural-urban migration and the labor cost in non agricultural activities;
- III. the profitability of farming and agricultural investment;
- IV. the relative profitability of alternative crops and therefore the pattern of land use;
- V. the extent to which planned crop area and production targets are met.

To manage this important set of variables, government intervention on land allocation and farming technology through the quantitative targets sets by the agricultural plan has been complemented by interventions on prices and marketing.

Up to the mid-80s, for most agricultural products the Supreme Agricultural Council fixed prices at farm level, which coincided with the buying prices paid by the public establishments entrusted with responsibility for domestic and/or international marketing, usually under a regime of monopoly. The four main marketing agencies were the General Organization for Cereals Trade and Processing (GOCTP), the General Organization for Cotton Ginning and Marketing (GOCGM), the General Company for Vegetables and Fruit (GCVF), and the General Establishment for Meat (GEM).

Other public establishments import the relevant inputs, which were mainly distributed as in kind credit through Agricultural Cooperative bank (see below). Official product prices remained fixed for long periods resulting in increased demand for low price food items, while the subsidies on agricultural inputs could not adequately compensate farmers for the increasing production cost and stimulate the use of modern inputs. This intervention created fiscal and trade imbalances, and growing difficulties in meeting domestic demand. The emergence of informal transactions, characterized by prices well above the official ones, pushed farmers to violate production plans, preferring to cultivate supplementary products not officially priced. The consequences were sharp price fluctuations, especially for supplementary crops, and occasional shortage of the main food staples.

In 1987, the Government initiated a reform of the agricultural marketing, aiming at reducing product losses, protecting consumers, improving marketing services, and promoting private sector involvement in agricultural marketing. Compulsory delivery of agricultural production was eliminated, with the exception of crops that are exclusively processed by state plants, such as cotton, sugar beet, and tobacco. Wholesale markets were developed, allowing individuals to buy or rent shops and storage facilities, while the Supreme Agricultural Council issued a number of resolutions relaxing trade restrictions<sup>12</sup>. Market liberalization, allowing private participation in marketing and processing, was accompanied by the official prices rising, for both products and inputs, while subsidies on food have been gradually removed.

At present, only cotton, tobacco and sugar beet maintain the traditional market organization, implying that farmers can only sell at official price to the relevant state establishment operating as a monopolist. Prices of all strategic crops are reviewed annually and applied for the following agricultural season at the same level throughout Syria (pan-territorial prices). These prices are set according to a national average unit cost of production, to ensure that a farmer adopting the agricultural practices recommended by the plan is able to cover costs and make a reasonable profit. The price setting mechanism does not take into account international market value as it is intended to encourage farmers to produce the corresponding crops at the domestic cost, even though this is higher than world price. However, it is worth mentioning that the domestic prices of the strategic crops have not been increased since 1996, despite the increasing cost of production, with the aim of reducing the difference between domestic and international prices.

For other strategic products like wheat, barley, lentils and chickpeas, the Government determines prices, but farmers can also sell to private dealers. For these crops, the official price is in effect a minimum price, as it is announced in advance and paid by the relevant state agencies. In the case of wheat, the relevant state agency (General Establishment for Cereals Trade and Processing) still has the monopoly on foreign trade but not on domestic marketing. However, the private sector has been allowed to import flour and wheat for milling and domestic processing under the condition that they are re-exported after processing as flour or pasta. The public agency still commercializes a major part of the production, as commercialization is connected to input and credit provision. However, on occasion farmers prefer to sell to private traders, sometimes even at prices slightly below the official one, because they can get better purchase packages, e.g., more attractive payment terms.

Table 9.1, reproduced from a FAO study (Westlake, 2001), compares, for the seven strategic products mentioned above, the official prices with the corresponding parity prices calculated using international prices from the period 1997-2000. These prices reflect the

---

<sup>12</sup> Two good examples are resolution no. 8/1993, which included general measures towards marketing liberalization, and resolution no. 9/1993, which allowed all sectors to perform domestic and international marketing for lentils and chickpeas.

conditions prevailing on international markets, e.g. the declining price trend largely as a consequence of the trade and domestic support granted to products such as sugar beet, wheat, and cotton by some major producing countries. However, the table provides an indication of an implicit positive or negative support in the official prices relative to the prices that would have prevailed on domestic market in absence of any domestic public intervention. In this way, it gives an indication of which products receive a better treatment on domestic markets, which has implications for farmers in terms of relative profitability of selling to procurement agencies or private trader, when the prices offered by the latter truly reflect international prices.

The table shows that official producer prices have been above parity for sugar beet, wheat, and cotton, indicating that present policies provide a strong incentive to increase these productions, and that a farmer can get better prices by selling to state procurement agencies rather than on international markets. In other words, there is no incentive for private traders to export these crops, as they cannot be exported without incurring a loss.

For barley, official price close to parity levels indicates that prices paid by the state are close to those prevailing on international markets so that in some years it can be convenient to sell to private traders, and that private import or export can be convenient in different years.

For lentils and chickpeas, official prices below parity indicate that, in most years, farmers can get better prices by selling to private traders as they buy at prices reflecting the higher price prevailing on international markets. This also indicates that domestic production is strongly competitive and can be profitably exported.

Overall, the price analysis for strategic products shows that price policies have encouraged sugar beet, wheat and cotton production relative to chickpeas, lentils and barley. In this regard, it is worth noticing that the faster growth of the first group of product is the result of price policies consistent with the land allocation directions provided by agricultural planning. Moreover, this highlights the responsiveness of farmers to prices and other economic incentives determined by the public sector presence in marketing, processing and credit.

Except for the cases of wheat and cotton, where official price is substantially above parity and private trade is banned, public marketing agencies not operating under a regime of monopoly compete with private traders, maintaining essentially the role of buyer of last resort and mainly serve rural population and the demands of public companies. Indeed, in these cases official Government price applies to purchases by the public establishments while the price determined by the market, as result of the joint effect of supply, demand and trade regulations, is usually above the official one.

This is the case of fruits and vegetables, which, taken as a group, are more valuable than any of the individual strategic crops. Indeed, even though the General Organization trades products such as apples and grapes for Fruits and Vegetables, it has a very limited market share and the official price has a limited influence on the market.

The General Establishment for Meat (GEM) had been in charge of domestic and foreign markets for meat until 1989, when meat dealers were authorized to enter the market with the same right as the GEM in exporting sheep up to 50% of the imports. In the same year, imports of ready meat were banned. Under these conditions, the GEM lost its upper hand and became unable to compete with the private sector. Subsequently, its volume of business declined significantly and it turned to slaughtering animals for the private sector (Rama 2001).

For dairy, the Government only determines cow milk price as a flat rate to be paid for delivery to state dairies, and farmers can sell to private processors at a price reflecting production seasonality.

Despite the relevant progress in marketing liberalization, some restriction is still in place. For example, farmers and private traders have to obtain certificates of origin in order to transport their production to the nearest collection area of the relevant public organization. In particular, the General Peasants' Federation (GPF) issues certificates of origin for all grains, except corn, while local departments of the MAAR give certificates of origin for yellow corn and cotton. For sugar beets, central and local committees meet weekly during harvest seasons in order to set up programs and issue delivery cards. Farmers use these cards to deliver their harvest to the General Establishment for Sugar (GES) at its nearest sugar factory.

At the wholesale and retail levels, price control pertains to the Price Directorate of the Ministry of Supply and Internal Trade (MSIT), with the exception of state companies' selling prices, which are fixed by the companies or other relevant authorities adding processing margins to farm level prices. This does not apply to wheat flour, as it is sold at a price lower than its cost due to an explicit consumers' subsidy applied without restriction to all bread of the lower quality. The situation for sugar and rice is similar. After the discontinuation of consumer subsidies on vegetable oil and tea, these are the only staple food still sold at preferential price against the presentation of a coupon obtainable by all families to purchase a maximum of 1.5 kg of sugar and 0.5 kg of rice per capita per month at 10 and 12 SP/Kg, respectively.

The MSIT monitors wholesale prices three times a week and retail prices once a week, and publishes maximum indicative prices based on the observed prices, which are supposed to represent the equilibrium between demand and supply. The MSIT checks that these prices are respected, both at wholesale or semi wholesale levels (like in Souq el Hal) and retail level. As any consumer can denounce abnormal price surges, the indicative prices published by MSIT work as an instrument to control and stabilize prices. However, price control is more or less strict depending on products. For meats, each week a price bulletin is issued by the MSIT and slaughterhouses and shops must expose it to the public. For other products, such as cheese, price controls are less strict and take mainly place on the basis of complains filed by consumers. In this case, MSIT functionaries visit the retailer and check the invoices concerning cheese purchase, transportation and other expenses to determine if the applied price was justified.

All pre-packed products must have a label indicating the price agreed with the MSIT. This defends consumer from unjustified price surges, but it also implies a certain degree of rigidity both in term of product differentiation, as prices of new products should be approved by MSIT, and in terms of downward adjustments, as even promotions must be agreed upon and a poster placed in the shop must announce the promotion and its length.

### **9.3. Credit and Inputs Policies**

State pricing and distribution of subsidized inputs played a major role in Syrian agricultural policy, as an essential support to agricultural plan implementation in presence of fixed output prices. Input subsidies were used to compensate farmers for the rising production costs, but they also contributed to promote the use of modern inputs, such as improved high-yield seeds and chemical fertilizers required for the adoption of improved cropping technologies. To implement this policy, the State acted as a monopolist in domestic production, international trade and internal distribution of all main inputs, and determined

prices of domestically produced inputs, and the official exchange rates was applied to the imported ones.

Moreover, input distribution was closely coordinated with the delivery of short-term credit so to jointly concur in ensuring smooth implementation of the agricultural plan. Short-term credit has been largely provided in kind, including agro-chemicals and seeds, which could be obtained by individual farmers and co-operatives in the quantities allowed for by the cropping licenses, or similar certifications issued on farmers' request by the local branches of the MAAR for activities not requiring a license. Credit repayment was guaranteed, as it was deducted from the amount due by the state procurement agency to which farmers delivered the product.

Consistently with the evolution in agricultural marketing and pricing, starting from the second half of the 80s most input subsidies have been eliminated, while prices of agricultural products were raised. In 1986, the Supreme Agricultural Council, at that time responsible for the determination of both farm inputs prices and interest rate applied by the Agricultural Cooperative Bank, issued a resolution to set the prices of locally produced seeds according to their cost, while subsidies on pesticides were eliminated under resolutions issued in 1987.

The gradual reduction of subsidies on fertilizer and machinery inputs followed. In the course of the 90s, fertilizer import was gradually liberalized and currently about 60% of total fertilizers used are produced in Syria. As result of the adjustment, implicit price support for the two major types of fertilizers (urea and phosphate) dropped from SP 1,092 million in the period 1991-1993 to an estimated average of SP 358 million in the period 1997-1999 (Wehrheim, 2001). Parthasarathy (2000), however, estimated the total implicit fertilizer subsidy in 2000 at SP 1,390 million, referring to a wider range of fertilizers. Additionally, he estimated at SP 435 million the net subsidy implicit in the wider government-dominated distribution system for fertilizer. In 2000 fertilizers import was opened to the private sector.

Nowadays, pesticides carry basically no subsidy and private traders import and commercialize substantial shares of pesticides at the prevailing market prices. Concerning strategic crops' seeds produced by the General Organization for Seed Multiplication, Parthasarathy (2000) estimates an implicit subsidy of SP 2,398 million per year.

Irrigation fees and, more recently, fuel and electricity prices have been increased close to cost recovery levels.

The Agricultural Co-operative Bank (ACB) remains the public monopoly formally in charge for providing long, medium, and short term credit to private, co-operative, and government sectors (see table 9.2 and 9.3 for the breakdown). ACB derives its resources from government funds, and private savings. Total credit provided by the ACB increased from SP 8.6 billion in 1990 to 15.5 in 1995 and decreased up to SP 8.8 billion in 2000.

Credit is provided in cash as well as in kind (Table 9.2) according to quantities, qualities, and delivery dates indicated in the schedule held by the Bank and its branches scattered in agricultural areas. Short-term loans are for a period of 300 days and are given in cash and in kind as inputs at 4.5% for public and co-operative sectors and 5.5% for individual farmers for loans amounting to less than SP 50,000. For those eligible for a higher sum, the respective rates are 5.5% and 6.5%. For private farmers two sureties are needed and in the case members of co-operatives, any single default would render the entire group ineligible for the next loan.

Medium term credit for periods not exceeding five years is extended for greenhouses, fruit tree planting, purchase of livestock, digging of canals for irrigation, equipment for poultry farms and machinery for grading, waxing and packing. Credits provided to fruit bearing

trees projects executed by all sectors are given a 5-year grace period. Other inputs like tractors, harvesters, threshers, sprayers, bee hives, and imported cows are delivered to the borrowers under delivery orders issued by the creditor branch and sent to the company that deals with the required input. The creditor companies are comprised of government companies specialized in agricultural input production, marketing, co-operatives, and the MAAR.

Long-term credit for periods of ten years or less is aimed at financing construction of stores, land improvement, forestry projects, fruit tree planting programs and cold storage facilities.

Interest rates paid for ACB loans are relatively low in nominal terms, at levels fixed since long time despite the wide annual variations of the inflation rate. Credit repayment is guaranteed through collateral and, very effectively, through the crop marketing mechanism for farmers who do not wish to do the repayment in cash directly to the ACB. Indeed, borrowing farmers deliver their crops to the public marketing organization, such as the GOCMT, and the GOCGMT which after deducting the credit plus interest of the ACB loans, deliver the remaining balance to farmers. For this reason production is considered the main collateral for credit. However, land ownership or lease titles, as well as ownership of means of production, can be used as collateral. Long, medium, and short-term credit is provided at specific ceilings according to the value of the collateral. Technical departments of ACB monitor the credits provided for investment projects. Projects are evaluated before the credit is granted and supervised during the implementation and operation in order to ensure compliance with the stated objectives.

Concerning credit duration (Table 9.3), the share of short term on total credit increased from 76% in 1990 to 90% in 2000 affecting important activities like land reclamation, fruit tree replanting, and machinery procurement. As regards finance for fruit tree planting programs, the term of 5 years is clearly insufficient, as most fruit trees take longer (6-7 years for apples, for example) to attain commercially viable level of bearing. Accordingly, farmers often obtained loans also from other sources. Farmers find it difficult to obtain loans for machinery like harvesters and tractors and have to depend on supplier credit at high interest rates of 20-30 %. Machinery suppliers are a common source of finance for purchase of equipment. Procedures are short and simple although interest rates are high. Interest on such deals generally becomes part of the price. Farmers are aware of the higher cost due to this choice but do not mind the extra cost if it is a way of saving time and inconvenience.

Concerning credit by type of activity, Table 9.4 shows that about 75% of annual disbursements concentrate on strategic crops. Whereas allocation to animal products and vegetables is clearly well below their importance in terms of contribution to production and value added.

For production expenses, alternative and informal credit sources are the input supplier and the output dealers, exporters' agents and cold storage units. Input dealers are generally small traders and do not have the capacity to extend credit covering the whole crop duration. Output dealers, exporters' agents and cold storage units are active in fruit and vegetable growing areas. In these cases, financing takes several forms. Direct advances ahead of the season are given with, and sometimes without, an agreement on the unit price at which the harvest would be sold. The farmer is thus under obligation to sell the crop to the dealer at a price to be negotiated, and he finds himself at the weaker end of the bargain. Another form of financing by the output buyer is an agreement on a lump sum to be paid to the grower for the entire output. The lump sum is paid in suitable installments in order to enable the grower to meet production expenses.

## 9.4. Taxation

Agricultural taxation, together with consumption subsidies, contributes to income redistribution as part of the overall fiscal policy, but it is also used, in combination with production subsidies, as policy tools to encourage or discourage the production of specific crops.

Tax on income depended on a set of old decrees and legislations until 1991, when Law no. 20 determined the progressive income tax rates, amending article 16 of the legislative decree no. 85/1949 and regulated the profit tax. A preferential fiscal regime was established for the agricultural sector. Accordingly, farm income is exempted from income tax, and cooperatives are exempted from the profit tax.

The agricultural sector also benefits from a number of other preferential treatments, including exemption from the real estate tax for buildings used for storage, animal shelters, and workers' housing; custom tariff exemption for export of live animals; preferential custom tariff for agricultural machinery, pesticides, and improved seeds; lower fees for electricity and access to government-financed irrigation systems.

Indirect taxation on agricultural production consists of a tax on livestock and on agricultural commodities. The former, regulated by law no. 25 of 1958, consists of an annual per head levy of SP 2.25 for sheep and goat, SP 4 for camels, SP 7 for cattle, and SP11 /head for pigs. The latter, is regulated by law no.384 of 1957, and it ranges between 9 and 12% of the products' value. According to law no. 437 of 1957 the tax on agricultural products is paid as follows:

- I. upon entry to processing plants for products such as cotton (on export or spinning), sugar beet, cotton seed or other oil seeds, tobacco (on delivery to the General Establishment for Tobacco or on export). Sesame is exempted from this tax;
- II. upon export for products such as legumes, grain straw, olives, cotton residues, onion, garlic, fresh and dried fruits, hemp husk and seeds, grapes, and aniseed;
- III. upon domestic sales for all other crops and by products not mentioned above and not subject to processing tax.

In the following decades, a number of exception and exemption were passed.

Fresh, dry, frozen and canned fruits and vegetables were exempted from the export tax under legislative decrees no. 27 of 1962 and no. 87 of 1967.

Olive oil and packages were exempted from export tax under decision no. 2 of 1997.

Raw cotton and yarn were exempted from export tax in 2000.

More recently, all agricultural exports were exempted from export taxes and fees<sup>13</sup> under legislative decree no. 51 of 2001, which also exempted from import fees all agricultural production inputs and machinery.

Also agricultural imports have been subject to a number of fees and levies, in addition to an "ad valorem" tariff. The decree no. 265 of 2001, adopting the harmonized system, revised custom tariff brackets and established a "unified tax" in the form of an additional percentage to the tariff, substituting all fees and other border measures adopted before. Both tariffs are applied to the import value converted in Syrian Pound from the US dollar applying a so called "custom exchange rate" presently consisting of three rates (11.25, 23, and 46.5 SP /USD) applied to different products according to the economic and social

<sup>13</sup> These included various duties such as an "income tax" of 1% on all earnings from exports and a "tax on foreign currency earnings" of SP 0.1 per dollar of fruits and vegetables and SP 0.5 per dollar of other agricultural exports.

criteria also used to determine the tariff levels. Accordingly, basic food items such as sugar, rice, vegetable oil, butter and powder milk but also production inputs and essential non agricultural goods, such as medicines, enjoy better treatment, while luxuries have the worst treatment (higher tariffs and “custom exchange rate”).

Decree 265 of 2001 determines 11 brackets ranging between 0 and 200% for the custom tariff, and rates varying between 5-35% for the “unified tax”. The future objective is to unify in a single rate the custom tariff and the unified tax and to unify the “custom exchange rate” to the single exchange rate presently used in the official currency market.

It is worth noticing that the Decree 265 of 2001 determines the custom tariff and the “unified tax” also for products such as grains, legumes, cotton, fruits, and vegetables, for which an import ban is in place.

## **9.5. Agricultural Investment Policies**

Economic policies aiming at fostering agricultural development are clearly different for private and public investments.

Concerning private investment in agriculture and agribusiness, applicable policies are essentially the same applied to all other economic activities, main exception being the Legislative Decree no. 10 of 1986 promoting the establishment of agricultural joint-ventures in which the Government participates providing the land against a 25% share of the capital. As part of the economic modernization effort of the late 80s, legislation to promote private investments was passed including, among others, Emigrants Law no. 19/91, Investment Law no. 20/91 and, most important, Law No.10 of 1991 and its attendant Decree 7/91 containing operational details about the implementation of the Law. More recently, Decree 7/2000 has enhanced the regime established in 1991.

Law 10/91 applies to private investment projects in agriculture, manufacturing, tourism, transportation, and others. So far, farming projects have been exceptional, and mostly linked to some related investment in the processing of agricultural products. This is due to several reasons: (i) the long recovery period of agricultural production investments; (ii) the risky nature of agricultural production influenced by climatic conditions; (iii) the difficulty in competing with foreign products and investments conditions in other countries. However, a substantial number of projects dealt with agro-industry. Projects eligible under Law 10 should involve investments of at least ten million Syrian Pounds (about U\$S 200,000). Granting benefits to specific projects rests on the Supreme Investment Council, a body chaired by the Prime Minister and including several Ministers, and the following up process is the responsibility of the Investment Commission, a technical body acting under the Prime Minister and linked to the technical offices in the ministries concerned. Approved projects enjoy several benefits. All equipment, raw materials, inputs, and vehicles needed for the project can be imported duty-free, and the project is granted a tax exemption of five years covering income tax and real estate tax. The period can be extended to few more years in a number of cases. For example, it is extended to seven years for joint ventures; for projects established in one of the developing Governorates like Al Raqqa, Al Hassakeh, and Deir Ezzor; and for projects whose importance for the national economy is recognized by the Supreme Investment Council. Moreover, the establishment period, which can be deducted from the tax exemption period if it exceeds three years, can be extended up to five years subject to the approval of the Supreme Investment Council.

Arab and foreign investors are allowed to buy or rent the land and buildings needed for their project within limits that can be exceeded in specific cases subject to approval from the concerned authorities. The company established under an approved project can open a

foreign currency account at the Commercial Bank of Syria, though no provisions are made for the company to be able to buy foreign currency with Syrian funds. Investors are allowed to borrow local currency from Syrian banks against collateral. They are also allowed to have insurance arrangements either with the Syrian Arab Company for Investment Insurance or any other insurance company.

Law 10 allows for foreign capital repatriation and profit remittances. Non-resident workers and technicians are allowed to transfer abroad 50% of their wages and 100% of the end-of-service remuneration in foreign currency. The law also authorizes non-resident investors to transfer abroad, after at least five years of commencement of operations, the invested capital, on the basis of the project net worth but not exceeding the original amount of the investment brought from abroad. They are thus not authorized to transfer abroad any capital accumulated through reinvestment or otherwise not brought to the country from abroad. A significant limitation relaxed by Decree 7/2000. The Law also authorizes the transfer abroad of interest and profit accruing from the investment of foreign capital.

Decree 7 of 2000 introduced significant improvements of Law no. 10. Investments were given a guarantee of no confiscation or expropriation, and they were given the right to sell their land rights and all constructions thereon, thus permitting investors to recover their investment in infrastructure in case they decide to sell or liquidate their company. The new decree also established stronger legal protection for investors, e.g. giving them the right of appeal before the Arab Investment Court or any other international jurisdiction arising from agreements signed between Syria and the country of the investor. For a detailed analysis of the effects of this Law see Maletta (2001).

Investments authorized under Law no. 10 are 2,721 with a capital of SP million 386,160 and 115,573 employments. Out of these agricultural production projects accounted for 1.2% of the total (29 projects) with a capital of SP million 4,514 and 1,411 employments. Agro processing projects accounted for 16.7% of the total (216) with a capital of SP million 46,483 and 16,450 employments.

Public investments in the agricultural and irrigation sectors are prioritized by the *investment plan* elaborated under the co-ordination of the State Planning Commission, which provides details on material and financial requirements, and execution timing for each investment project. The Ministry of Irrigation implements land reclamation, establishes irrigation schemes in irrigated areas and dams for all purposes

Projects implemented by MAAR to improve plant and livestock production are classified as investments in agricultural services and have been discussed in chapter 8. MAAR is currently implementing 55 projects in 2002 including 43 old projects, 9 new projects and 3 replacement projects. The most important investments are agricultural roads, fruit trees and seedlings production, artificial forestation, Al Badia development, agricultural research, plant protection, livestock health care, and cattle improvement projects. The MAAR investments increased from SP 1,069.4 million in 1990 to SP 2,819 million in 1995 and to SP 5,766.2 million in 2000. Moreover, allocations for the year 2002 have reached SP 9,694.5 million. Actual spending is mainly related to the ability of supplying fruit trees and, in the case of Al Badia development projects, machinery. Worth mentioning is that foreign resources from development aid account for 25% of the entire investment plan.



## References

- Abdalla, A.** 2000. *Reorganization of the Ministry of Agriculture and Agrarian Reform*. Damascus, FAO Project GCP/SYR/006/ITA.
- ACSAD- Arab Center for the Studies of Arid and Dry Land/UNDP- United Nations Development Programme/ME-Ministry of Environment.** 1996. *The State of Desertification in Arab Countries: Approaches in Combating Desertification*. Damascus.
- AOAD-Arab Organization for Agricultural Development.** 2001. *Yearbook of Agricultural Statistics*. Damascus.
- CBS-Central Bureau of Statistics.** *Statistical Abstract*. Damascus.
- CBS-Central Bureau of Statistics.** 2000. *Household Income and Expenditure Survey*. Damascus.
- Cummins, G.** 2000. *Livestock Sub-Sector*. Damascus, FAO Project GCP/SYR/006/ITA.
- Directorate of Natural Resource Research, General Commission for Agricultural Scientific Research.** 2000. *Monthly Reports*. Damascus.
- Edwards-Jones, G.** 2002. *Agricultural Policy and the Environment in Syria: An Examination of Impacts and Suggestions for Policy Reform*. Damascus, FAO Project GCP/SYR/006/ITA.
- FAO Project GCP/SYR/006/ITA.** 2001. *Country Profile: The State of Food and Agriculture in Syria*. Damascus.
- Forni, N.** 2001. *Land Tenure Systems: Structural Features and Policies*. Damascus, FAO Project GCP/SYR/006/ITA.
- Grad, S. & Al Sadi, O.** 2001. *National Case Study: Co-Ordination of Arabic Agricultural Policies*. Damascus, MAAR.
- JICA-Japan International Cooperation Agency/UNDP-United Nations Development Programme.** 1996. *Development of the Water Supply System for Damascus City*. Tokyo, Koei Co. Ltd.
- JICA-Japan International Cooperation Agency/UNDP-United Nations Development Programme.** 1997. *Water Resources Development in the North-Western and Central Basins of Syria*. Tokyo, Koei Co. Ltd.
- MAAR-Ministry of Agriculture and Agrarian Reform.** *The Annual Agricultural Statistical Abstract*. Damascus.
- MAAR.** 2000. *Report for the Follow-up of the Annual Unified Plan*. Damascus.
- MAAR.** 2000. *Performance of the Plant Protection Department MAAR/Directorate of Irrigation and Evaluation of Domestically-Produced and Imported Nozzles*. Damascus.
- Maletta, H.** 2001. *Promotion of Private Investment in the Agro-Food Sector*. Damascus, FAO Project GCP/SYR/006/ITA.
- Ministry of Environment, ACSAD- Arab Center for the Studies of Arid and Dry Land and Damascus University.** 1995. *Biological and Toxic Monitoring of Pollution Caused by*

*Using the Barada River and Groundwater for Irrigation*. Damascus, Damascus-Al Ghouta Toxic and Bacterial Pollution for Water, Soil, and Plants Project.

**Ministry of Environment, ACSAD- Arab Center for the Studies of Arid and Dry Land and Damascus University.** 1997. *Biological and Toxic Monitoring of Pollution Caused by Using the Barada River and Groundwater for Irrigation*. Damascus, Damascus-Al Ghouta Toxic and Bacterial Pollution for Water, Soil, and Plants Project.

**Ministry of Industry.** *Performance Evaluation of the General Establishment for Food Industries*. Damascus.

**Ortega, V.C. & Saragdoy, J.** 2001. *Agricultural Water Use*. Damascus, FAO Project GCP/SYR/006/ITA.

**Parthasarathy, N.S.** 2000. *Agricultural Inputs Liberalization*. Damascus, FAO Project GCP/SYR/006/ITA.

**Parthasarathy, N.S.** 2001. *Agricultural Credit*. Damascus, FAO Project GCP/SYR/006/ITA.

**Rama, D.** 2001. *Agricultural Marketing and Processing*. Damascus, FAO Project GCP/SYR/006/ITA.

**Saker, S. E. et al.** 2001. *Agricultural Research and Extension in Syria: Present Situation and Policy Recommendations*. Damascus, NAPC.

**Salem, H.** 2001. *Food Security*. Damascus, FAO Project GCP/SYR/006/ITA.

**Sarris, A.** 2001. *Agricultural Development Strategy for Syria*. Damascus, FAO Project GCP/SYR/006/ITA.

**World Bank & UNDP.** 1998. *National Environmental Action Plan for the Arab Republic of Syria*. Damascus.

**Wehrheim, P.** 2001. *Taxation and Net Transfers to the Agricultural Sector*. Damascus, FAO Project GCP/SYR/006/ITA.

**Westlake, M.** 2000. *Strategic Crops' Sub-Sector*. Damascus, FAO Project GCP/SYR/006/ITA.

## **Annex Tables by Chapter**





*The State of Food and Agriculture in the Syrian Arab Republic (SOFAS) provides a systematic description of the Syrian agriculture, supported and verified by a comprehensive and updated data record.*

*It intends to support research and decision making on agricultural policies in order to sustain the challenging process of Syria's economic modernization*

*This research, besides offering an overview of the geographical features of the country, points out the crucial role of agriculture in Syrian economy and its relevant contribution to GDP. Further, it provides a focus on farming issues such as land tenure, mechanization, irrigation, animal production and agricultural inputs. With regard to environmental issues, water is identified as the engine of agriculture and, therefore, as one of the main factors affecting production. Agricultural output (both crop and animal) is then analyzed by area, yield, product and governorate, providing hints on the structure of the food companies operating in Syria both in the public and private sector.*

*Finally, the report reviews the public services supporting farmers, such as research, extension and veterinary care, and provides an overview of Syrian agricultural policies with a view at their impact on modernization and development of the sector.*