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EVALUATION OF AGRICULTURAL POLICIES IN THE SYRIAN ARAB REPUBLIC
(Policy Analysis Matrix Approach)

UNITED NATIONS
New York, 1995

Bibliographical and other references have, wherever possible, been verified.

PREFACE

The present study was initiated by the Joint ESCWA/FAO Agriculture Division at the request of the Government of the Syrian Arab Republic. The objectives of the study were to identify policy issues in agriculture and to provide strategic policy direction and recommendations intended to develop an overall framework for policy reform in the Syrian Arab Republic. The first of its kind, the study develops a policy analysis matrix for selected crops in the irrigated areas and the agro-ecological zones. The study would be helpful in making future price and trade policies inasmuch as it clearly reveals the extent of policy distortions in agriculture and estimates the comparative advantage in each crop.

A seminar was organized in November 1994 by the Syrian Ministry of Agriculture and Agrarian Reform to discuss the main finding of the study. The seminar was attended by senior policy makers, analysts from relevant ministries and a representative of the Food and Agriculture Organization of the United Nations (FAO), Rome as well as the FAO representative in the Syrian Arab Republic.

The study was completed under the leadership of the Resource Planning Economist of the Joint ESCWA/FAO Agriculture Division, and two international consultants, Amer Jabarin and Samir Hababb, and Said Al-Halabi. Three missions to the Syrian Arab Republic during the summer and fall of 1994 were undertaken to complete the work.

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INTRODUCTION

A. GEOGRAPHIC FEATURES

The Syrian Arab Republic occupies about 185,000 square kilometres (km^2). It is bordered on the north by Turkey, on the east by Iraq, on the south by Jordan and on the west by Lebanon and the Mediterranean. The narrow coast runs parallel to a twin chain of mountains separated by a rift valley. Branches of the eastern chain of mountains are found in some inland areas. Plains are located among mountain edges and near lowlands in the north-west bordering the Euphrates River and its tributaries in the north-central region and extending to the Geziereh in the north-east. The Arabian steppe-desert forms the south-eastern part of the country.

The climate in the Syrian Arab Republic is Mediterranean: cool, rainy winters, warm summers with clear skies and relatively short spring and autumn seasons. The rainy season begins in September over the coastal and north-eastern areas and spreads to other places in October. The periods of maximum rainfall are December and January. Rainfall stops in May, except for coastal areas, where it continues until June.

Total annual precipitation ranges from 100 to 150 mm in the north-west, 150 to 200 mm from the south towards the central and east-central areas, 300 to 600 mm in the plains and along mountain edges in the west, and 800 to 1,000 mm along the coast, increasing to 1,400 mm in the mountains.

Arable land covers 6.046 million hectares (ha), which constitutes about 32.6 per cent of the total area, while the cultivated area in 1992 was 5.553 million ha. The irrigated area in 1992 was 905,000 ha (about 10 per cent of the cultivated area). Rangeland and forests constituted about 43 per cent and 4 per cent of the total area, respectively (annex A.1).

For agricultural planning purposes, the country is divided into five settlement zones, the boundaries of which are drawn mainly on the basis of the rainfall patterns. These zones are:

(a) **Zone one**: rainfall greater than 350 mm. It is subdivided into two subzones:

(i) Rainfall greater than 600 mm where rain-fed crops are grown without any risk;
(ii) Rainfall between 350 and 600 mm and only two seasons out of three are secured. The area of zone one is 2.698 million ha (about 14.6 per cent of the total area);

(b) **Zone two**: characterized by rainfall between 250 and 350 mm. Two out of three seasons are secured in this zone, which has an area of 2.473 million ha;

(c) **Zone three**: characterized by rainfall greater than 250 mm in more than half of the seasons. The area covers 1.307 million ha;

(d) **Zone four**: characterized by rainfall between 200 and 250 mm in more than 50 per cent of the seasons. This zone covers 1.823 million ha;

(e) **Zone five**: characterized by rainfall of less than 200 mm in more than 50 per cent of the seasons. It covers an area of 1.0218 million ha (about 55.1 per cent of the total area of the Syrian Arab Republic) and is considered rangeland and desert.

For each settlement zone, the ideal crops and cropping patterns are determined centrally after extensive consultation with local authorities and with the relevant bodies in the farming community. The selection is not only based on strict agro-climatic factors, but takes into consideration national objectives, such as self-sufficiency in principle staples and adequate supplies or raw materials for agro-processing plants. Pressure

is exerted on the farming community to grow only the prescribed crops through a system of licences which simultaneously give farmers access to subsidized inputs and credit. For holdings of 5 ha or less, farmers are not required to obtain a licence.

There are several sources for irrigation water; they are divided as follows:

Surface water	16,477 million m^3
Springs	3,693 million m^3
Renewable underground water	2,321 million m^3
Total	22,491 million m^3

In addition, rainfall contributes about 45,000 million m^3 of water annually, but most of it either evaporates or recharges the groundwater. Only 9 per cent of the rainfall flows as surface water.

There are 16 rivers and tributaries in the Syrian Arab Republic, the largest being the Euphrates, which is 602 km long in the Syrian Arab Republic and has an average flow of 1,042 m^3/second. The Al-Khabour and its tributaries extend 405 km and flow an average of 3 m^3/second, while the Orantes and its tributaries run some 325 km and flow at an average rate of 51 m^3/second.

There are 141 dams in the Syrian Arab Republic with a total storage capacity of 25,693 million m^3. The largest dam is located at Al-Tabka on the Euphrates. It forms Lake Al-Assad and has a storage capacity of 11,200 million m^3. Approximately 640,000 ha of land are under irrigation with water from this dam. Medium-sized dams included Al Resten (225 million m^3), Mouhardeh (50 million m^3) and Taldo (15.5 million m^3). There are some 20 dams classed as small, the largest of which is Dara'a with a storage capacity of 15 million m^3; the majority of these dams are located near Homs and Hama.

Apart from Lake Al-Assad, there are five lakes in the Syrian Arab Republic, the largest being Lake Jabboul, near Aleppo (surface area about 239 km^2); Lake Qattineh (near Homs) is the principal lake in the Syrian Arab Republic that remains full throughout the year.

The population of the Syrian Arab Republic in 1992 was about 12.5 million; it is expected to reach 17 million by the year 2000. The agricultural labour force in 1992 numbered about 756,000, which constituted 25.2 per cent of the total labour force. About 25 per cent of agricultural workers are women, and about 32 per cent of agricultural labour consists of family labour.

B. LAND USE

The development of land use in the Syrian Arab Republic is shown in table 1. In 1980, the cultivated area in the Syrian Arab Republic was about 5,684,000 ha. It increased to about 5,802,000 ha in 1982, fluctuated and eventually dropped to 5,426,000 ha in 1993. The average annual decrease was about 18,600 ha. The uncultivated arable land increased by about 9,600 ha annually.

Continuous changes in land use generally result from the reclassification of land to a different use category. Such reclassification may result from changes in, *inter alia*, comparative advantage, applied technology, market forces, weather patterns, agricultural practices and government policies. Afforestation projects have converted steppe land to forests: the average annual increase in forest land between 1980 and 1993 was about 18,200 ha, while the steppe and pasture land dropped by 34,400 ha annually during the same period. Irrigation projects have converted some parts of rain-fed land to irrigated cultivated land. Irrigated land increased by about 37,000 ha annually. Urbanization has brought about the construction of buildings

and roads on cultivated land, the area of which had increased on average by 25,400 ha annually. On the other hand, planning guidelines specified cropland rotations and changed crop-fallow patterns.

The largest spread of cultivated land is in Al-Hassakeh Governorate (about 1,384,000 ha), followed by Aleppo (about 1,227,000 ha) and Al-Raqqa (about 887,000 ha). In 1993, the arable land in these three governorates constituted about 60 per cent of the total arable land in the Syrian Arab Republic. The main pasture land is in Homs (about 2,539,000 ha), followed by Dair-Ezzor (about 1,855,000 ha).

In 1984, irrigated land in the Syrian Arab Republic totalled about 617,000 ha. During the period from 1985 to 1988 it averaged 652,000 ha; it then started to increase until it reached about 1,013,000 ha in 1993. The average annual increase in irrigated land during the entire period was about 37,300 ha. The additional irrigated land was devoted mainly to vegetable production (about 31,000 ha annually), and the rest was used to plant additional fruit trees (table 2).

Although rain-fed land increased during the period 1984 to 1993 from 3,734,000 to 4,939,000 ha, it fluctuated from one year to the next. On the other hand, fallow land dropped significantly, from 1,920,000 ha in 1984 to 487,000 ha in 1993.

About 56 per cent of the irrigated land is located in Al-Hassakeh, Al-Raqqa and Aleppo (table 2). These three governorates also constituted the main rain-fed area in the Syrian Arab Republic (about 64 per cent), while Aleppo and Dair-Ezzor governorates contained the majority of fallow land (308,000 ha), as shown in table 2.

Rivers, groundwater and springs constitute the irrigation sources in the Syrian Arab Republic. Tube wells are sometimes utilized, although pumps are used in most of the rivers. In a few cases, water from springs and rivers is used without pumps to irrigate farms. The area irrigated by gravity flow increased from 117,000 ha in 1984 to 175,000 ha in 1993, while the area irrigated by wells and rivers using pumps increased annually by 30,000 and 4,600 ha, respectively (table 3).

About 27 per cent of the surface-irrigated area is located in Ghab, while about 86,000 ha were irrigated by gravity flow in Damascus, Homs, Aleppo and Al-Hassakeh. The main governorate containing tube wells in 1993 was Al-Hassakeh (301,000 ha), while Dair-Ezzor, Al-Raqqa, Al-Hassakeh and Aleppo irrigated about 163,000 ha with water pumped from rivers (table 3).

In 1993, about 3,914,000 ha were planted with winter crops; about 16.7 per cent of this area was irrigated, and the rest was considered rain-fed. The irrigated area planted with winter crops in zone one was about 208,000 ha (about 5.3 per cent of the total planted area). In zone four there were about 5,000 ha (the smallest). The area of rain-fed agriculture in zone two was the largest (about 1,177,000 ha), and the smallest was zone five (about 307,000 ha). The winter crop area, both irrigated and rain-fed, was the largest in Al-Hassaka Governorate, followed by Al-Raqqa (annex A.5).

The summer crop area in 1993 was about 367,000 ha, about 88 per cent of which was irrigated. The main zone planted with summer crops was zone two (about 840,000 ha), and the irrigated summer area in this zone was about 827,000 ha (annex A.6).

TABLE 1. LAND USE IN THE SYRIAN ARAB REPUBLIC DURING 1980-1993, AND IN THE GOVERNORATES IN 1993

(Thousands of hectares)

Year	*Uncultivated land*						*Arable land*			
	Forests	*Steppe & pasture*	*Rocky & sandy lakes*	*Rivers & lakes*	*Buildings & public roads*	*Total*	*Uncultivated*	*Cultivated*	*Total*	*Total area*
1980	467	8 485	3 082	113	327	3 521	361	5 684	6 045	18 518
1981	486	8 356	3 085	113	336	3 534	383	5 759	6 142	18 518
1982	491	8 311	3 061	113	345	3 519	394	5 802	6 197	18 518
1983	499	8 384	3 052	113	365	3 530	498	5 607	6 105	18 518
1984	498	8 319	3 039	112	381	3 532	515	5 654	6 169	18 518
1985	516	8 328	3 033	112	402	3 547	504	5 623	6 127	18 518
1986	523	8 283	3 037	116	414	3 567	508	5 637	6 145	18 518
1987	534	8 277	3 035	117	423	3 575	502	5 631	6 133	18 518
1988	542	8 231	3 063	122	494	3 679	505	5 561	6 065	18 518
1989	718	7 989	3 069	136	576	3 782	526	5 503	6 029	18 518
1990	723	7 869	3 054	136	587	3 777	523	5 626	6 149	18 518
1991	731	7 936	3 035	138	599	3 772	503	5 576	6 079	18 518
1992	655	8 059	3 022	140	597	3 759	491	5 554	6 045	18 518
1993	585	8 217	3 037	138	602	3 777	513	5 426	5 939	18 518
Damascus	36	1 336	164	4	69	236	67	127	193	1 802
Dara'a	7	28	34	2	16	111	13	214	227	373
Sweida	6	228	113	1	29	143	50	140	191	555
Quneitra	2	15	15	1	7	22	130	17	147	186
Homs	127	2 539	953	6	86	1 043	1	385	39	4 094
Hama	34	301	105	3	42	150	66	327	392	878
Ghab	38	5	1	3	10	14	0	82	82	138
Latakia	85	3	11	3	15	29	13	99	112	230
Tartous	31	3	18	2	22	41	0	114	114	190
Idleb	70	46	115	2	40	157	22	315	337	610
Aleppo	44	217	265	24	71	360	1	1 226	1 227	1 848
Al-Hassaka	95	767	33	11	44	88	106	1 277	1 384	2 333
Al-Raqqa	5	887	25	67	54	145	3	884	887	1 924
Dair-Ezzor	5	1 855	1 176	11	26	1 213	34	199	233	3 306
G.A.D.E.B.	0	0	10	0	4	14	6	19	25	39
Damascus City	1	0	2	0	8	10	0	2	2	18

Source: Ministry of Agriculture and Agrarian Reform, Planning Directorate

TABLE 2. CULTIVATED LAND ACCORDING TO TYPE OF IRRIGATION DURING 1984-1993, AND BY GOVERNORATE IN 1993

(Thousands of hectares)

Year	*Irrigated trees*	*Others*	*Rain-fed trees*	*Others*	*Total irrigated*	*Rain-fed*	*Planted area*	*Fallow*	*Total*
1984	75	542	475	2 642	617	3 117	3 734	1 920	5 654
1985	83	569	503	2 816	652	3 319	3 970	1 653	5 623
1986	88	564	530	2 721	652	3 251	3 903	1 734	5 637
1987	95	560	558	2 827	655	3 385	4 040	1 591	5 631
1988	104	546	591	3 056	650	3 647	4 297	1 263	5 560
1990	118	575	635	4 138	693	4 773	5 466	160	5 626
1991	120	669	656	3 409	789	4 065	4 854	723	5 577
1992	135	771	669	3 546	906	4 215	5 121	433	5 554
1993	124	889	548	3 377	1013	3 925	4 939	487	5 426
Damascus	36	34	22	22	70	44	114	13	127
Dara'a	7	20	19	157	27	176	203	11	214
Sweida	0	0	27	99	0	126	126	14	140
Quneitra	2	2	3	10	4	13	17	0	17
Homs	13	3	52	234	16	286	332	54	386
Hama	6	36	40	221	42	261	302	25	327
Ghab	1	69	2	10	70	12	82	0	82
Latakia	19	12	33	35	31	68	99	0	99
Tartous	7	17	62	28	24	90	114	0	114
Idleb	5	25	118	167	30	285	315	0	315
Aleppo	16	88	171	819	104	990	1 094	132	1 226
Al-Hassaka	2	355	1	920	357	921	1 277	0	1 277
Al-Raqqa	3	104	0	601	107	601	708	176	884
Dair-Ezzor	2	82	0	51	84	51	136	63	199
G.A.D.E.B.	6	11	0	2	17	2	19	0	19
Damascus City	1	1	0	0	2	0	2	0	2

Source: Ministry of Agriculture and Agrarian Reform, Planning Directorate.

TABLE 3. IRRIGATED LAND ACCORDING TO SOURCE OF IRRIGATION DURING 1984-1993, AND BY GOVERNORATE IN 1993

(Thousands of hectares)

Year	*From rivers and springs*	*Groundwater (pump)*	*Rivers*	*Total*
1984	117	295	205	617
1985	129	318	204	651
1986	153	316	183	652
1987	162	312	181	655
1988	124	310	216	650
1989	150	314	206	670
1990	134	342	217	693
1991	145	416	228	789
1992	139	531	236	906
1993	175	610	228	1013
Damascus	23	47	0	70
Dara'a	5	8	14	27
Sweida	0	0	0	0
Quneitra	1	2	1	4
Homs	20	18	7	45
Hama	9	31	3	43
Ghab	47	23	0	70
Latakia	8	3	20	31
Tartous	4	17	3	24
Idleb	1	27	2	30
Aleppo	22	56	26	104
Al-Hassaka	21	301	34	356
Al-Raqqa	13	49	45	107
Dair-Ezzor	0	27	58	85
G.A.D.E.B.	0	0	16	16
Damascus City	1	1	0	2

Source: Ministry of Agriculture and Agrarian Reform, Planning Directorate.

The total area planted with winter field crops and pulses in the Syrian Arab Republic in 1993 was about 3,896,000 ha; about 28.5 per cent of this area consisted of high-yield wheat, while ordinary wheat and barley each occupied about 5.8 per cent of that area (figure 1). Lentils and chick-peas occupied about 2.7 per cent and 2 per cent of the area planted with winter field crops and pulses in 1993 (figure 2). About half of the high-yielding wheat was produced under irrigation, while about 94 per cent of the ordinary wheat was produced in rain-fed areas. All sugar beet is produced in irrigated areas (annex A.9). Zone two had the largest area producing winter field crops and pulses (about 1,352,000 ha). It produced about 2.1 million tons, but zone one produced about 2.7 million tons from only 837,000 ha. High-yield wheat was produced mainly in zone one (about 50 per cent of total production). On the other hand, zones one and two produced about 92 per cent of the ordinary wheat (annex A.11).

Annex A.10 shows that the main summer field crop in 1993 was cotton, followed by sugar beet. It also shows that all the main summer field crops are produced in irrigated areas (figure 3).

Figure 1. HARVESTED AREA OF WHEAT AND BARLEY (1975-1993)

(Thousands of hectares)

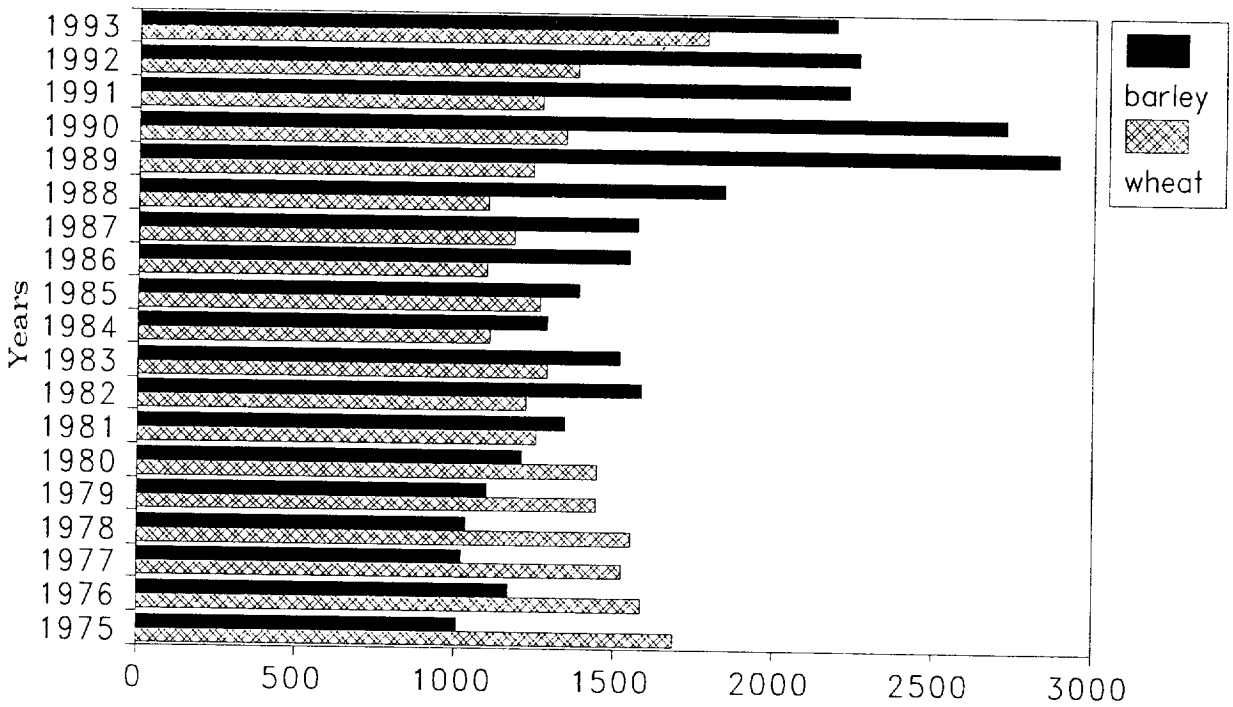


Figure 2. HARVESTED AREA OF CHICK-PEAS AND LENTILS

(Thousands of hectares)

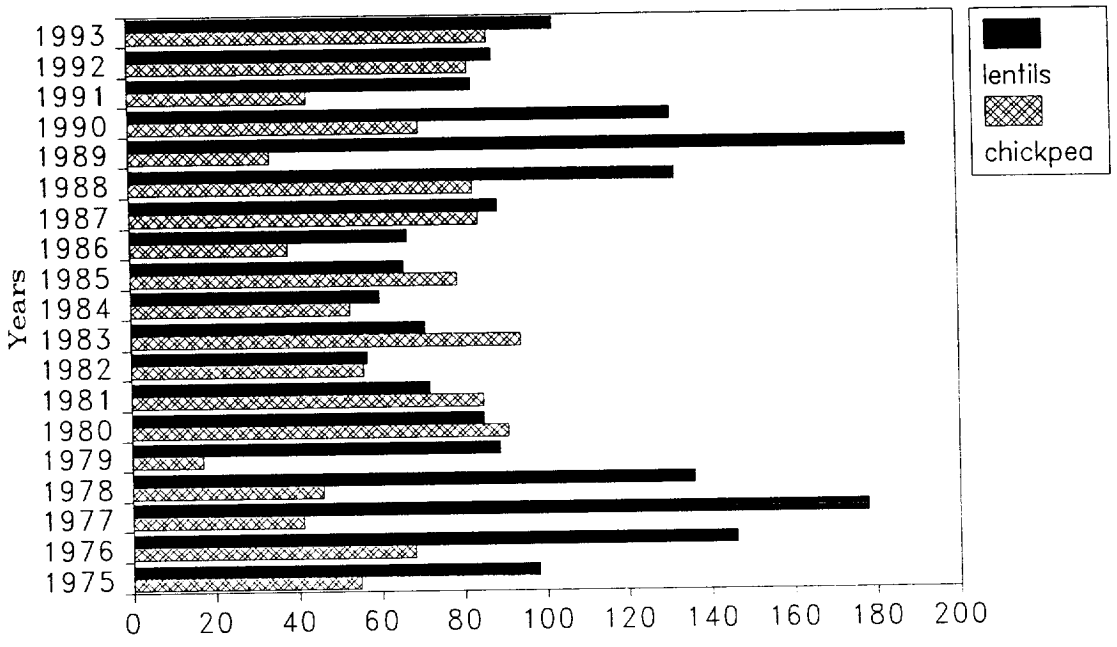
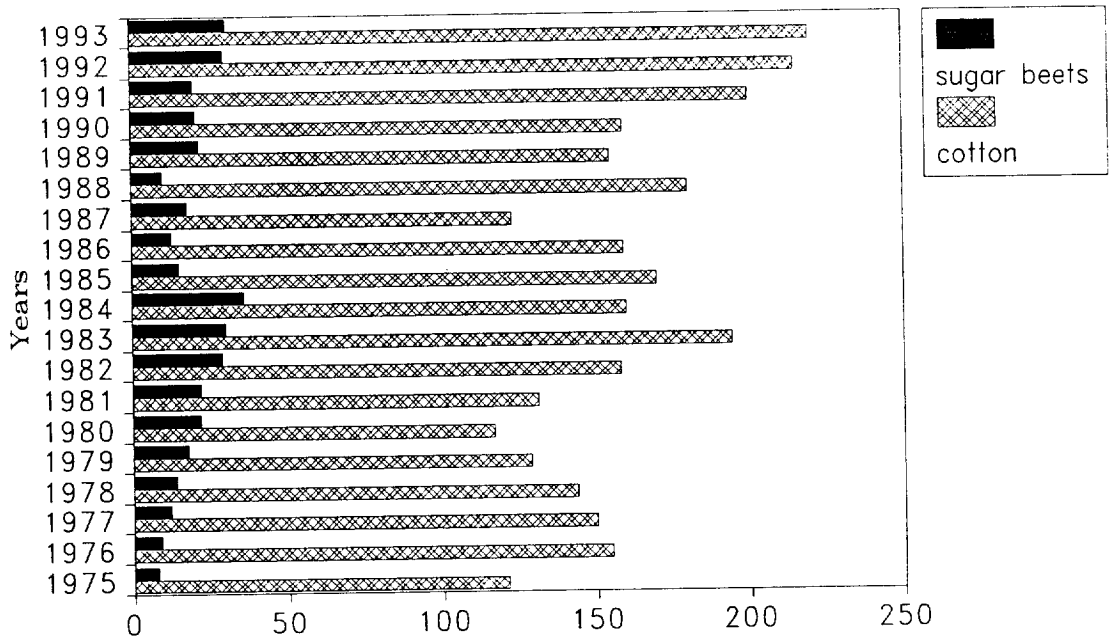


Figure 3. HARVESTED AREA OF COTTON AND SUGAR BEETS

(Thousands of hectares)



I. AGRICULTURAL PRODUCTION AND MARKETING

As mentioned in the introduction, wheat, barley, lentils, chick-peas and sugar beets are the main winter crops in the Syrian Arab Republic, while cotton, maize and sunflower are the main summer crops. These eight crops are studied in detail below, using the data presented in annex A.13.

A. WHEAT

Wheat is produced in both irrigated and rain-fed areas. High-yield wheat is produced mainly under irrigation. Wheat production fluctuated during the period 1983 to 1992. It was about 1.6 million tons in 1983, then dropped to 1.1 million tons the following year, and recovered to reach about 2 million tons by 1992.

The Syrian Arab Republic imports small amounts of soft wheat to be mixed with the local hard wheat so as to enrich its quality. Wheat exports are negligible.

The General Organization for Trading and Processing of Grains (GOTPG) has a monopoly on the grain trade and is the sole legal purchasing organization.

In terms of grain traded, Al-Hassakeh Governorate is by far the most important area. Since permission to sell to other governorates and to export must be granted by the Government, illegal domestic and border sales take place, but the extent is not known. The major part of untraded grains is retained on farms for household needs. The current high level of subsidization of bread serves as an important incentive to attract increasing quantities of wheat to the purchasing centres operated by the GOTPG throughout the country. This organization is also responsible for the foreign trade in grains. Figure 4 summarizes the marketing channels for wheat in the Syrian Arab Republic.

The quantities of grain are delivered in bags at the purchasing centres, but the Cereals Office also makes arrangements to purchase grain directly from some producers, particularly the small farmers, and trucks are sent to the farm to collect the grain.

Direct purchases of grain at the silo plants is not a common practice. The operation of the silo plants is the responsibility of the General Company for Elevators (GCE). Most of the wheat is delivered from storage to the General Company for Trade and Grain Processing (GCTGP), which sells the flour to the General Institution for Consumption (GIC).

Since the Syrian Arab Republic is seldom self-sufficient in wheat, the GOTPG imports wheat and wheat flour to supplement the local production. Owing to a shortage in milling capacity, most wheat is imported as flour and delivered directly to the GCE. The primary reason for not delivering imported flour directly to bakeries is that imported flour is usually mixed with locally produced flour before delivery.

Consumers purchase bread baked mainly in bakeries owned by the General Company for Baking. The rest is purchased from private bakeries. The GIC sells flour to consumers, while local traders sell only grain.

B. BARLEY

Barley is produced mainly under rain-fed conditions. About one third of the crop was produced in zone three. Barley production witnesses more fluctuation than that of wheat. The highest production was about 2.8 million tons in 1988, and the lowest was 279,000 tons in 1989. The production of barley in 1992

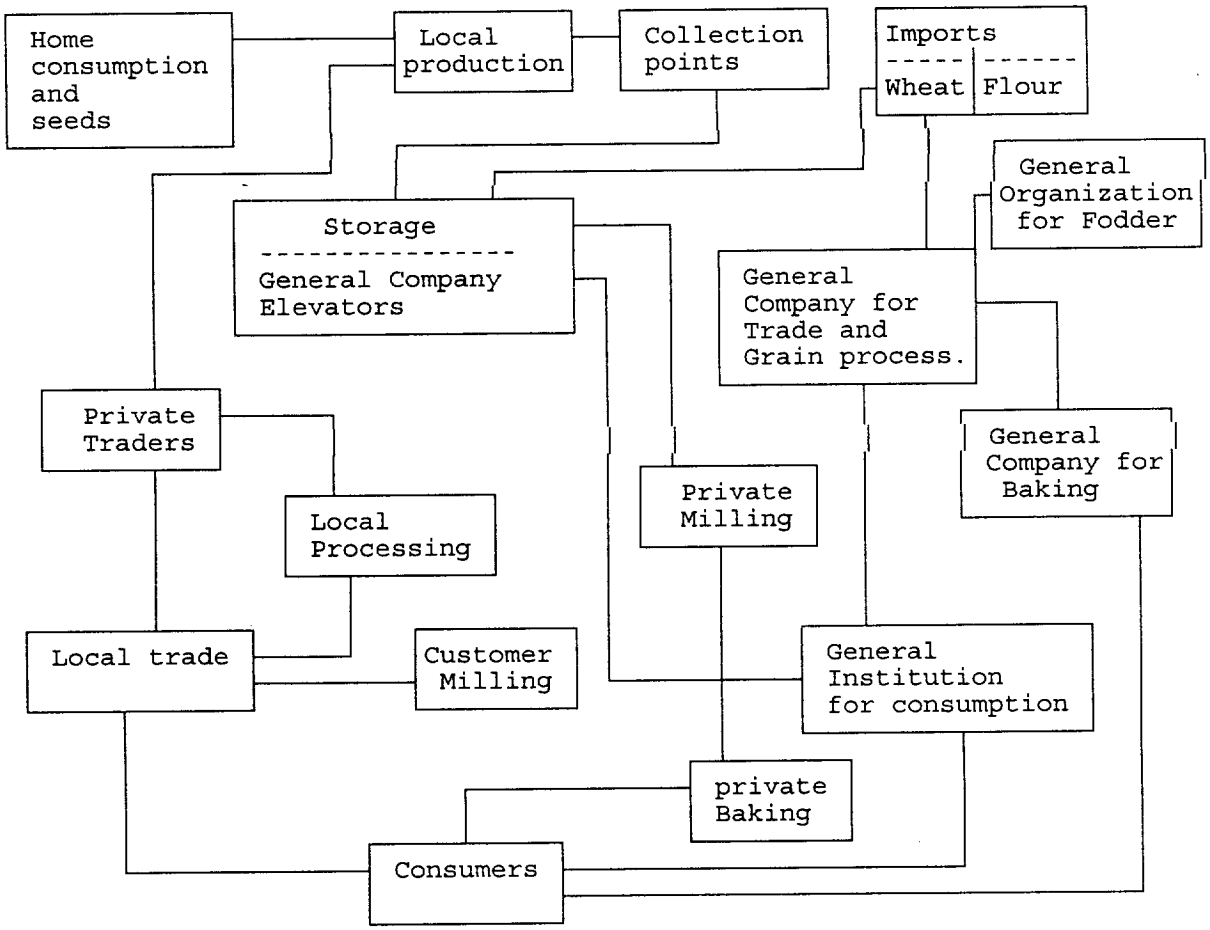


Figure 4. MARKETING CHANNELS FOR WHEAT

was about 1.1 million tons.

The largest quantity imported was about 299,000 tons in 1984, but there were no imports in 1986, 1989 or 1990. On the other hand, the Syrian Arab Republic exported only small quantities in 1983 (57,000 tons) and in 1988 (177,000 tons). The GOTPG also purchases barley through its centres, which are open from the middle of May until September. For small lots of grain, the GOTPG employs agents to purchase the barley on its behalf.

The GOTPG procures barley from farmers at prices fixed by the Higher Agricultural Council (HAC). A premium is given for deliveries before and after the main harvest period to avoid the peak period. Private trade in barley is restricted primarily by prohibiting the transport of barley between the governorates without a GOTPG certificate.

Most of the barley purchased by GOTPG is sold to the General Organization for Fodder (GOF) (see figure 5). In some periods, the price paid by the GOF is lower than the GOTPG purchasing price. The GOF sells grains to sheep, cattle and poultry producers.

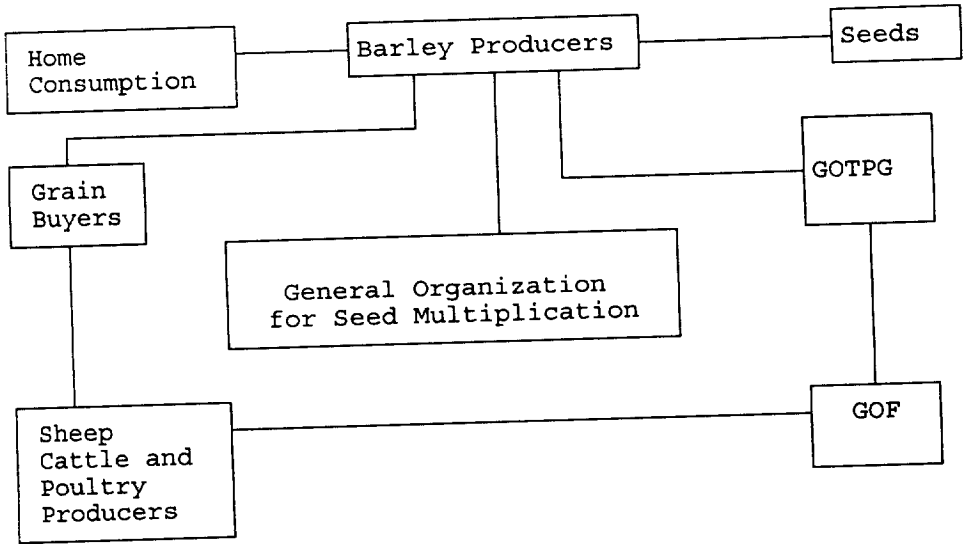


Figure 5. MARKETING CHANNELS FOR BARLEY

C. LENTILS

During the period from 1983 to 1992, production of lentils also fluctuated. The highest level of production occurred in 1988 (171,000 tons), and the lowest (36,000 tons) in 1984. No lentils were imported during the period 1983 to 1992, but there were varying levels of exports. The largest quantity (95,000 tons) was exported in 1989, while exports in 1984 were nil.

In 1990, about 63 per cent of lentil production was sold to the GCTGP, which sold most of it to the General Institution for Consumption (GIC). The GIC then sells the lentils to consumers.

D. CHICK-PEAS

Chick-pea production also fluctuated during the period under study, with the lowest level (13,000 tons) occurring in 1989 and the highest (74,000 tons) in 1992. The Syrian Arab Republic has not imported any quantities of chick-peas, and exports have come to a virtual halt since 1990.

Only small quantities of chick-peas were delivered to the GOTPG in 1989 (about 7,300 tons) and in 1990 (about 3,000 tons). The GOTPG sold most of the chick-peas to the GIC, which resold it to consumers.

E. MAIZE

The Syrian Arab Republic is far from self-sufficiency in maize production. The average production during the period 1989 to 1991 (the highest production period) was about 174,000 tons, while the apparent demand during the same period was 378,000 tons. Thus, the self-sufficiency ratio during that period was about 45 per cent. Maize marketing follows the same pattern as that of barley, except that there is no role for the General Organization for Seed Multiplication.

F. SUGAR BEET

The Syrian Arab Republic neither imported nor exported sugar beet from 1984 to 1994. Although sugar beet production is governed by planning policies, it fluctuated during the period under study. The highest production level was 1,365,000 tons in 1992, and the lowest was 187,000 tons in 1989.

All quantities produced are delivered to the processing factories owned by the Government. Sugar is then sold to the GIC, which sells it to consumers. Sugar beet pulp is sold to the GOF, which sells it to sheep and cattle farmers. The molasses is used in the production of alcoholic drinks.

G. COTTON

Cotton is the main agricultural cash crop in the Syrian Arab Republic, and until 1974 it was the most exportable product. Currently, it is second only to oil in foreign exchange earnings. The highest level of production of cotton lint was 555,000 tons in 1991. In 1992 it dropped to 55,000 tons.

Marketing of cotton has been the responsibility of the Cotton Marketing Organization (CMO) since 1965, when this activity was nationalized. Currently, only the State has the authority to buy cotton seeds from producers. The purpose of CMO is to procure cotton seeds and gin and to market lint cotton and the by-products of ginning. Currently, about 50 per cent of lint production is exported, and most of the remainder is used by the Syrian textile industry. All cotton seeds (except small quantities supplied to farmers through the Cooperative Agricultural Bank [CAB] as loans) are transferred to the State-owned company for vegetable oil processing. Oil is then sold to the Union of Food Industries, which sells it to consumers. Control of the cotton industry by the State begins with the issuance of licences to farmers to grow cotton, and this control continues through the marketing system (figure 6).

Cotton is a product in which the Syrian Arab Republic has a clear competitive advantage in production and marketing.[1/] The product is profitable at all levels and brings a favourable price in international markets. Partly because it is hand-picked, it is normally priced above the average international price of cotton having comparable grade and stable length.

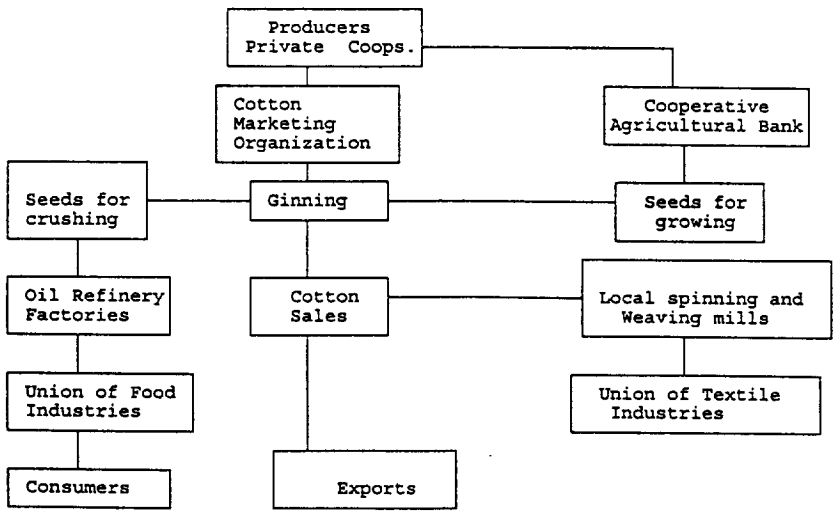


Figure 6. MARKETING CHANNELS FOR COTTON

[1/] United States Department of Agriculture (USDA) and United States Agency for International Development (USAID), "Agricultural Sector Assessment—Agricultural Marketing Annex", vol. 4, 1980, p. 72.

II. MACROECONOMIC FRAMEWORK

A. AGRICULTURAL ROLE IN NATIONAL DEVELOPMENT

During the 1970s, the gross domestic product (GDP) in the Syrian Arab Republic witnessed strong growth (6.7 per cent annually from 1975 to 1980 at constant market prices). From 1980 to 1985, however, its growth slowed to 2.9 per cent and thereafter the average growth was 1.6 per cent throughout the rest of the 1980s. It increased by 11 per cent annually from 1990 to 1992, with the mining and manufacturing sector in the lead. In 1970 the mining and manufacturing sector produced about 15.2 billion Syrian pounds (LS) (at constant 1985 prices); afterwards, it increased continuously and reached about LS 66.3 billion in 1992.

An FAO report indicated that

> The external payments position deteriorated throughout the first half of the 1980s, showing a deficit in 1985 of 1 billion Syrian pounds. Despite a reduction in transfers received from other Arab countries in the Gulf in recognition of the Syrian Arab Republic's position as a front-line State and of remittances by Syrian nationals living and working abroad, the second half of the decade showed a steady improvement in the balance of payments as a result of booming oil exports and of the Government's import compression policies. The country, nevertheless, went through a severe foreign exchange crisis in 1986 through 1988. According to World Bank figures, the Syrian Arab Republic's foreign debt stood at about US$ 5 billion in 1988, of which about 75 per cent is long term.[2/]

In the second half of the 1980s, expenditure increased nominally but was wiped out by inflation. Budgets are normally submitted in disequilibrium, and the difference is made up by projected internal and foreign borrowing. Recurrent expenditure is the main cause of budget deficits. Their burden on public funds stems from the rapidly growing wage bill, the large transfers to productive activities, especially in agriculture, and direct subsidies on consumption. The total expenditure on consumption in 1991 (at constant 1985 prices) was LS 96 billion, 84 per cent of which consisted of private consumption. The total investment in the same year was LS 10.4 billion, about 52 per cent of which came from the private sector.

The average contribution of the agricultural sector to the GDP during the period from 1970 to 1992 was 18.6 per cent, the lowest contribution was 16.3 per cent in 1985, and the highest was 19.6 per cent in 1970. The average contribution during that period was LS 24.27 billion. Production in the agricultural sector increased from about LS 9.1 billion in 1970 to LS 32.8 billion in 1992 (over 260 per cent).

The highest value of plant production was about LS 20.5 billion in 1988; however, it dropped to LS 13.2 billion in 1989. This drop was mainly due to the drop in cereal production from LS 7.3 billion in 1988 to about LS 1.4 billion in 1989. The value of plant production recovered to reach LS 20.1 billion in 1992. This increase was noticed in all plant production subsectors.

On the other hand, livestock sector production increased slowly, from LS 7.5 billion in 1988 to LS 12.7 billion in 1992. Milk production was the leading subsector in animal products inasmuch as it produced about LS 5.9 billion in 1992. The livestock subsector was next with about LS 4.9 billion.

The importance of the agricultural sector, in addition to its contribution to the GDP, lies in owning the main factors of production, such as land, water and forests. Such ownership plays a major role in providing food to the growing population and provides inputs for agro-business enterprises. The share of agricultural

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[2/] Food and Agriculture Organization of the United Nations (FAO), "Report of the FAO Programming and Project Identification Mission" (Rome, 1991), p. 4.

exports in total exports was about 15 per cent in 1989; it increased to 16.4 per cent in 1990 and to 18 per cent in both 1991 and 1992.

The socio-economic development plans in the Syrian Arab Republic emphasize dependence on commodity-producing sectors, mainly the agricultural sector, through the following strategies:

(a) Taking Arab economic integration into consideration in planning, and encouraging Arabs to invest in bilateral projects;

(b) Emphasizing the need for integration between the public, private and mixed subsectors to provide higher quality products that meet the needs of local and external markets;

(c) Giving priority to productive sectors (agriculture, irrigation, industry and energy), especially production for exports;

(e) Investing in technologies aimed at increasing productivity;

(f) Depending on local resources to meet public expenditure needs;

(g) Developing production services and agricultural policies to increase production of strategic products;

(h) Encouraging the processing of agricultural products that are in surplus during the high season;

(i) Keeping the environment clean.

B. POLICIES RELATED TO THE AGRICULTURAL SECTOR

The Syrian Arab Republic has a mixed socialist-capitalist economy, and the Government is involved in preparing production plans for the main products and in setting prices at all levels, as well as owning and operating a substantial part of the agricultural and food marketing system. This section reviews the most important policies relating to agriculture, such as agricultural planning and production policies, pricing policies, marketing policies, exchange rate policies and input subsidization policies.

1. *Agricultural production planning policy*

As mentioned in the introduction, general cropping patterns and production and input utilization for agriculture are centrally planned in the Syrian Arab Republic. The main actors in this process are the farmers, the Ministry of Agriculture and Agrarian Reform, the Farmers' Union, the Cooperative Agricultural Bank (CAB) and the Higher Agricultural Council (HAC). Planning is generally done on an annual basis within the context of national five-year plans. After information regarding the desired planting of major crops makes its way from the farmers through the village, cooperative, province and governorate to the national level, final plans for the area planted with major crops are developed. The area plans are then passed down via the HAC, the Ministry of Agriculture and Agrarian Reform and the Farmers' Union to various government departments and ultimately to the farmers.

Implementation of planned cropping patterns is carried out by means of a licensing process administered by the Farmers' Union and the Ministry of Agriculture and Agrarian Reform as well as other agencies. Each fall, a date is announced on which farmers may obtain licences for the subsequent year. For

private farmers, a number of items must be certified by the agriculture office representative at the provincial level in order for the farmer to be licensed. These items are as follows:

(a) He must own or control his land (more than 5 ha) and cultivate it;

(b) He must not be a member of a cooperative;

(c) He must have a licence from the appropriate authorities if he wishes to irrigate his land;

(d) He should complete official documents describing his operational plan.

Once all of the above-mentioned items are certified, the farmer can, through the provincial office, obtain a licence specifying the area devoted to various crops as well as quantities of inputs (primarily seeds, fertilizers, pesticides and credit) that he is entitled to obtain or borrow from CAB.

All of the main agricultural crops produced in the Syrian Arab Republic are licensed. This includes cereals, cotton, vegetables, tobacco and sugar beets. All other commodities are licensed if the farmer desires a loan from CAB. For some commodities such as tobacco and sugar beets, licences are handled on an allotment or contract basis in cooperation with particular organizations or establishments that are responsible for those commodities. In the case of tobacco, the licence is issued to the farmer on an annual basis, and penalties are assessed on farmers who market less than the amount for which they were licensed.

Owing to the variation in the weather, it can be assumed that production planning is difficult and, in any given year, can deviate substantially from plans formulated at the beginning of the growing season. It is also generally known that, despite regulations relating to the use of inputs obtained through the licensing process, some farmers may shift to other, more profitable, crops, such as vegetables. Also, subsidizing inputs may cause inefficient applications that may increase the salinity of land.

The Ministry of Labour and Social Affairs sets guidelines for farm lease arrangements between landlords and tenants on private and cooperative farms. If the land is irrigated by pumping from underground sources, the tenant pays 20 per cent of the production plus the expenses of pumping. When the owner pays the irrigation tax, in cases where canals and ditches are used, the tenant pays 25 per cent of his production. If it is a government irrigation project, the charge to the tenant is 25 per cent. In the case of non-irrigated land, the owner receives 15 per cent of the production in return for the use of the land.

The Ministry of Labour and Social Affairs does not involve itself in livestock-share arrangements, except as they apply to wages paid for labour in general. If an owner provides pasture for sheep, however, he would be entitled to 20 per cent of the production. Leases are written on an annual basis and are automatically renewable.

2. *Pricing policies*

The pricing policy in the Syrian Arab Republic plays a significant role in the development strategy. The main goals of the pricing policy may be summarized as follows:

(a) To establish prices of agricultural products so as to ensure a stable income for the productive farmer and to direct agricultural production practices in order to reach the planned targets;

(b) To mobilize rural manpower so as to utilize agricultural resources fully and develop the rural sector in general;

(c) To achieve self-sufficiency in the production of main foodstuffs and commodities and endeavour to achieve increasing rates of self-sufficiency in other commodities;

(d) To improve food standards and, in particular, the availability of animal proteins, and to increa production of fruits and vegetables at relatively attractive prices;

(e) To provide agricultural raw material for domestic industry for the production of the require quantities of manufactured goods;

(f) To achieve a trade surplus in order to reduce the balance of trade deficit;

(g) To achieve real increases in the agricultural GDP;

(h) To protect both producers and consumers against domination by market middlemen who reap disproportionately high benefits relative to the value of the services that they perform;

(i) To regulate the agricultural market through considerable planned production and marketing activities, but not necessarily to monopolize all stages of commodity production and marketing;

(j) To provide adequate profit margins for the main crops so that they can compete with the secondary products that are freely priced;

To achieve the above-mentioned goals, the HAC, in consultation with the Farmers' Union, established the following strategies:

(a) The cost of production should be established on the basis of standards prepared by the Ministry of Agriculture and Agrarian Reform and the Farmers' Union by specifying input needs for each crop in physical (such as kilograms, hectares or tons) and monetary units;

(b) A permanent central committee should be established for estimation of the cost of production. This committee should consist of representatives of the Ministry of Agriculture and Agrarian Reform, the National Farmers Bureau, the Ministry of Supply and Internal Trade, the Farmers' Union, the Agricultural Engineering Association and CAB;

(c) Prices should then be determined for each of the following crop categories:

(i) The HAC sets the prices of the main products handled by government agencies. These products are: wheat, barley, cotton, sugar beets and tobacco;

(ii) The planned products that are handled by other agencies are priced according to the cost of production but are freely traded. If the farmer wishes to sell to the Government, the government agencies are obliged to buy any quantities of this group for only 10 per cent over the cost of production. These products include: potatoes, onions, garlic, peas, tomatoes and grapes for processing, apples, milk, eggs and broilers;

(iii) The prices for all other agricultural products are set by secondary committees in the governorates based on market prices three times per week.

The HAC sets the wholesale prices by adding wide profit margins (34 to 76 per cent) for the main products according to the policy for each product, as stated in table 4.

Table 4. COST OF PRODUCTION AND PROFIT MARGINS FOR MAIN AGRICULTURAL PRODUCTS, 1987-1992
(LS/kg)

		Year					
Crop		*1987*	*1988*	*1989*	*1990*	*1991*	*1992*
High-yielding wheat	Cost	1.82	2.43	2.85	4.19	4.55	4.92
	Price	2.50	3.60	5.10	7.5	8.00	8.50
	Margin (%)	37	48	79	79	76	73
Durum rain-fed wheat	Cost	1.89	2.5	2.96	4.69	5.68	5.68
	Price	2.65	3.75	5.75	8.50	9.00	9.50
	Margin (%)	40	50	49	81	58	67
Barley	Cost	1.74	2.14	2.47	3.79	4.48	4.50
	Price	2.00	2.80	3.50	5.50	6.25	6.50
	Margin (%)	15	31	42	45	40	44
Chick-peas	Cost	4.95	6.26	7.06	9.76	9.78	10.60
	Price	7.00	9.00	10.00	13.50	15.00	16.00
	Margin (%)	41	44	42	38	53	51
Lentils	Cost	4.88	6.90	7.81	10.51	10.57	11.50
	Price	6.00	8.00	9.00	12.00	12.25	14.00
	Margin (%)	23	16	15	14	16	22
Maize	Cost	2.44	3.39	3.76	5.26	5.26	5.50
	Price	3.00	4.00	5.50	7.00	7.00	7.00
	Margin (%)	23	18	47	33	33	27
Cotton	Cost	4.96	7.32	8.43	11.67	12.50	13.50
	Price	6.65	10.00	14.00	19.00	20.00	2.00
	Margin (%)	31	37	66	63	44	48
Sugar beet	Cost	0.38	0.44	0.67	0.91	1.25	1.30
	Price	0.40	0.55	0.85	1.25	1.90	1.90
	Margin (%)	25	27	37	52	68	46
Sunflower	Cost	N/A	8.10	8.19	11.94	11.94	N/A
	Price	N/A	14.00	14.00	16.00	16.00	N/A
	Margin (%)	N/A	73	52	34	34	N/A

Source: Ministry of Agriculture and Agrarian Reform.

3. *Marketing policies*

The goals of the current policy regarding the marketing of agricultural products are as follows:

(a) To protect both the producer and the consumer against domination by individual intermediari which may occur in an uncontrolled marketing system;

(b) To provide adequate economic incentives to encourage production and the crop compositio specified by the plan;

(c) To supply the public sector institutions responsible for trade and industrialization with the needed quantity of agricultural goods according to the plan;

(d) To supply foodstuffs to consumers at prices which keep up with inflation to the extent possible;

(e) To transfer cooperative marketing and production gradually to private individuals.

The import policy emphasizes the added role of the private sector in ensuring market efficiency. The Government allows the private sector, in addition to the public sector, to spend 75 per cent of the value of its export earnings on imported commodities.

As export earnings are needed to cover imports, the Government established a committee headed by the Deputy Prime Minister for Economic Affairs and other ministers. The committee was to be responsible for export promotion and would decide on the commodities that each institution or ministry could export to generate foreign exchange for their needs. The first step that this committee took was to switch from the concept of "available for export" to "what could be exported"; in other words, all restrictions on exportable products were to be eliminated. The committee also encouraged cooperation between the public and private sector and obliged the public sector to develop an export plan with clear and well-stated objectives and implementation procedures.

4. *Exchange rate policy*

The exchange rate policy depends on assigning a value to the Syrian pound with respect to the United States dollar. Exchange rates with other currencies are subsequently determined. Because the official exchange rate was significantly low with respect to the real exchange rate (the official rate was LS 4 = US$ 1, and the market exchange rate was LS 26 = US$ 1), the Government created multiple levels of exchange rates in the early 1980s to narrow the gap between the two rates, thus encouraging investors to bring in hard currency. In addition to the market rate, the Government set three exchange rates: the official exchange rate (LS 11.25 = US$ 1), the encouragement rate (LS 22 = US$ 1) and the tourism price (LS 42.25 = US$ 1).

The policy of multiple exchange rates has had negative effects on the various economic sectors. Food, medicine, fertilizers and pesticides are imported by the CAB using the official rate, while machinery is imported using the tourism rate.

The main reasons for the shortage in hard currencies in the Syrian Arab Republic prior to 1988 may be summarized as follows:

(a) Use of the official exchange rate (LS 11.25 = US$ 1) for government exports and imports;

(b) The Central Bank of Syria followed the instructions of the Ministry of Economy and Foreign Trade and the permanent central committee (composed of various representatives of ministries and public institutions). At the same time, the Government froze the Monetary and Finance Board, which had been responsible for Syrian monetary policy in the 1950s;

(c) The Government's dependence on financing projects by borrowing;

(d) The Government was financing imports without obliging the importers to bring back the hard currency. This procedure has changed under Investment Encouragement Decree No. 10 of 1986, which provided more freedom in trade and hard currency movement. A 1991 amendment allows an exporter to keep 75 per cent of his earnings in hard currency outside the Syrian Arab Republic, in order to finance his imports directly, and return the rest to the Syrian Arab Republic to be exchanged at the most favourable rate available;

(e) The use of a unified fixed interest rate for a long period of time.

5. *Agricultural input policies*

Until recently, almost all inputs benefited from explicit and implicit subsidies. This subsidization results mainly from the use of the official exchange rate to price these inputs (an overvalued exchange rate). The only agricultural inputs that remain subsidized are irrigation water and fertilizers.

C. IRRIGATION WATER

Water, especially from the Euphrates basin, is heavily subsidized. The Government charges LS 1,250/ha, while the real cost of operation and maintenance, according to expert opinion, exceeds LS 5,000/ha. The Government intends to increase water charges in 1995 to LS 2,500/ha.

The cost of pumping water differs according to the source of the water. Pumping one cubic metre from rivers costs about LS 0.54, from shallow tube wells the cost rises to LS 0.89, and from deep tube wells it is LS 1.45.

D. FERTILIZERS

Fertilizers are imported by the Government and distributed to farmers through the CAB. Until recently, at least 40 per cent of the cost of fertilizers was subsidized, the goal being to increase productivity, especially in controlled crops.

Table 5 shows the quantities of the main types of fertilizers used from 1985 to 1990. Nitrogen applications increased constantly during this period. The use of phosphorus fertilizers increased every year until 1989, when it reached about 109,000 tons, but it dropped in 1990 to less than 92,000 tons. The use of potash fertilizers followed the same pattern as phosphorus.

The CAB is responsible for the storage and distribution of all chemical fertilizers used in agriculture. The Higher Agricultural Council (HAC) provides the CAB with an estimate of the fertilizers needed, by kind, for the coming year. Projections for fertilizer consumption are contained in each five-year plan and in each annual plan. The CAB adds 20 per cent to the annual estimate provided by HAC to ensure that sufficient stocks are available if the weather makes application of additional fertilizers profitable.

TABLE 5. QUANTITIES OF THE MAIN FERTILIZERS USED DURING 1985-1990
(In thousands of tons)

Type of fertilizer	Year					
	1985	1986	1987	1988	1989	1990
Nitrogen	126.7	140.6	143.6	158.4	160.6	153.6
Phosphorus	74.3	85.1	95.5	99.7	109.2	91.6
Potash	5.7	6.2	6.8	9.4	10.5	4.4

Source: ESCWA, The current situation of agricultural product marketing in the Syrian Arab Republic: rationalization of food consumption and distribution (in Arabic) (E/ESCWA/AGR/1992/10).

Approximately 50 per cent of fertilizers are produced locally, and the rest are imported by the General Foreign Trade Organization for Chemicals and Foodstuffs (GEZA). Most imported fertilizers are brought in by sea through the ports of Tartous and Latakia. The CAB transfers fertilizer to the warehouses in each CAB branch. The fertilizers are then distributed to farmers on either a cash or in-kind basis. The private farmer buys fertilizer directly from the CAB, while cooperative members receive it through their local cooperative association.

E. PESTICIDES

All pesticides and related chemicals are imported from abroad. Sulphur powder is the only locally produced fungicide. The Syrian Arab Republic is planning to establish factories for pesticide production with the help of Arab and international agencies. Pesticides were subsidized until 1989, after which they were sold at cost. The private sector, along with the government sector, is allowed to import any quantity of pesticides.

Each year the Ministry of Agriculture and Agrarian Reform estimates the quantity of chemicals needed. This estimate is given to the CAB, which notifies GEZA of its chemical requirements. GEZA then imports the chemicals through international tenders either overland from Europe or by sea. The private sector is permitted to import and distribute the pesticides after acquiring licences from the Ministry.

The CAB is the only government institution that is allowed to store and distribute the pesticides purchased by the Government. Private companies and the CAB distribute about the same amount of pesticides (in terms of value) to farmers each year. The main responsibility of the CAB is to provide pesticides to cover all major crops, including sugar beet, cotton, wheat, barley and vegetables.

All imported pesticides are inspected thoroughly by the Government to ensure that they are suitable for local conditions and that any side-effects on the environment and on human beings are acceptable.

F. MACHINERY

Tractor production in the Syrian Arab Republic is limited to the manufacture of about 20 per cent of the tractor parts. The remainder is imported for assembly at the Al-Frat tractor plant in Aleppo. The General Machinery Company (GMC) is responsible for supplying imported tractors to farmers whose needs are not met by the locally assembled 71-hp Erbo tractor. Germany and the United States of America are the main

suppliers of large tractors, while Romania provides low-horsepower tractors for use in fruit tree production and gardens.

Private and cooperative farmers purchase tractors from the GMC office in Aleppo. Implements and spare parts may be purchased from distribution stores of the Farmers' Union. The private sector is now allowed to import agricultural equipment or harvesters with its own hard-currency earnings.

G. AGRICULTURAL CREDIT POLICY

The main objectives of the Syrian agricultural credit policy are: (a) to provide producers with the credit necessary to enable them to comply with annual production targets and programmes; and (b) to extend such credit facilities at low interest rates, especially for cooperatives and State farms. The CAB is the main source of institutional agricultural credit in the country inasmuch as it provides about 90 per cent of the total credit for agriculture.[3/] The rest is provided as built-in credit for inputs by commodity organizations specializing in, for example, tobacco or sugar. Middlemen and merchants also provide small producers with credit.

CAB provides agricultural inputs such as seeds, fertilizers and pesticides as loans in kind and extends cash loans for agricultural projects such as poultry and animal fattening. Its financing activities are determined by the agricultural plan formulated annually by the Ministry of Agriculture and Agrarian Reform and approved by the Higher Agricultural Council.

CAB also acts as a medium for transferring payments from farmers after deducting outstanding loans for cotton, sugar beets, groundnut and potatoes.

CAB provides three types of loans:[4/]

(a) Seasonal or short-term loans to finance purchases of seeds, pesticides, fertilizers and agricultural implements as well as the fattening of animals. Such loans must be repaid within one year, except in the case of crop failure, when repayment is usually postponed. The interest rate charged for these loans ranges from 4 to 7.5 per cent (4 per cent for State farms, 4 to 6 per cent for cooperatives and 5.5 to 7.5 per cent for individual farmers);

(b) Medium-term loans, which must be repaid within five years. This type is usually extended to finance: (i) the purchase of agricultural machinery; (ii) land preparation; (iii) the establishment of poultry farms, greenhouses and fish-ponds; and (iv) the digging of wells and the purchase of pump sets. These loans carry interest rates ranging from 4 per cent (for State farms and cooperatives) to 5.5 per cent (for individual farmers);

(c) Long-term loans, which must be repaid within 10 years. They are usually extended to finance such activities as (i) construction of storage areas, (ii) establishment of livestock farms, (iii) purchase of land for cooperatives, (iv) irrigation and drainage works and (v) construction of cold stores. The interest rates for these loans are the same as for medium-term loans.

[3/] Food and Agriculture Organization of the United Nations (FAO), "Report of the FAO Programming and Project Identification Mission" (Rome, 1991), pp. 54-55.

[4/] Ibid.

The loan recovery rate was, on average, about 98 per cent during the period from 1987 to 1990. The high repayment rate is due to the following:

(a) CAB controls the sale of inputs, especially for sugar beet and cotton, where repayment is ensured by having the payments to producers channelled through CAB;

(b) The direct subsidy on fertilizers renders loans on this product easy to repay;

(c) Interest rates are much lower than the inflation rate, and this implicit subsidy facilitates a high repayment rate.

III. THE POLICY ANALYSIS

A. OBJECTIVES OF THE POLICY ANALYSIS

Governments often intervene in the national economy to achieve certain objectives. These objectives include improving the distribution and stability levels of the real income in the economy, increasing production of food commodities, and improving the efficiency of resource allocation. To reach these objectives in the agricultural sector, a Government uses different policy tools, such as: (a) intervention in production plans; (b) fixing input prices; (c) subsidization of output prices; (d) tariffs and quotas on imports competing with domestic products; and (e) multiple exchange rates for import and export.

It is well known that markets play a crucial role in allocating resources and direct agricultural production. However, the public sector plays an important role in supporting markets by: (a) providing the necessary infrastructure, such as irrigation systems and roads; (b) providing sound macroeconomic policies that avoid high rates of inflation and appreciated exchange rates; (c) providing agricultural market information, research and extension; and (d) facilitating the creation of an environment conducive to the development of competitive markets.

A recent FAO study[5/] on the agricultural sector of the Syrian Arab Republic concluded that the Five-Year Development Plan (1991-1995) was expected to place considerable emphasis on promoting greater efficiency in the use of natural resources such as water, as well as financial and human resources. The overall objective of the study was to determine the impact of public policies, including output and input prices, resource prices, credit subsidies and exchange rates, on the efficiency of producing wheat, barley, lentils and chick-peas under rain-fed conditions, and wheat, cotton, sugar beet, maize and sunflower seeds under irrigation in four governorates.

Primary data gathered by a team from the Syrian Ministry of Agriculture and Agrarian Reform were used to build different enterprise budgets for selected crops in the different production areas. The budgets were then used to build several accounting matrices. The accounting matrix is called a Policy Analysis Matrix (PAM) and is designed to help elucidate the interactions of the many policies that influence agricultural incentives. The PAM also helps to highlight any trade-offs between policy objectives.[6/]

B. THE POLICY ANALYSIS MATRIX (PAM)

1. *Empirical model*

The concept of economic profits is a fundamental part of the PAM analysis. Profit is defined as the difference between the value of output (revenues) and the costs of all inputs (costs).

The PAM model is depicted in table 6. Private profits are defined in the first row as $D=A-B-C$. The letter A is used to denote private revenues (the revenues at the prevailing market price). Costs are divided into two components. Costs of tradable inputs (inputs that are traded in world markets), such as fertilizers, pesticides and seeds, are included in the second column. The value of tradable inputs at the prevailing market

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[5/] Food and Agriculture Organization of the United Nations, "Report of the FAO Programming and Project Identification Mission" (Rome, 1991).

[6/] Erik A. Monke and Scott R. Pearson, *The Policy Analysis Matrix for Agricultural Development*, Cornell University Press (Ithaca, New York, U.S.A., 1989), p. 18-19.

prices (private prices) is recorded in the first row and denoted by the letter *B*. Tradable inputs can be imported from or exported to other countries. The third column of the matrix includes domestic factors, which include land, labour and capital. Costs in private prices are denoted by the letter *C*. Domestic factors are also called non-tradable inputs because there is no international market for these inputs.

The fourth column in the matrix is labelled "profits". Private profits, denoted by the letter *D* in the matrix, are included in the first row of the fourth column. Values in the fourth column are calculated by subtracting the values in columns two and three from the revenues in the first column. A positive difference at prevailing market prices means that an excess profit exists, which encourages other firms to enter the business. Positive profits also function as a stimulus for firms to increase output in order to earn more profits. When more firms enter the market and existing firms expand, the result is economic growth. However, if the market prices of inputs or output are distorted by either market failure or policy failure, then private profits could be a deceptive indicator.

The second row of the PAM is used to calculate social profits, *E-F-G=H*. Social profits or ("without policy" profits) are those profits without divergence. In table 6, the letter *E* denotes revenues valued at efficiency prices (social prices) and the letters *F* and *G* indicate the efficiency values of tradable inputs and domestic factors, respectively. Positive social profits (*H*) provide an incentive for expansion of these activities and result in apparent economic growth in the national income.

A study at Egerton University in Kenya used a PAM approach to study agricultural growth in Kenya. It stated that

> The rationale for calculation of the individual revenue and cost elements of the second row [of the PAM]—E, F, and G—borrows heavily from the logical foundations of cost-benefit analysis and international trade theory. For example, the Little-Mirrlees method of project evaluation argues that efficiency prices for tradable outputs (E) and tradable commodity inputs (F) are given by world prices, because these prices would prevail in the economy if there were no domestic government policies. A similar conclusion comes from international trade theory—setting domestic prices equal to world prices allows the economy to exhaust potential gains from trade and realize maximum national income. The desirability of equal domestic and world prices no longer holds when the country is large enough to affect world prices, but maximum income is still associated with a particular set of world prices.[7/]

The third row of the matrix shows the divergence or differences between the first row (private valuation) and second row (social valuation). If there is no market failure, then all divergence between the private and social prices of tradable output and inputs are caused by distorting policies.

Policies that may cause divergence include subsidies, taxes and quantitative controls applied to domestic production of or trade in the commodity. Price policies may also cause distortions.

In the third row, if the value of *I* is positive, then private revenues exceed social revenues. This indicates that the Government is subsidizing output prices; in other words, the Government is purchasing production at prices above international market prices. The difference takes the form of a transfer from society (taxpayers) to the producers of that commodity.

[7/] Egerton University, Stanford University and the University of Arizona, "Agricultural Growth in Kenya: Applications of the Policy Analysis Matrix" (Policy Analysis for Rural Development Working Paper No. 13, Research and Training in Agricultural Policy Analysis Project), December 1990 (Njoro, Kenya), p. 5.

If the value of *I* is negative, then the value of the social revenues is greater than that of private revenues. This means that the Government is taxing producers. In other words, the Government is purchasing production at prices below those prevailing in international markets. The tax in this case takes the form of a transfer from producers to society (or to the Government).

The letter *J* represents the difference between the private cost and the social cost of tradable inputs. If the value of *J* is negative, then the private cost of tradable inputs is lower than the social cost. This means that the Government is subsidizing one or more inputs, such as fertilizer, rendering the prices of these inputs lower than those found in international markets.

If *J* is positive, then the private cost of inputs is greater than the social cost. This indicates that the Government is taxing inputs used by farmers. The net effect is that the prices paid by farmers for the inputs are greater than world market prices.

The letter *K* indicates the divergence in domestic factors. The Government can affect the prices of domestic factors such as capital or land. It is not uncommon for Governments of developing countries to provide subsidized credit to producers as an incentive to use more capital-intensive inputs such as machinery and fertilizer. In such cases, the private cost of a domestic factor may be lower than the social cost, and *K* will have a negative value. However, if the Government taxes domestic factors, which rarely happens in developing countries, the difference will be positive.

Taxes, subsidies and quantity control (quotas) are commodity-specific policies. They directly affect the prices of the output or inputs. Governments may employ policies that do not directly affect the commodity being analysed, such as manipulating the exchange rate of the country's currency. Since PAM accounting is done in domestic currency and world prices are reported in international currencies, conversions are required to express international prices in their domestic equivalents.

The effect of exchange rate manipulation depends upon whether the policy results in over- or undervaluation. An overvalued exchange rate occurs if there is excess demand for foreign currencies that results in extra foreign borrowing, excessive drawing down of exchange reserves, or rationing of foreign exchange among domestic users. An undervalued exchange rate reflects an excess supply of foreign exchange that is accumulating as excessive reserves and reducing potential income.[8/]

An overvalued exchange rate serves as an implicit tax on producers of tradable products. Overvaluation reduces the competitiveness of local producers in international markets inasmuch as they are practically taxed in both output prices and input prices.

Undervaluation of the exchange rate has the opposite effect. An undervalued exchange rate means that prices of tradables (output and inputs) are effectively subsidized, which improves the competitiveness of local producers in international markets. Evaluation of the consequences of an adjustment of the exchange rate is facilitated in a PAM by converting world prices to domestic prices at the social exchange rate rather than at the official rate.

The letter *L* denotes the net transfer of all policies affecting the commodity system under study, (*L=I-J-K*). If the overall effect of all policies affecting input and output prices and the exchange rate favours

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[8/] Erik A. Monke and Scott R. Pearson, *The Policy Analysis Matrix for Agricultural Development*, Cornell University Press (Ithaca, New York, U.S.A., 1989), pp. 77-80.

the producer (in the short run), L will have a positive value. Alternatively, L will have a negative value if the policies work to the detriment of the producer.

2. *Measures of protection*

To compare the profitability and efficiency of different crops, a common numeraire must be used throughout the analysis. Ratios are an expedient approach for avoiding the problem of finding a common numeraire, particularly when the units of measure for the production process and for the output are dissimilar. Ratios, which are estimated from values of the PAM, can be used to rank alternatives according to different policy objectives. The ratios calculated in a standard PAM include the Nominal Protection Coefficient (NPC) and the Effective Protection Coefficient (EPC).

The NPC is estimated by dividing the revenue in private prices (A) by the revenue in social prices (E). If this ratio is less than one, it reveals the presence of taxes on output. An NPC greater than one indicates the presence of subsidies. When the NPC is equal to one (in the absence of market failure), this reveals the absence of government intervention in output markets. An NPC of one is considered desirable by international donor agencies such as the World Bank and the United States Agency for International Development (USAID).

The EPC is defined as the ratio of value added in private prices (A-B) to value added in social prices (E-F). It is another measure of incentives to farmers.[9/] This coefficient indicates the combined effects of policies in tradable-commodity markets (inputs and output). The EPC is a useful measure because input and output policies, such as commodity price supports and fertilizer subsidies, are often part of a comprehensive policy package. An EPC of less than one indicates negative incentive effects of policy (a tax on farmers), whereas an EPC greater than one indicates positive incentive effects of policy (a subsidy).[10/]

3. *Comparative advantage measures*

The data used to estimate the protection coefficients could also be used to estimate the comparative advantage of a specific crop in a particular region. The Domestic Resource Coefficient (DRC) is used to determine if the production of a specific crop makes efficient use of domestic resources.

The DRC, as a measure of efficiency or comparative advantage, is calculated by dividing the factor costs (G in table 6) by the value added in social prices (E-F).[11/] A DRC value greater than one indicates that the value of domestic resources used to produce the commodity is greater than the contribution of its value added at social prices. A DRC value less than one indicates that the country has a comparative advantage in producing that commodity.

[9/] R. Naylor and C. Gotsch, "Agricultural Policy Analysis Course—Computer Exercises", Food Research Institute, Stanford University, Palo Alto, CA, USA (July 1989), pp. 99-100.

[10/] Ibid., p. 99

[11/] Ibid., p. 94.

TABLE 6. THE POLICY ANALYSIS MATRIX

	Revenues	*Costs*		*Profits*
		Tradable inputs	*Domestic factors*	
Private prices	A	B	C	D
Social prices	E	F	G	H
Policy effects	I	J	K	L

Note: The symbols (capital letters) are defined as follows:

A Total revenues in private prices (market prevailing prices are sometimes called financial prices).
B Cost of tradable inputs (such as fertilizers, seeds, plastic mulch) in private prices.
C Cost of domestic factors (such as labour and capital) in private prices.
D Private profit.
E Total revenues in social prices (prices that are adjusted to reflect government intervention).
F Cost of tradable inputs (such as fertilizers, seeds, plastic mulch) in social prices.
G Cost of domestic factors (such as labour and capital) in social prices.
H Social profit.

Private profits (D) = A-B-C
Social profits (H) = E-F-G
Output transfers (I) = A-E
Input transfers (J) = B-F
Factor transfers (K) = C-G
Net transfers (L) = D-H

4. *Modelling assumptions*

(a) *Selection of commodity systems*

Four governorates (called *mohafaza* [Damascus, Aleppo, Al-Hassakeh, and Hamah]) were chosen for the policy analysis. The fundamental objective of conducting the Policy Analysis Matrix (PAM) for these governorates is to estimate policy incentives and profitability. These governorates represent four irrigated development zones in the country and contain most of the important commodities produced in the Syrian Arab Republic. Wheat, cotton, sugar beet, maize and sunflower are the principal crops produced in this region of the country. Two varieties of wheat (hard and soft), cotton and sugar beet are the most important in terms of acreage. Soybean is a new crop that has been introduced to the cropping pattern as an industrial crop. Facilities to process soybean are still not available.

Wheat, barley, lentils and chick-peas are the principal crops produced in the rain-fed region of the Syrian Arab Republic. As previously mentioned, the country is divided into five agro-ecological zones based on rainfall.

(b) *Social valuation of tradables and non-tradables*

Social valuation of output and inputs is a major segment in the building process of the PAM. Social prices in the PAM analysis are also referred to as efficiency prices. Social prices or efficiency prices

demonstrate the opportunity costs of consumption. The world prices of inputs and output are a cornerstone for estimating efficiency prices.

The social prices were calculated by adjusting the international-market prices for exchange rates, insurance, handling, losses, processing, domestic marketing and the costs of transport to the farm. Different assumptions were used for adjusting the prices of different inputs and outputs.

To perform the social valuation, the tradable products were identified. The products were then classified into exportable and importable products. Importables are local products competing with imports. Exportables are local products that are exported. Exportables include cotton lint and lentils, while importables include wheat, barley, chick-peas, sugar, sunflower seeds, maize and nitrogen, phosphorus and potash fertilizers. The prices of non-tradables such as land, water, domestic transportation and labour cannot be obtained since they are not traded internationally.

The equilibrium exchange rate may be estimated by using one of several methods (such as the elasticity approach, the common approach and the Standard Correction Factor approach). The elasticity approach[12/] requires the availability of data on foreign exchange supply and demand and the nominal exchange rates accompanied by the supply and demand elasticities. The common approach uses data containing information on total values of exports and imports in foreign prices, which are converted to domestic values at the official exchange rate as a premium to adjust the official exchange rate.[13/]

The Standard Correction Factor (SCF) approach[14/] is used to adjust for distortions introduced by trade regime between the border prices of traded goods and the domestic shadow prices of non-traded goods. According to this approach, the equilibrium exchange rate for the Syrian Arab Republic was estimated as follows:

(a) The SCF was first calculated by dividing the total value of exports and imports by the total value of exports and imports plus taxes on imports and exports minus subsidies on exports;

(b) The equilibrium exchange rate is equal to the official exchange rate divided by the SCF. The estimated equilibrium exchange rate according to the above procedure was found to be LS 45.5 to the U.S. dollar.

(i) *Social prices of tradables*

The social prices of wheat, barley, chick-peas, sugar, sunflower seeds, maize, nitrogen, phosphorus and potash were estimated using import parity prices for importable commodities and export parity prices for exportable commodities. The only exportable commodities were cotton and lentils. A three-year weighted average of c.i.f. prices for importables and f.o.b. prices for exportables at the Latakia port was calculated from the official records.[15/]

[12/] World Bank, *Comparative Studies: Trade, Exchange Rate, and Agricultural Pricing Policies in Egypt, Vol. I*, Washington, D.C., 1990.

[13/] Isabelle Tsakok, *Agricultural Price Policy—A Practitioner's Guide to Partial-Equilibrium Analysis*, Cornell University Press (Ithaca, NY, USA, 1990), pp. 35-40.

[14/] Ibid., p. 39.

[15/] Syrian Arab Republic, Office of the Prime Minister, Central Bureau of Statistics, *Statistical Abstract* (Damascus, 1993).

Table 7 shows the steps for calculating the import parity prices of wheat, maize, sunflower seeds, barley, chick-peas, nitrogen, phosphorous, and potash. The import parity price for imported sugar is calculated in a different table inasmuch as it involves processing costs. Table 8 indicates the steps for calculating the import parity price for sugar beet. The observed port of entry price is the c.i.f. price adjusted for the equilibrium exchange rate of the Syrian pound against the U.S. dollar. The import parity prices are estimated using equation 1.[16/]

Equation 1. IMPORT PARITY PRICE

$$IPP = OPP_{cif} * ER + HCP + TCBM + MC - TCFM - TPC$$

Where:

IPP	=	Import Parity Price
OPP_{cif}	=	Observed port of entry price
ER	=	Equilibrium Exchange Rate (LS/US$)
HCP	=	Handling costs at port of entry
TCBM	=	Transport cost from border to market
MC	=	Marketing costs
TCFM	=	Transport costs from farm to market
TPC	=	Total processing cost at the factory.

Table 9 includes the steps for calculating the export parity price of cotton produced in Aleppo, Hamah, Al-Hassakeh, and Damascus and exported to Liverpool, United Kingdom. Table 10 shows the steps for calculating the export parity price of lentils produced in the four rain-fed agro-ecological zones and exported to neighbouring countries such as Jordan and Turkey. The observed port of entry price is the f.o.b. price adjusted for the equilibrium exchange rate of the Syrian pound against the U.S. dollar. The export parity prices for cotton and lentils are estimated using equation 2.[17/]

Equation 2. EXPORT PARITY PRICES

$$EPP = OPP_{fob} * ER - HCP - TCBM - MC - TPC - TCFM$$

Where:

EPP	=	Export Parity Price;
OPP_{fob}	=	Observed Port of Entry Price;
ER	=	Equilibrium Exchange Rate (LS/US$);
HCP	=	Handling Costs at Port of Entry;
TCBM	=	Transport Cost from Border to Market;.
MC	=	Marketing Costs;
TPC	=	Total Processing Cost at the Factory; and
TCFM	=	Transport Costs from Farm to Market.

For seeds and chemicals, information regarding import fees, handling and exchange rates (obtained from the import licensing schedules) was used to adjust prices from domestic to social values. The approach

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[16/] Isabelle Tsakok, *Agricultural Price Policy—A Practitioner's Guide to Partial-Equilibrium Analysis*, Cornell University Press (Ithaca, NY, USA, 1990), p. 42.

[17/] Ibid., p. 43.

involved deducting the tariffs and the distortion of the exchange rate from the observed domestic price to obtain an estimate of the social price of seeds and chemicals.

Since 1991, imports of machinery have been allowed without any taxes or exchange rate premiums. The private sector was allowed to finance imports of needed machinery from its own hard-currency holdings abroad. For this reason the domestic prices of machinery were used as a social prices without any adjustment.

(ii) *Social prices of non-tradables*

Non-tradable inputs are domestic factors not traded internationally (meaning that there are no international prices these factors). The social prices for domestic factors such as land, water, capital and labour are determined in the domestic economy of the country.

Different approaches may be used to obtain estimates for the social prices of these resources. One approach is to use the output of a general equilibrium model. A general equilibrium model could provide an estimate of the social prices of domestic factors, but unfortunately a general equilibrium model is not available for the Syrian Arab Republic. The following sections shows how alternative approaches were used to estimate the social price of each factor.

a. *Capital*

The major source of financing agricultural inputs is the CAB. The Bank, which is a formal capital source, provides farmers with the needed credit at the beginning of the production season. The Bank charges a subsidized interest rate that amounts, on average, to 5.5 per cent, while commercial banks charge about 9.0 per cent. This subsidy of 3.5 per cent was added to the interest cost component of the financial cost of production in order to arrive at the opportunity cost of the capital.

b. *Labour*

The labour market in the Syrian Arab Republic is relatively free, although insignificant wage differences exist between governorates. For instance, wages in Al-Hassakeh were higher than those in Aleppo and Hamah. No adjustments were made to the private cost of labour to arrive at its social cost.

c. *Land*

One of the most difficult assignments in building a PAM is determining the social price of land inasmuch as land values differ from one location to another based on the use of the land (such as industrial, commercial and residential uses). Agricultural land rents also differ, mainly on the basis of the availability of irrigation water, the soil type, precipitation, size and location.

The financial (private) prices used in private budgets were those prices reported by farmers as reflecting the prevailing market price of one hectare of land. Different prices were reported for different crops in the various governorates and agro-ecological zones. The social price of irrigated land was estimated from the budgets. The average private gross margin of cultivated land in agro-ecological zones one and two was used as the opportunity cost of irrigated land in the different governorates. The average gross margin value was found to be LS 10,510/ha. The social price of rain-fed land in the four agro-ecological zones was assumed to be zero inasmuch as there are no competing crops that could be produced, other than the four that are currently being cultivated.

TABLE 7. CALCULATION OF IMPORT PARITY PRICES OF WHEAT, MAIZE, SUNFLOWER SEEDS, BARLEY, CHICK-PEAS, NITROGEN, PHOSPHATE AND POTASH

Item	Wheat	Maize	Sunflower	Barley	Chick-pea	Nitrogen	Phosphate	Potash
CIF Latakia (US$/ton)	212.70	188.00	438.17	122.00	350.00	261.74	311.11	776.67
Shadow Exchange rate (LS/US$)	45.50	45.50	45.50	45.50	45.50	45.50	45.50	45.50
CIF Latakia (LS/ton)	9 677.85	8 554.00	19 936.66	5 551.00	15 925.00	11 909.13	14 155.56	35 338.33
Insurance (1.5%)	145.17	128.31	299.05	83.27	238.88	178.64	212.33	530.08
Bank interest (14 per cent for 180 days)	677.45	598.78	1 395.57	388.57	1 114.75	833.64	990.89	2 473.68
Handling charges (LS/ton)	43.75	43.75	43.75	43.75	43.75	43.75	43.75	43.75
Clearance fees (LS/ton)	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
General fees (LS/ton)	126.52	126.52	126.52	126.52	126.52	126.52	126.52	126.52
Losses 0.5 per cent of total costs	53.41	47.32	109.07	31.03	87.30	65.52	77.71	192.62
Interest on working capital 7.5 per cent for 3 months	201.30	178.33	411.05	116.93	329.03	246.92	292.85	725.94
Profit margin 3 per cent of total costs	328.12	290.67	670.01	190.59	536.32	402.48	477.35	1 183.29
Distance between port and farm (km)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Transport rate between mills to port (LS/km)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Transportation cost (LS/ton)	62.0	62.0	62.0	62.0	62.0	62.0	62.0	62.0
Import parity price at mills (LS/ton)	11 327.6	10 041.7	23 065.7	6 605.6	18 475.5	13 880.6	16 451.0	40 688.2
Import parity price (LS/kg)	11.33	10.04	23.07	6.61	18.48	13.88	16.45	40.69
Transport cost from farm to mill (LS/kg)	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
Import parity price at farm gate (LS/kg)	11.3	10.0	23.0	6.5	18.4	13.8	16.4	40.6
Conversion factor (flour to wheat grain)	0.7							
Import parity price of wheat grains (LS/kg)	8.2							

TABLE 8. CALCULATION OF THE IMPORT PARITY PRICE OF SUGAR BEET PRODUCED IN ALEPPO, HAMAH AND DAMASCUS

Item	Values
Latakia c.i.f. (US$/ton)	329.00
Shadow exchange rate (LS/US$)	45.50
Adjusted border price Latakia (LS/ton)	14 969.50
Handling charges (LS/ton)	43.75
Clearance fees (LS/ton)	12.00
General fees (LS/ton)	126.52
Distance between port and factory (km)	100.00
Transportation rate (LS/km)	0.60
Transportation cost (LS/ton)	62.00
Adjusted sugar price at mill gate (LS/ton)	15 213.80
Processing and marketing costs (LS/ton)	2 708.00
Adjusted sugar price at factory gate (LS/ton)	12 505.80
Adjustment from final product to sugar beets	
• Processing ratio: 1 ton of sugar per 10.7 tons of sugar beet	0.09
Sugar beets price at factory gate (LS/ton)	1 168.80
Transport from farm to factory (62 LS/ton)	62.00
Equivalent border price of sugar beets (LS/ton)	1 106.76
Equivalent border price of sugar beets (LS/kg)	1.11

d. *Water*

Four sources of water are used for irrigation in the different governorates: (a) deep tube wells; (b) shallow tube wells; (c) rivers; and (d) dams (government projects). The private cost of water varies from one source to another. Tables 11, 12 and 13 demonstrate the private cost components of the first three water sources. Four private enterprise budgets were constructed for each crop in each governorate based on the source of irrigation water.

Since the private sector imports all tradable parts of irrigation systems at an exchange rate equivalent to the equilibrium exchange rate (LS 45.5/US$), the same water charges estimated in the above tables (11, 12 and 13) were used as social values for irrigation water. Since the Syrian Government is intending to raise the price of irrigation water from government projects (gravity irrigation) to LS 2,500/ha instead of the current LS 1,037/ha, the social cost of irrigating one hectare by gravity irrigation would be LS 2,500.

TABLE 9. CALCULATION OF THE EXPORT PARITY PRICE OF COTTON PRODUCED IN ALEPPO, HAMAH, AL-HASSAKEH AND DAMASCUS
(Exported to Liverpool, UK)

Item	Values
Latakia f.o.b. of cotton lint (US$/ton)	1 750.00
Shadow exchange rate (LS/US$)	43.00
Adjusted border price of C-lint (LS/ton)	75 250.00
Handling charges (LS/ton)	43.75
Clearance fees (LS/ton)	12.00
General fees (LS/ton)	126.52
Distance between port and factory (km)	100.00
Transportation rate (LS/km)	0.62
Transport cost from mills to port (LS/ton)	62.00
Adjusted price of lint at factory gate (LS/ton)	75 005.70
Adjusted price of 1.05 tons lint at factory gate (LS)	78 756.00
Domestic price of cotton seeds (LS/ton)	507.00
Adjusted price of 1.95 tons seeds at factory gate (LS)	988.70
Adjusted price of 3 tons of raw cotton (LS)	79 744.70
Adjusted price of 1.0 ton of raw cotton (LS)	26 581.60
Ginning cost (LS/ton)	2 635.95
Adjusted mill gate price (LS/ton)	23 945.61
Transportation cost from farm to mill (LS/ton)	62.00
Adjusted farm gate price of raw cotton (LS/ton)	23 883.61
Adjusted farm gate price of raw cotton (LS/kg)	23.88

(c) *Data*

The basic component of the PAM is the farm budget. Enterprise budgets were estimated for selected crops in the four governorates and in each of the four agro-ecological rain-fed zones. The budgets were prepared by a team of researchers at the Department of Agricultural Economics in the Ministry of Agriculture and Agrarian Reform. The data required for the budgets were gathered by means of personal interviews.

Two kinds of budgets were estimated: private and social budgets. Private budgets are those with prevailing market prices. Social budgets are those estimated with adjusted prices (social prices or efficiency prices).

TABLE 10. CALCULATION OF THE EXPORT PARITY PRICE OF LENTILS PRODUCED IN THE FOUR RAIN-FED AGRO-ECOLOGICAL ZONES OF THE SYRIAN ARAB REPUBLIC AND EXPORTED TO NEIGHBOURING COUNTRIES

Item	Values
Latakia f.o.b. of lentils (US$/ton)	479.00
Shadow exchange rate (LS/US$)	43.00
Adjusted border price (LS/ton)	20 597.00
Handling charges (LS/ton)	43.75
Clearance fees (LS/ton)	12.00
General fees (LS/ton)	126.52
Distance between port and collection centre (km)	100.00
Transportation rate (LS/km)	0.62
Transport cost from mills to port (LS/ton)	62.00
Adjusted price of lentils at coll-centre (LS/ton)	20 352.70
Transportation cost from farm to coll-centre (LS/ton)	62.00
Adjusted farm gate price of raw cotton (LS/ton)	20 290.73
Adjusted farm gate price of raw cotton (LS/kg)	20.29

TABLE 11. PRIVATE COST OF ONE CUBIC METRE OF WATER FROM DEEP TUBE WELLS

Item	Value
Fixed costs	
• Well depth (m)	150.0
• Cost of drilling (LS/m)	500.0
• Cost of drilling a 150-metre depth well (LS)	75 000.0
• Cost of casing (LS/m)	500.0
• Cost of casing a 150-metre depth well (LS)	75 000.0
• Depreciation of well and casing (LS/hr)	12.5
• Capital cost (interest [LS/hr])	2.6
• Value of the vertical pump (LS)	150 000.0
• Value of a 45-horsepower engine (LS)	150 000.0
• Capital cost of pump & engine (interest [LS/hr])	5.2

Table 11. ***(continued)***

Item	Value
• Depreciation of pump and engine (LS/hr)	25.0
• Total fixed costs (LS/hr)	45.3
Operational costs	
• Engine size (horsepower)	45.0
• Diesel consumption (litre/hr)	0.2
• Diesel price (LS/litre)	4.0
• Cost of fuel (LS/hr)	36.0
• Lubrication oil (15 per cent of diesel value [LS/hr])	5.4
• Maintenance of engine (10 per cent) & pump (5 per cent [LS/hr])	0.4
• Total operational costs (LS/hr)	41.8
Total cost of one hour (LS)	87.1
Capacity of the well (m^3/hr)	60.0
Cost of 1 m^3 (LS)	1.45

TABLE 12. PRIVATE COST OF ONE CUBIC METRE OF WATER FROM SHALLOW TUBE WELLS

Item	*Value*
Fixed costs	
• Well depth (m)	70.0
• Cost of drilling (LS/m)	300.0
• Cost of drilling a 150-metre depth well (LS)	21 000.0
• Cost of casing (LS/m)	600.0
• Cost of casing a 150-metre depth well (LS)	42 000.0
• Depreciation of well and casing (LS/hr)	5.3
• Capital cost (interest [LS/hr])	1.1
• Value of the vertical pump (LS)	75 000.0
• Value of a 35-horsepower engine (LS)	70 000.0
• Capital cost of pump and engine (interest [LS/hr])	2.5
• Depreciation of pump and engine (LS/hr)	12.1
• Total fixed costs (LS/hr)	20.9

Table 12. *(continued)*

Item	*Value*
Operational costs	
• Engine size (horsepower)	35.0
• Diesel consumption (litre/hr)	0.2
• Diesel price (LS/litre)	4.0
• Cost of fuel (LS/hr)	28.0
• Lubrication oil (15 per cent of diesel value [LS/hr])	4.2
• Maintenance of engine (10 per cent) and pump (5 per cent [LS/hr])	0.2
• Total operational costs (LS/hr)	32.4
Total cost of one hour (LS/hr)	53.3
Capacity of the well (m^3/hr)	60.0
Cost of 1 m^3 (LS)	0.89

TABLE 13. PRIVATE COST OF ONE CUBIC METRE OF WATER FROM RIVERS

Item	*Value*
Fixed costs	
• Value of the pump (LS)	30 000.0
• Value of a 25-horsepower engine (LS)	60 000.0
• Capital cost of pump and engine (interest [LS/hr])	1.6
• Depreciation of pump and engine (LS/hr)	7.5
• Total fixed costs (LS/hr)	9.1
Operational costs	
• Engine size (horsepower)	25.0
• Diesel consumption (litre/hr)	0.2
• Diesel price (LS/litre)	4.0
• Cost of fuel (LS/hr)	20.0
• Lubrication oil (15 per cent of diesel value [LS/hr])	3.0
• Maintenance of engine (10 per cent) and pump (5 per cent [LS/hr])	0.1
• Total operational costs (LS/hr)	23.1
Total cost of one hour (LS)	32.2
Capacity of the well (m^3/hr)	60.0
Cost of 1 m^3 (LS)	0.54

5. *Results*

To identify the impact of current policies on production incentives, both social and private profitability were calculated. Tables 7 through 10 present the results of the policy analysis for the selected crops in the irrigated areas in the four governorates. Table 14 presents the results of the policy analysis for the selected crops in each agro-ecological zone. Cost and return are given on a per-hectare basis. Each table contains information about private profits, social profits, impact of policy on revenue, input costs, factor costs, protection coefficients and the comparative advantage coefficient. The results in each governorate and each agro-ecological zone are presented separately below.

(a) *Results of irrigated production on governorate level*

(i) *Aleppo*

Wheat is the dominant crop produced under irrigation in the Aleppo region. In 1993, the following was grown in the Aleppo region: 49,931 ha of wheat; 20,625 ha of cotton; 10,523 ha of maize; and 3,905 ha of sugar beet. Maize is produced after wheat as an intensive crop. Table 7 contains the main results of the different PAMs for each crop. Four PAMs for each crop were calculated based on the irrigation water source.

Table 14 shows that production of wheat, cotton and sugar beet under regulated prices is feasible and profitable for all production systems except for sugar beet produced under deep well irrigation and maize under all irrigation systems. There are clear incentives to produce wheat, which offers up to LS 17,878 per hectare in private profit. The second most profitable crop is cotton, followed by sugar beet.

Table 14 also shows the social analysis of revenues and costs. It shows that the social profits are positive for cotton produced under all production systems, for wheat produced under gravity irrigation from government projects and for maize produced under irrigation from rivers and government projects. The official-price system and the overvalued exchange rate resulted in private profits for wheat and sugar beet significantly higher than the social profits, while private profits for cotton were 20 per cent of the social profits. The policy impact on inputs and factors shows that inputs and factors used for wheat and maize production are subsidized, while those used to produce cotton and sugar beet are taxed.

The nominal protection coefficients (NPCs) for wheat, cotton and sugar beet are 1.32, 1.03 and 1.77, respectively. The coefficients indicate that the government procurement prices for the three crops are higher than world prices, especially for wheat and sugar beet. However, the NPC for maize is 0.71, indicating that the official prices of maize are 29 per cent lower than world prices.

The effective protection coefficients (EPCs), which give the ratio of value added at private prices to the value added at social prices for wheat and sugar beet, are greater than one. The EPC of 1.64 for wheat indicates that the producer subsidy has been increased and that the effective price received by the farmer has increased from 132 per cent of the world price (NPC = 1.32) to 164 per cent of the world price (EPC = 1.64). However, the EPC of 3.31 for sugar beet indicates that the value added in private prices is 3.31 times the value added in social prices owing to the immense price subsidy (NPC = 1.77).

The EPC for cotton is 0.98, which indicates that, owing to the tax on inputs used in cotton production, the effective price received by the farmer has decreased from 103 per cent of the world price (NPC = 1.03) to 98 per cent of the world price (EPC = 0.98).

The EPC for maize is 0.73 indicates that, owing to the subsidization of inputs used in m production, the effective price received by the farmer has increased from 71 per cent of the world p (NPC = 0.71) to 73 per cent of the world price (EPC = 0.73). The coefficient indicates that maize produ are taxed, and 27 per cent of their income is transferred to the society.

The domestic resource coefficient (DRC) indicates the amount of domestic resources required to or save a unit of foreign exchange. The DRC is a measure of the comparative advantage of growing cr If the coefficient is less than one, then the country has a comparative advantage in producing that prod Since a low coefficient means that few resources are used to generate income, the lower the DRC, the m profitable or efficient the system. In Aleppo Governorate, the analysis shows that domestic resources used efficiently in: (a) the production of cotton under the various irrigation systems; (b) the production wheat irrigated from government projects; and (c) the production of maize under irrigation from rivers a government projects. The DRC for these production systems is less than one, which implies that the Syr Arab Republic has a comparative advantage in production of these crops in Aleppo areas.

(ii) *Al-Hassakeh*

In 1993, the following was grown in Al-Hassakeh: 254,368 ha of wheat, 89,878 ha of cotton a 5,918 ha of maize. Production of wheat and cotton under private prices is feasible and profitable for production systems (table 15). There are clear incentives to produce cotton, which offers up to LS 20,90 per hectare. The second most profitable crop is wheat.

The social profits are positive for cotton produced under all production systems, for wheat produce under gravity irrigation from government projects and for maize produced under irrigation from rivers an government projects. The policy impact on inputs show that inputs used for wheat production are subsidized while those used to produce cotton and maize are implicitly taxed.

The nominal protection coefficients (NPC) for wheat, cotton and maize are 1.10, 1.03 and 0.70, respectively. The coefficients demonstrate that the government procurement prices for wheat and cotton are higher than world prices. However, the NPC for maize is less than one (0.70), indicating that the official prices of maize are lower than world prices, in this case by 30 per cent.

The effective protection coefficient (EPC) for wheat is 1.21. However, the EPCs for cotton and maize are 0.96 and 0.44, respectively.

In Al-Hassakeh Governorate, the analysis shows that domestic resources are used efficiently in the production of cotton under the various irrigation systems, the production of wheat irrigated from government projects and the production of maize under irrigation from rivers and government projects. The DRCs for these production systems are less than one, which implies that the Syrian Arab Republic has a comparative advantage in production of these crops in Al-Hassakeh.

(iii) *Hamah*

In 1993, the following was grown in Hamah Governorate: 20,538 ha of wheat; 6,072 ha of cotton; 1,226 ha of sugar beet; 1,770 ha of maize; and 222 ha of sunflower. Production of wheat, cotton and sugar beet under prevailing prices is profitable for all production systems (table 16). The most feasible crop is cotton, which offers up to LS 28,789 per hectare. However, it is not profitable to produce maize or sunflower. The table also shows that the social profits are positive for cotton produced under all production systems and sunflower produced under all production systems except deep well irrigation.

The EPC for maize is 0.73 indicates that, owing to the subsidization of inputs used in maize production, the effective price received by the farmer has increased from 71 per cent of the world price (NPC = 0.71) to 73 per cent of the world price (EPC = 0.73). The coefficient indicates that maize producers are taxed, and 27 per cent of their income is transferred to the society.

The domestic resource coefficient (DRC) indicates the amount of domestic resources required to gain or save a unit of foreign exchange. The DRC is a measure of the comparative advantage of growing crops. If the coefficient is less than one, then the country has a comparative advantage in producing that product. Since a low coefficient means that few resources are used to generate income, the lower the DRC, the more profitable or efficient the system. In Aleppo Governorate, the analysis shows that domestic resources are used efficiently in: (a) the production of cotton under the various irrigation systems; (b) the production of wheat irrigated from government projects; and (c) the production of maize under irrigation from rivers and government projects. The DRC for these production systems is less than one, which implies that the Syrian Arab Republic has a comparative advantage in production of these crops in Aleppo areas.

(ii) *Al-Hassakeh*

In 1993, the following was grown in Al-Hassakeh: 254,368 ha of wheat, 89,878 ha of cotton and 5,918 ha of maize. Production of wheat and cotton under private prices is feasible and profitable for all production systems (table 15). There are clear incentives to produce cotton, which offers up to LS 20,908 per hectare. The second most profitable crop is wheat.

The social profits are positive for cotton produced under all production systems, for wheat produced under gravity irrigation from government projects and for maize produced under irrigation from rivers and government projects. The policy impact on inputs show that inputs used for wheat production are subsidized, while those used to produce cotton and maize are implicitly taxed.

The nominal protection coefficients (NPC) for wheat, cotton and maize are 1.10, 1.03 and 0.70, respectively. The coefficients demonstrate that the government procurement prices for wheat and cotton are higher than world prices. However, the NPC for maize is less than one (0.70), indicating that the official prices of maize are lower than world prices, in this case by 30 per cent.

The effective protection coefficient (EPC) for wheat is 1.21. However, the EPCs for cotton and maize are 0.96 and 0.44, respectively.

In Al-Hassakeh Governorate, the analysis shows that domestic resources are used efficiently in the production of cotton under the various irrigation systems, the production of wheat irrigated from government projects and the production of maize under irrigation from rivers and government projects. The DRCs for these production systems are less than one, which implies that the Syrian Arab Republic has a comparative advantage in production of these crops in Al-Hassakeh.

(iii) *Hamah*

In 1993, the following was grown in Hamah Governorate: 20,538 ha of wheat; 6,072 ha of cotton; 1,226 ha of sugar beet; 1,770 ha of maize; and 222 ha of sunflower. Production of wheat, cotton and sugar beet under prevailing prices is profitable for all production systems (table 16). The most feasible crop is cotton, which offers up to LS 28,789 per hectare. However, it is not profitable to produce maize or sunflower. The table also shows that the social profits are positive for cotton produced under all production systems and sunflower produced under all production systems except deep well irrigation.

The nominal protection coefficients (NPCs) for wheat, cotton, sugar beet, maize and sunflower are 1.41, 1.02, 1.73, 0.73 and 0.69, respectively. However, the NPCs for maize and sunflower are less than one (0.73 and 0.69 respectively).

The effective protection coefficients (EPCs) for wheat and sugar beet are greater than one, while for cotton it is exactly 1.00. The EPCs for sunflower and maize are 0.63 and 0.73, respectively. The coefficients for sunflower and maize indicate that producers of these crops are taxed 37 and 27 per cent, respectively.

The domestic resource coefficient (DRCs) for crops produced in Hamah Governorate show that domestic resources are used efficiently in the production of cotton under the various irrigation systems and production of sunflower seeds under all irrigation systems except deep well irrigation. The DRC for these production systems is less than one, which implies that the Syrian Arab Republic has a comparative advantage in the production of these crops in Hamah.

(iv) *Damascus*

In 1993, the following was grown in Damascus Governorate: 22,907 ha of wheat; 2,290 ha of cotton; and 10 ha of sugar beet. At prevailing market prices, production of wheat and cotton is feasible for all production systems except for cotton irrigated from deep wells. Social profits are positive for cotton produced under all production systems except for deep well irrigation and for wheat produced under all production systems except deep well irrigation (table 17).

The nominal protection coefficients (NPCs) for wheat, cotton and sugar beet are 1.20, 1.05 and 1.72, respectively. The effective protection coefficients (EPCs) are 1.41, 1.15 and 3.75, respectively.

The domestic resource coefficient (DRC) for crops produced in the Damascus area indicate that production of wheat and cotton under the different irrigation systems make efficient use of the domestic resources except for deep well irrigation. The DRC for these production systems is less than one, which implies that the Syrian Arab Republic has a comparative advantage in production of wheat and cotton in Damascus Governorate.

(b) *Results of rain-fed production on agro-ecological zone level*

As mentioned above, for agricultural planning purposes the Syrian Arab Republic is divided into five settlement zones (agro-ecological zones) based on the rainfall patterns. Wheat, barley, lentils and chick-peas are the principal crops produced in these zones. Wheat is the principal crop produced in the rain-fed regions of the country, followed by barley. Wheat is produced mainly in agro-ecological zones one and two, while barley is produced in all four zones. Table 18 contains the cultivated area of each of the four crops in each agro-ecological zone during the 1993 production season.

Table 19 presents the main results of the different PAMs for crops produced in the four rain-fed zones. The table shows that production of wheat, barley, lentils and chick-peas is feasible and profitable in zones one and two. It also shows that production of wheat, barley and lentils is feasible and profitable under regulated prices in zone three. However, barley production is not profitable under regulated prices in zone four.

TABLE 14. RESULTS OF COMMODITY SYSTEM, 1993-1994, IN ALEPPO GOVERNORATE

(In Syrian pounds per hectare)

CROP SYSTEM		P-PROFITS*	S-PROFITS**	POLICY IMPACT ON PROTECTION COEFFICIENTS					
				REVENUE	INPUTS	FACTORS	NPC	EPC	DRC
WHEAT	DEEP WELL IRRIGATION	11 514.7	-6 023.6	12 386.2	-770.5	-4 381.5	1.32	1.64	1.29
WHEAT	SHALLOW WELL IRRIGATION	14 651.3	-2 210.6	12 386.2	-770.5	-3 705.2	1.32	1.64	1.11
WHEAT	RIVER IRRIGATION	16 617.6	-559.4	12 386.2	-770.5	-4 020.3	1.32	1.64	1.03
WHEAT	GRAVITY IRRIGATION	17 877.8	38.0	12 386.2	-770.5	-4 683.0	1.32	1.64	1.00
COTTON	DEEP WELL IRRIGATION	3 933.1	6 826.6	2 907.4	4 372.2	1 428.8	1.03	0.98	0.89
COTTON	SHALLOW WELL IRRIGATION	10 066.9	14 283.1	2 907.4	4 372.2	2 751.4	1.03	0.98	0.77
COTTON	RIVER IRRIGATION	13 912.1	17 512.1	2 907.4	4 372.2	2 135.2	1.03	0.98	0.72
COTTON	GRAVITY IRRIGATION	16 376.4	21 194.7	2 907.4	4 372.2	3 353.5	1.03	0.98	0.67
SUGAR BEET	DEEP WELL IRRIGATION	-3 092.2	-44 081.2	47 419.2	3 211.6	3 218.5	1.77	3.31	3.31
SUGAR BEET	SHALLOW WELL IRRIGATION	2 867.4	-36 836.7	47 419.2	3 211.6	4 503.6	1.77	3.31	2.93
SUGAR BEET	RIVER IRRIGATION	6 603.4	-33 699.4	47 419.2	3 211.6	3 904.9	1.77	3.31	2.76
SUGAR BEET	GRAVITY IRRIGATION	8 997.7	-30 196.1	47 419.2	3 211.6	5 013.8	1.77	3.31	2.58
MAIZE	DEEP WELL IRRIGATION	-12 202.9	-8 864.1	-13 020.9	-3 749.6	-5 932.5	0.71	0.73	1.26
MAIZE	SHALLOW WELL IRRIGATION	-6 394.4	-1 803.1	-13 020.9	-3 749.6	-4 680.0	0.71	0.73	1.05
MAIZE	RIVER IRRIGATION	-2 753.1	1 254.7	-13 020.9	-3 749.6	-5 263.6	0.71	0.73	0.96
MAIZE	GRAVITY IRRIGATION	-419.4	4 602.5	-13 020.9	-3 749.6	-4 249.4	0.71	0.73	0.86

* Private profits = private revenues minus private costs (the figure is estimated from the private budget of each crop).

** Social profits = social revenues minus social costs (the figure is estimated from the social budget of each crop).

TABLE 15. RESULTS OF COMMODITY SYSTEM, 1993-1994, IN AL-HASSAKEH GOVERNORATE
(In Syrian pounds per hectare)

CROP SYSTEM		P-PROFITS*	S-PROFITS**	POLICY IMPACT ON PROTECTION COEFFICIENTS					
				REVENUE	INPUTS	FACTORS	NPC	EPC	DRC
WHEAT	DEEP WELL IRRIGATION	4 035.7	-5 657.8	3 558.1	-326.2	-5 809.3	1.10	1.21	1.30
WHEAT	SHALLOW WELL IRRIGATION	6 649.6	-2 480.4	3 558.1	-326.2	-5 245.7	1.10	1.21	1.13
WHEAT	RIVER IRRIGATION	8 288.2	-1 104.4	3 558.1	-326.2	-5 508.3	1.10	1.21	1.06
WHEAT	GRAVITY IRRIGATION	9 388.3	-1 045.0	3 558.1	-326.2	-6 499.1	1.10	1.21	1.06
COTTON	DEEP WELL IRRIGATION	8 464.4	9 440.0	2 249.8	4 677.5	-1 452.0	1.03	0.96	0.86
COTTON	SHALLOW WELL IRRIGATION	14 598.2	16 896.5	2 249.8	4 677.5	-129.4	1.03	0.96	0.75
COTTON	RIVER IRRIGATION	18 443.4	20 125.5	2 249.8	4 677.5	-745.6	1.03	0.96	0.71
COTTON	GRAVITY IRRIGATION	20 907.8	23 808.1	2 249.8	4 677.5	472.7	1.03	0.96	0.65
MAIZE	DEEP WELL IRRIGATION	-23 269.7	-7 311.3	-13 706.5	4 109.9	-1 857.9	0.70	0.44	1.23
MAIZE	SHALLOW WELL IRRIGATION	-17 461.2	-250.3	-13 706.5	4 109.9	-605.4	0.70	0.44	1.01
MAIZE	RIVER IRRIGATION	-13 819.9	2 807.5	-13 706.5	4 109.9	-1 189.0	0.70	0.44	0.91
MAIZE	GRAVITY IRRIGATION	-11 486.2	6 155.3	-13 706.5	4 109.9	-174.8	0.70	0.44	0.81

* Private profits = private revenues minus private costs (the figure is estimated from the private budget of each crop).
** Social profits = social revenues minus social costs (the figure is estimated from the social budget of each crop).

TABLE 16. RESULTS OF COMMODITY SYSTEM, 1993-1994, IN HAMAH GOVERNORATE

(In Syrian pounds per hectare)

CROP SYSTEM		P-PROFITS*	S-PROFITS**	POLICY IMPACT ON PROTECTION COEFFICIENTS					
				REVENUE	INPUTS	FACTORS	NPC	EPC	DRC
WHEAT	DEEP WELL IRRIGATION	14 232.1	-7 236.2	16 909.3	-1 435.1	-3123.9	1.41	1.99	1.39
WHEAT	SHALLOW WELL IRRIGATION	16 323.1	-4 694.2	16 909.3	-1 435.1	-2673.0	1.41	1.99	1.25
WHEAT	RIVER IRRIGATION	17 634.0	-3 593.4	16 909.3	-1 435.1	-2883.1	1.41	1.99	1.19
WHEAT	GRAVITY IRRIGATION	18 474.1	-4 072.2	16 909.3	-1 435.1	-4202.0	1.41	1.99	1.22
COTTON	DEEP WELL IRRIGATION	17 760.4	19 833.6	2 308.9	1 964.4	2417.7	1.02	1.00	0.74
COTTON	SHALLOW WELL IRRIGATION	23 197.2	26 442.7	2 308.9	1 964.4	3590.0	1.02	1.00	0.65
COTTON	RIVER IRRIGATION	26 605.5	29 304.8	2 308.9	1 964.4	3043.8	1.02	1.00	0.61
COTTON	GRAVITY IRRIGATION	28 789.8	32 270.0	2 308.9	1 964.4	3824.7	1.02	1.00	0.58
SUGAR BEET	DEEP WELL IRRIGATION	12 514.6	-25 574.4	46 112.5	4 239.6	3783.9	1.73	2.95	2.19
SUGAR BEET	SHALLOW WELL IRRIGATION	15 999.7	-21 337.8	46 112.5	4 239.6	4535.4	1.73	2.95	2.00
SUGAR BEET	RIVER IRRIGATION	18 184.5	-19 503.1	46 112.5	4 239.6	4185.3	1.73	2.95	1.91
SUGAR BEET	GRAVITY IRRIGATION	19 584.7	-18 546.9	46 112.5	4 239.6	3741.3	1.73	2.95	1.87
MAIZE	DEEP WELL IRRIGATION	-7 829.3	-10 376.3	-9 128.7	-2 951.5	-8724.2	0.73	0.73	1.45
MAIZE	SHALLOW WELL IRRIGATION	-5 041.2	-6 987.0	-9 128.7	-2 951.5	-8123.0	0.73	0.73	1.31
MAIZE	RIVER IRRIGATION	-3 293.4	-5 519.2	-9 128.7	-2 951.5	-8403.1	0.73	0.73	1.24
MAIZE	GRAVITY IRRIGATION	-2 173.2	-5 280.5	-9 128.7	-2 951.5	-9284.5	0.73	0.73	1.23
SUNFLOWER	DEEP WELL IRRIGATION	-11 741.3	-1 955.3	-17 664.2	-1 665.9	-6212.3	0.69	0.63	1.05
SUNFLOWER	SHALLOW WELL IRRIGATION	-6 536.9	4 371.3	-17 664.2	-1 665.9	-5090.0	0.69	0.63	0.90
SUNFLOWER	RIVER IRRIGATION	-3 274.3	7 111.1	-17 664.2	-1 665.9	-5612.9	0.69	0.63	0.84
SUNFLOWER	GRAVITY IRRIGATION	-1 183.3	9 837.1	-17 664.2	-1 665.9	-4977.8	0.69	0.63	0.77

* Private profits = private revenues minus private costs (the figure is estimated from the private budget of each crop).

** Social profits = social revenues minus social costs (the figure is estimated from the social budget of each crop).

TABLE 17. RESULTS OF COMMODITY SYSTEM, 1993-1994, IN DAMASCUS GOVERNORATE
(In Syrian pounds per hectare)

CROP SYSTEM		P-PROFITS*	S-PROFITS**	POLICY IMPACT ON PROTECTION COEFFICIENTS					
				REVENUE	INPUTS	FACTORS	NPC	EPC	DRC
WHEAT	DEEP WELL IRRIGATION	13 170.4	-810.5	9 254.8	-3 101.5	-1 624.6	1.20	1.41	1.03
WHEAT	SHALLOW WELL IRRIGATION	16 481.3	3 214.3	9 254.8	-3 101.5	-910.7	1.20	1.41	0.89
WHEAT	RIVER IRRIGATION	18 556.8	4 957.2	9 254.8	-3 101.5	-1 243.3	1.20	1.41	0.84
WHEAT	GRAVITY IRRIGATION	19 887.0	5 734.1	9 254.8	-3 101.5	-1 796.6	1.20	1.41	0.81
COTTON	DEEP WELL IRRIGATION	-4 251.1	-9 139.0	3 992.8	-3 727.7	2 832.6	1.05	1.15	1.18
COTTON	SHALLOW WELL IRRIGATION	4 461.7	1 452.5	3 992.8	-3 727.7	4 711.3	1.05	1.15	0.97
COTTON	RIVER IRRIGATION	9 923.7	6 039.2	3 992.8	-3 727.7	3 836.0	1.05	1.15	0.88
COTTON	GRAVITY IRRIGATION	13424.2	12 376.6	3 992.8	-3 727.7	6672.9	1.05	1.15	0.75
SUGAR BEET	DEEP WELL IRRIGATION	11 609.1	-20 970.2	41 431.8	2 662.8	6 189.6	1.72	3.75	2.49
SUGAR BEET	SHALLOW WELL IRRIGATION	15 094.3	-16 733.6	41 431.8	2 662.8	6 941.1	1.72	3.75	2.19
SUGAR BEET	RIVER IRRIGATION	17 279.0	-14 898.9	41 431.8	2 662.8	6 591.0	1.72	3.75	2.06
SUGAR BEET	GRAVITY IRRIGATION	18 679.2	-13 942.7	41 431.8	2 662.8	6 147.0	1.72	3.75	1.99

* Private profits = private revenues minus private costs (the figure is estimated from the private budget of each crop).
** Social profits = social revenues minus social costs (the figure is estimated from the social budget of each crop).

TABLE 18. CULTIVATED AREA OF WHEAT, BARLEY, LENTILS AND CHICK-PEAS IN THE RAIN-FED REGI OF THE SYRIAN ARAB REPUBLIC, 1993

(Hectares)

Agro-ecological zone	*Wheat*	*Barley*	*Lentils*	*Chick-peas*
Zone 1	406 196	100 410	61 675	34 773
Zone 2	328 681	723 148	37 555	43 596
Zone 3	58 019	494 461	42 070	-
Zone 4	-	556 220	-	-

Source: Ministry of Agriculture and Agrarian Reform (unpublished data).

Note: A hyphen (-) indicates that the item is not applicable.

The analysis of social revenues and costs in table 19 shows that social profits are positive for all crop produced in the various agro-ecological zones. The policy impact on inputs show that inputs used for th production of all crops in the four zones are subsidized.

The nominal protection coefficients (NPCs) for wheat, barley and chick-peas in zones one, two and three are greater than one, indicating that the government procurement prices are higher than the world prices, especially for wheat (NPC = 1.29). The NPCs for lentils produced in zones one, two and three are less than one, which indicates that official prices are lower than world prices.

The effective protection coefficients (EPCs) wheat, barley, lentils and chick-peas are greater than one and greater than the NPCs, except for lentils produced in zone two. This indicates that the effective price received by the producer increased owing to the subsidy on inputs.

The domestic resource coefficients (DRCs) for all crops produced in the various zones are far below one. This indicates that the Syrian Arab Republic has a comparative advantage in producing these crops in the four agro-ecological zones.

(c) *Impact of the GATT agreement on the performance of the agricultural sector*

The Uruguay Round of the General Agreement on Tariffs and Trade (GATT) includes a long-term objective to reform trade in agriculture. The stated objective of the declaration is "to establish a fair and market-oriented agricultural trading system and that a reform process should be initiated through commitments on support and protection and through the establishment of strengthened and more operationally effective GATT rules and disciplines". This objective was the basis of the 1992 Uruguay Round agreement on agriculture that was signed in April 1994. The agreement regulations will be implemented at the beginning of 1995.

Neither the Syrian Arab Republic, Jordan, Lebanon, Saudi Arabia, the United Arab Emirates nor Yemen are members of GATT, but they are considering membership. To become members, these countries should comply with GATT regulations. The major expected effects of the GATT on agriculture are: (a) the reduction of agricultural support and export subsidies in developed countries; (b) the removal of trade barriers; (c) the replacement of nontariff barriers with tariff barriers; and (d) the reduction of tariff rates on

TABLE 18. CULTIVATED AREA OF WHEAT, BARLEY, LENTILS AND CHICK-PEAS IN THE RAIN-FED REGION OF THE SYRIAN ARAB REPUBLIC, 1993

(Hectares)

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Zone 3	58 019	494 461	42 070	-
Zone 4	-	556 220	-	-

Source: Ministry of Agriculture and Agrarian Reform (unpublished data).

Note: A hyphen (-) indicates that the item is not applicable.

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agricultural products. It is expected that these actions will lead to increased food commodity prices, mainly for wheat, barley, maize, rice, vegetable oils and sugar.

TABLE 19. RESULTS OF COMMODITY SYSTEMS, 1993-1994, BY AGRO-ECOLOGICAL ZONE
(In Syrian pounds per hectare)

			POLICY IMPACT ON PROTECTION COEFFICIENTS					
CROP	**P-PROFITS**	**S-PROFITS**	**REVENUE**	**INPUTS**	**FACTORS**	**NPC**	**EPC**	**DRC**
ECO-ZONE # 1								
WHEAT	7 905.1	6 920.0	6 238.5	-2 032.9	7 286.2	1.29	1.99	0.17
BARLEY	2 396.4	2 518.1	538.3	-2 134.5	2 794.5	1.04	1.67	0.37
LENTILS	5 063.5	9 825.9	-2 751.9	-3 779.0	5 789.5	0.89	1.07	0.32
CHICK-PEAS	6 788.7	6 800.1	2 290.7	-3 336.2	5 638.3	1.11	1.52	0.37
ECO-ZONE # 2								
WHEAT	7 579.1	5 026.0	3 791.3	-1 552.6	2 790.8	1.23	1.86	0.19
BARLEY	3 284.4	3 206.3	476.8	-1 930.2	2 328.9	1.04	1.57	0.24
LENTILS	4 330.6	8 776.4	-3 293.7	-3 167.2	4 319.3	0.84	0.99	0.32
CHICK-PEAS	7 917.7	6 377.3	2 084.5	-2 996.5	3 540.7	1.11	1.53	0.33
ECO-ZONE # 3								
WHEAT	1 888.0	1 284.2	1 570.6	-753.3	1 720.1	1.18	2.21	0.33
BARLEY	943.8	837.8	412.8	-851.4	1 158.2	1.07	1.93	0.38
LENTILS	3 570.2	4 157.6	-177.4	-1 952.1	2 362.0	0.99	1.24	0.45
ECO-ZONE # 4								
BARLEY	-486.3	126.0	-447.5	-478.5	643.3	0.87	1.06	0.76

To estimate the effects of the GATT agreement on the production of the crops selected for this study, a scenario is suggested wherein the world prices of these crops increase by 20 per cent. The 20 per cent increase in the international prices of tradable commodities was modelled on the PAM. The results of this scenario are shown in tables 15, 16, 17, 18 and 19. The following conclusions are derived from the tables:

(a) Since social analysis is based on valuation of output, inputs and resources at equilibrium prices (free market conditions), the social profits would be the best indicator of the effect of the GATT agreement on the agricultural system of the Syrian Arab Republic. The results of the scenario show that the social profits of the selected crops, except for sugar beet, has increased, which indicates that the Syrian Arab Republic would benefit from GATT membership;

(b) The comparative advantage indicator (DRC) has improved tremendously for all selected crops. The new DRC indicates that the Syrian Arab Republic would have a comparative advantage in producing all of the selected crops under different irrigation systems except for sugar beet.

IV. CONCLUSIONS AND RECOMMENDATIONS

Since the early 1980s, the Syrian Government has encouraged the production of wheat, sugar beet and cotton to meet the growing domestic consumption. The Government has also established agro-industries, including textile and food processing, that employ inexpensive raw materials. The policies of the Syrian Government have also aimed at reducing dependency on imports of wheat and sugar. Production of wheat, cotton and sugar beet has been expanded to larger areas in both irrigated and rain-fed regions.

This study has presented an evaluation of the current production systems for the main crops produced in both irrigated and rain-fed regions of the Syrian Arab Republic by means of the Policy Analysis Matrix methodology. Protection coefficients and comparative advantage coefficients were also estimated to test the economic efficiency of the selected crops in the various regions. The results are expected to be of value to policy makers in the Syrian Arab Republic as well as to international agencies.

The analysis was mainly emphasized on the Syrian Government's price policies and the exchange rate policy. These policies include: (a) subsidization of the output prices of the selected crops; (b) subsidization of input prices; (c) subsidization of factor costs; and (d) overvaluation of the exchange rate against international currencies.

Table 20 provides a summary of the most important results of the various PAMs. The results are reported for the selected crops under irrigation in the four governorates and under rain-fed conditions in the four agro-ecological zones. The following findings may be derived from the table:

(a) The high NPCs and EPCs for wheat indicate that the pricing system provides real incentives to cultivate this crop. This finding is supported by the high private profitability of producing wheat under irrigation in the various governorates and under rain-fed conditions in the four agro-ecological zones. However, there is a clear comparative advantage for wheat produced under rain-fed conditions, for wheat produced in Aleppo under gravity irrigation and for wheat produced in the Damascus region under different irrigation systems;

(b) The private prices of cotton are not significantly different from the social prices. The NPCs and EPCs are close to one, indicating that the current prices do not provide real incentives to farmers, but the comparative advantage coefficients are less than one for cotton produced in Aleppo, Al-Hassakeh and Hamah. Social profits are also much higher than private profits, indicating the high potential of this crop to earn foreign exchange;

(c) Substantial subsidies are offered to sugar beet producers. These subsidies are reflected in the high NPCs and EPCs and in the differences between private and social profits. Yet, the DRCs suggest that the Syrian Arab Republic does not have a comparative advantage in producing sugar beet. The country could save substantial funds if sugar were imported instead of locally produced. The same resources used to produce sugar could be allocated to commodities in which the country has a comparative advantage;

(d) Maize is usually produced after wheat as an intensive crop. The low NPCs and EPCs suggests disincentives. This is also true for private profitability in Aleppo, Al-Hassakeh, and Hamah. However, the DRCs imply that the Syrian Arab Republic does have a comparative advantage in producing this crop under gravity irrigation;

(e) Sunflower seed private prices are 31 per cent lower than prices in international markets. The NPC and EPC for this crop indicate a disincentive, while the DRC and social profits show a comparative advantage in producing this crop under all irrigation systems except deep well irrigation in the Hamah region;

(f) The output prices for barley are close to international prices, while input prices are subsidized. The DRCs for all barley produced in the Syrian Arab Republic are less than one. This indicates that barley production in the Syrian Arab Republic utilizes domestic resources efficiently. The DRCs also imply that the Syrian Arab Republic could earn foreign exchange from exporting this crop;

(g) Lentils and chick-peas are the two most common legumes produced in the rain-fed areas of the Syrian Arab Republic. Chick-peas are produced in zones one and two, while lentils are produced in zones one, two and three. The NPCs for lentils indicate disincentives. The NPCs for chick-peas are greater than one, demonstrating that regulated prices are higher than world prices. The DRCs for both crops are less than one, and the social profits are positive, which confirms that the country has a comparative advantage in producing those two crops in the rain-fed areas. The social profits earned from lentils are higher than those earned from wheat.

The result of the intervention on the output prices of the selected crops was a net expenditure of LS 11,612,804,663 in 1992 (table 21). This transfer from the Syrian Government (or taxpayers) to producers constituted about 3 per cent of the 1992 gross domestic product at current prices.

Net transfers are the differences between private profits and social profits; this shows the degree of inefficiency in an agricultural system. The net transfer value captures the total effect of the different policies affecting revenues, inputs and factors. Table 22 includes the amount of net transfer for each selected crop. The total net transfer amounted to LS 17,526,507,375, which constitutes about 5 per cent of the GDP.

Since 1988, the Syrian Government has persistently tried to reduce direct and indirect government intervention in the agricultural sector. The steps taken so far include: (a) allowing the private sector to import needed machinery at the equilibrium exchange rate (45.5 LS/US$); (b) importing pesticides and fertilizers at an exchange rate close to the equilibrium exchange rate (42.5 LS/US$); and (c) allowing the private sector to export a certain amount of selected agricultural products, including chick-peas, lentils and barley. The Syrian Government also intends to increase irrigation water charges within the next year to LS 2,500/ha, up from the current LS 1,037/ha. These policy changes were taken into consideration in the various parts of the above policy analysis. The figures in table 22 would be much higher in the absence of these policy modifications.

The analyses have proved that the policies of the Syrian Government in the rain-fed zones are appropriate. The current cropping pattern makes efficient use of resources in the rain-fed regions, although some minor adjustments may be needed to further improve production efficiency. Since the world prices of lentils and chick-peas are much higher than those of wheat and barley, consideration should be given, in the formulation of cropping plans, to expanding the area cultivated with lentils and chick-peas. More research should be conducted to improve yield and production practices, mainly the harvesting techniques for lentils and chick-peas.

TABLE 20. NPC, EPC, DRC AND PRIVATE AND SOCIAL PROFITS IN 1993, PER HECTARE

Crop	*NPC*	*EPC*	*DRC**	*P-Profits**	*S-Profits**
			IRRIGATED REGIONS		
Wheat					
Aleppo	1.32	1.64	1.29-1.00	11 515-17 878	(-6 023)**-38
Al-Hassakeh	1.10	1.21	1.30-1.06	4 035-9 338	(-5 658)-(-1 045)
Hamah	1.41	1.99	1.39-1.22	14 232-18 474	(-7 236)-(-4 072)
Damascus	1.20	1.41	1.03-0.81	13 170-19 887	(-810)-5 734
Cotton					
Aleppo	1.03	0.98	0.89-0.67	3 993-16 376	6 826-21 195
Al-Hassakeh	1.03	0.96	0.86-0.71	8 464-20 907	9 440-20 808
Hamah	1.02	1.00	0.74-0.58	17 760-28 789	19 834-32 270
Damascus	1.05	1.15	1.18-0.75	(-4 251)-13 424	(-9 139)-12 377
Sugar beet					
Aleppo	1.77	3.31	3.31-2.58	(-3 092)-8 998	(-44 081)-(-30 196)
Hamah	1.73	2.95	2.19-1.87	12 515-19 585	(-25 574)-(-18 547)
Damascus	1.72	3.75	2.49-1.99	11 609-18 679	(-20 970)-(-13 942)
Maize					
Aleppo	0.71	0.73	1.26-0.86	(-12 203)-(-419)	(-8 867)-4 602
Al-Hassakeh	0.70	0.44	1.23-0.81	(-23 269)-(-11 486)	(-7 311)-6 155
Hamah	0.73	0.73	1.45-1.05	(-7 829)-(-2 173)	(-10 376)-(-5 281)
Sunflower					
Hamah	0.69	0.63	1.05-0.77	(-11 741)-(-1 183)	(-1 955)-9 837
			RAIN-FED REGIONS		
Wheat					
Zone 1	1.29	1.99	0.17	7 905	6 920
Zone 2	1.23	1.86	0.19	7 579	5 026
Zone 3	1.18	2.21	0.33	1 888	1 284
Barley					
Zone 1	1.04	1.67	0.37	2 396	2 518
Zone 2	1.04	1.57	0.24	3284	3 206
Zone 3	1.07	1.93	0.38	944	838
Zone 4	0.87	1.06	0.76	-486	-126
Lentils					
Zone 1	0.89	1.07	0.32	5 064	9 826
Zone 2	0.84	0.99	0.32	4 331	8 776
Zone 3	0.99	1.24	0.45	3 570	4 157
Chick-peas					
Zone 1	1.11	1.52	0.37	6 789	6 800
Zone 2	1.11	1.53	0.33	7 918	6 377

* Ranges are given according to the irrigation system
** Values in brackets are negative

TABLE 21. VALUE OF TOTAL PRICE SUBSIDY PAID FOR EACH OF THE SELECTED CROPS
(Syrian pounds)

Crop	*Irrigated*	*Rain-fed*	*Total*
Wheat	5 667 298 923	3 867 237 168	9 534 536 091
Barley		355 434 305	355 434 305
Lentils		-294 612 134	-294 612 134
Chick-peas		170 519 007	170 519 007
Sugar beet	1 433 182 716		1 433 182 716
Cotton	562 828 838		562 828 838
Sunflower	-149 084 160		-149 084 160
Total	**7 514 226 317**	**4 098 578 346**	**11 612 804 663**

TABLE 22. VALUES OF NET TRANSFER FOR EACH SELECTED CROP
(Syrian pounds)

Crop	*Irrigated*	*Rain-fed*	*Total*
Wheat	8 084 557 147	5 465 089 478	13 549 646 625
Barley		2 513 042 136	2 513 042 136
Lentils		102 280 221	102 280 221
Chick-pea		439 231 776	439 231 776
Sugar beet	1 116 687 403		1 116 687 403
Cotton	-105 551 895		-105 551 895
Sunflower	-88 828 890		-88 828 890
Total	**9 006 863 764**	**8 519 643 611**	**17 526 507 375**

To enhance the efficiency of production of the selected crops in the irrigated areas, policy makers in the Syrian Arab Republic may wish to consider the following actions:

(a) An adjustment to the current price of irrigation water from government projects to cover at least the maintenance and operation costs;

(b) A gradual adjustment to the current cropping pattern to expand production of competitive crops and avoid inefficient ones, such as sugar beet and wheat produced under deep well irrigation. New production schemes should be studied in detail, especially after the latest changes in trade and exchange policies. This includes summer vegetables and irrigated fruits, especially those for export to other countries in the region;

(c) The continuation of the trade liberalization process by allowing the private sector to export additional quantities of agricultural products such as lentils, chick-peas and barley in prosperous seasons;

(d) The continuation of the gradual devaluation of the exchange rate to arrive at its equilibrium level so as to improve the efficiency of trade, since the value of total exports exceeds the value of imports;

(e) The formulation of a comprehensive and efficient agricultural policy, which would require more extensive studies including all agricultural subsectors. This type of study necessitates the establishment of an agricultural policy unit in the Ministry of Agriculture and Agrarian Reform. The prospective personnel should receive extensive and specialized training on the many aspects of policy analysis;

(f) The Syrian Arab Republic should consider joining GATT. The findings of the analysis indicated the major financial benefits of GATT membership. In this connection, a comprehensive study is needed to examine the overall impact of GATT on all crops produced in the Syrian Arab Republic to determine the most profitable crop mix in the absence of government intervention.

ANNEXES*

* The annexes have been reproduced as submitted.

ANNEX A

A.1 Land use pattern in the Syrian Arab Republic in 1992

(Thousands of hectares)

Governorate	Total area	Arable land			Non-arable land				Steppe & Pasture	Forests
		Cultivated	Non-cultivated	Total	Buildings & roads	Water	Rocky	Total		
Damascus	1803	133	63	196	68	3	164	235	1343	38
Dara'a	373	213	13	226	75	2	34	111	29	7
Sweida	555	150	41	191	29	1	113	143	212	9
Homs	4094	392	1	392	86	6	947	1039	2528	135
Ghab	138	83	-	83	10	2	1	13	-	42
Latakia	230	102	10	113	15	3	11	29	2	86
Tartous	189	123	-	123	18	1	15	24	1	31
Idleb	610	330	10	340	40	2	109	151	45	74
Aleppo	1820	1210	7	1217	66	22	264	252	203	48
Al-Hasake	2233	1331	106	1437	44	11	715	88	715	93
Al-Reqqa	1922	903	2	905	54	67	25	146	867	4
Dair-Ezzor	2306	198	34	222	26	12	1176	1214	1855	5
G.A.E.B	41	22	5	27	4	-	10	14	-	-
Damascus-City	12	2	-	2	8	-	2	10	-	
Total	18518	5554	491	6045	597	140	3022	3759	8059	655

Source: Ministry of Agriculture and Agrarian Reform.

A.2. WATER BASINS AND WATER RESOURCES (PROBABILITY OF 50 PER CENT RAIN)

Water basin	Area km²	Annual precipitation		Average annual quantities (million m³)			
		mm	Million m³	Surface	Underground	Springs	Total
Damascus	8560	268	2291	200	578	633	1411
Asi	21643	403	8733	1110	473	1134	2717
Coast region	5100	1294	6599	1557	290	488	2335
Degla and Khaboor	21129	402	8494	788	483	1117	2388
Euphrates	40083	182	7295	12175	26	-	26400
Yarmouk	6724	287	1930	181	17	248	446
Al-Badia	70786	138	9768	163	176	6	345
Aleppo	11155	304	3391	303	279	67	649
Total	185180	-	48490	34954	2320	2693	46982

Source: Ministry of Agriculture and Agrarian Reform.

A.3. GROSS DOMESTIC PRODUCT AT CONSTANT 1985 PRICES BY SECTOR DURING 1970-1992

Sector	Year					
	1970	1980	1985	1990	1991	1992
Agriculture	9065	22470	22517	28710	29988	32874
Mining & manufacturing	15170	30612	39793	59102	62953	66340
Bldg. & construction	2280	11403	15196	6197	6820	7325
Wholesale & retail trade	7079	18502	20604	17922	19677	22598
Transport & communication	4126	9400	21612	15633	15965	17385
Finance & insurance	2194	5133	4507	4242	4475	4875
Social & personal services	762	2273	3301	2488	2861	3040
Government services	5357	17049	19915	15088	17416	18920
Private non-profit	38	53	80	110	119	129
Total	46071	116895	138525	149492	160274	173468

Source: Central Bureau of Statistics.

A.4. VALUE OF AGRICULTURAL PRODUCTION AT CONSTANT 1985 PRICES

(Millions of Syrian pounds)

Agricultural production	Year				
	1988	1989	1990	1991	1992
Plant production	20494	13215	16970	17535	20106
* Cereals	7293	1414	4978	5097	6701
* Industrial crops	2266	2047	2247	2772	3436
* Fruits	5272	4018	4832	4855	4952
* Vegetables	3934	3202	3057	2936	2887
* Dry legumes	587	332	521	344	961
* Others	768	1190	1335	1543	1543
Animal products	7486	11055	11552	12254	12682
* Milk	3457	5479	5710	5994	5935
* Livestock	2669	4308	4473	4780	4891
* Eggs	801	715	789	836	1058
* Wool & hair	342	347	364	384	418
* Others	217	206	216	260	320
Total	27980	24270	28522	29789	32728

Source: Central Bureau of Statistics.

A.5. WINTER CROP AREA IN THE GOVERNORATES AND SETTLEMENT ZONES IN 1993

(Hectares)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Governorate	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	207773	629454	184568	1176697	39901	569997	52110	577458	159793	307458	644145	3261066
Damascus	759	2830	1989	6338	8185	5708	5845	4615	22630	796	39408	20287
Dara'a	2681	18985	7300	78460	74	29045	200	8012	0	3100	10255	137602
Sweida	0	2881	0	80352	0	10960	0	383	0	1393	0	95969
Quneitra	753	8487	0	0	0	0	0	0	0	0	753	8487
Homs	14671	35839	5863	34173	3010	37141	185	43532	865	60430	24594	211115
Hama	15884	27955	5784	84910	2025	56418	1010	25126	260	13829	24963	208238
Ghab	46556	9222	9222	0	0	0	0	0	0	0	55778	9222
Latakia	0	22254	0	0	0	0	0	0	0	0	0	22254
Idleb	11633	65010	2226	60065	803	21759	0	0	0	0	14662	146834
Aleppo	8537	93106	29719	456475	8335	151615	10228	56000	0	32000	56819	789196
Tartous	8151	27208	0	0	0	0	0	0	0	0	8151	27208
Al-Hasake	98148	315677	108128	267606	13627	118421	15433	172210	24007	40340	259343	914254
Al-Raqqa	0	0	14337	108320	3842	138930	14892	228735	30679	120173	63750	596158
G.A.D.E.B.	0	0	0	0	0	0	2207	1795	3836	357	6043	2152
Dair Ezzor	0	0	0	0	0	0	2110	37050	77516	35040	79626	72090

Source: Ministry of Agriculture and Agrarian Reform.

A.6. SUMMER CROP AREA IN THE GOVERNORATES AND SETTLEMENT ZONES IN 1993

(Hectares)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Governorate	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	113508	27140	826926	13294	16990	2687	27691	859	81794	13	322676	43993
Damascus	45	0	80	40	736	1398	706	39	4483	0	6049	1477
Dara'a	1141	1986	389	7108	24	220	1	820	0	0	1555	10133
Sweida	0	0	0	238	0	0	0	0	0	0	0	238
Quneitra	232	950	0	0	0	0	0	0	0	0	232	950
Homs	10513	3332	2554	26	1587	0	0	0	90	0	14743	3358
Hama	6608	2558	2692	714	316	0	138	0	32	13	9786	3285
Ghab	30460	582	0	0	0	0	0	0	0	0	30460	582
Idleb	5435	3620	1319	2450	280	1069	0	0	0	0	7034	7139
Aleppo	4415	4993	19425	2718	6558	0	8011	0	0	0	38409	7711
Tartous	9105	3469	0	0	0	0	0	0	0	0	9105	3469
Latakia	3678	5651	0	0	0	0	0	0	0	0	3678	5651
Al-Hasake	41877	0	45871	0	5389	0	2261	0	3621	0	99018	0
Al-Raqqa	0	0	10361	0	2095	0	14222	0	24831	0	51509	0
G.A.D.E.B.	0	0	0	0	0	0	1853	0	2485	0	4338	0
Dair Ezzor	0	0	0	0	0	0	0	0	44965	0	44965	0

Source: Ministry of Agriculture and Agrarian Reform.

A.7. WINTER CROP PRODUCTION IN THE GOVERNORATES AND SETTLEMENT ZONES IN 1993

(Thousands of tons)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Governorate	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	1389.4	1329.1	728.3	1377.3	203.5	303.2	242.7	167.6	1127.7	45.9	3699.9	3223.1
Damascus	7.2	2.8	19.9	5.2	83.9	4.8	60.4	3.7	232.3	0	403.7	16.5
Dara'a	10.5	30	29.7	54.8	0.2	9.1	0.4	1.4	0	0.3	40.8	95.6
Sweida	0	2.9	0	65.3	0	5.5	0	0.1	0	0.6	0	74.4
Quneitra	1.5	11.2	0	0	0	0	0	0	0	0	1.5	11.2
Homs	178.2	64.3	35.1	31.8	13.3	19.5	0.6	5.1	2.7	11.8	229.9	132.5
Hama	135.2	59.5	27.3	134.6	7	28.2	4	3.4	1	2.5	174.5	228.2
Ghab	462.4	28.3	0	0	0	0	0	0	0	0	462.4	28.3
Idleb	76.7	135.6	10.8	61	2.6	13.8	0	0	0	0	90.1	210.4
Aleppo	115.6	232	136	582.8	30.9	107.5	31.2	19.5	0	3.2	313.7	945
Tartous	29.1	61.3	0	0	0	0	0	0	0	0	29.1	61.3
Latakia	0	31	0	0	0	0	0	0	0	0	0	31
Al-Hasake	373.0	670.2	400.9	330.3	51.2	86	68.4	90	103.1	14.4	996.6	1190.9
Al-Raqqa	0	0	68.6	111.5	14.4	28.8	71.1	17.4	243.5	6.3	397.6	164
G.A.D.E.B.	0	0	0	0	0	0	6.6	0	16.3	0	22.9	0
Dair Ezzor	0	0	0	0	0	0	8.3	27	528.8	6.8	537.1	33.8

Source: Ministry of Agriculture and Agrarian Reform.

A.8. SUMMER CROP PRODUCTION IN THE GOVERNORATES AND SETTLEMENT ZONES IN 1993

(Thousands of tons)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Governorate	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	537.1	38.9	317.8	3.8	130.9	0.3	125.8	0.6	388.4	0	150.0	43.6
Damascus	0.4	0	1.0	0	8.6	0.1	15.9	0	77.4	0	103.3	1.0
Dara'a	4.2	0.7	2.0	1.8	0	0.1	0	0.6	0	0	6.2	3.2
Sweida	0	0	0	0	0	0	0	0	0	0	0	0
Quneitra	0.4	1.0	0	0	0	0	0	0	0	0	0.4	1.0
Homs	81.3	10.0	55.7	0	58.3	0	0	0	0.5	0	195.7	10
Hama	24.8	5.3	8.9	0.4	1.0	0	0.4	0	0.1	0	35.2	51.6
Ghab	136.3	0.8	0	0	0	0	0	0	0	0	136.3	0.8
Idleb	38.1	2.7	3.7	0.2	0.9	0.1	0	0	0	0	42.8	3.1
Aleppo	89.4	4.2	79.5	1.3	39.4	0	39.3	0	0	0	247.8	5.5
Tartous	18.6	9.7	0	0	0	0	0	0	0	0	18.6	0.7
Latakia	9.0	4.6	0	0	0	0	0	0	0	0	9.0	4.6
Al-Hasake	134.8	0	137.3	0	15.9	0	7.1	0	11.9	0	306.9	0
Al-Raqqa	0	0	29.8	0	6.3	0	56.1	0	93.8	0	186.1	0
G.A.D.E.B.	0	0	0	0	0	0	2.0	0	4.0	0	6.0	0
Dair Ezzor	0	0	0	0	0	0	0	0	199.0	0	199.0	0

Source: Ministry of Agriculture and Agranian Reform.

A.9. Area of winter field crops and pulses in the settlement zones in 1993

(Hectares)

Crop	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	207808	629453	175347	1176697	40045	569997	52165	577437	159293	307458	634658	3261042
High-yield wheat	185835	334982	159861	195151	34266	19521	46969	11238	112465	8398	539396	569290
Ordinary wheat	4440	71214	6709	132530	154	38498	216	8932	35	12720	11554	263894
Barley	1403	100410	3855	723148	1346	494461	624	556220	1070	286340	8298	2160579
Lentils	81	61675	10	37555	5	4207	3	1008	17	0	116	104445
Chick-peas	106	34773	0	43596	1	1841	0	15	0	0	107	80225
Sugar beet	12280	0	884	0	22	0	1121	0	8375	0	22682	0
Others	3663	26399	4028	44717	4251	11469	3232	24	37331	0	52505	82609

Source: Ministry of Agriculture and Agrarian Reform.

A.10. AREA OF SUMMER FIELD CROPS AND PULSES IN THE SETTLEMENT ZONES IN 1993

(Hectares)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Crop	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	113508	27140	82693	16967	16990	1687	27691	859	81794	13	322676	46666
Sugar beet	5535	0	1477	0	158	0	584	0	0	0	7754	0
Cotton	60331	0	66273	0	10470	0	13508	0	45893	0	196475	0
Soybean	3432	0	913	0	111	0	800	0	1162	0	6418	0
Sunflower	7787	0	609	0	43	0	0	0	0	0	8439	0
Others	36423	27140	13421	16967	6208	1687	12799	859	34739	13	103590	46666

Source: Ministry of Agriculture and Agrarian Reform.

A.11. Production of winter field crops and pulses in the settlement zones in 1993

(Thousands of tons)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Crop	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	138945	132810	72840	137628	20773	30325	26369	15752	112770	4637	371697	321252
High-yield wheat	78755	84801	62072	28390	12966	1070	17929	510	41741	275	213463	115046
Ordinary wheat	1827	13281	2590	13566	26	2314	43	254	0	241	4485	29656
Barley	581	20657	1137	87222	382	25854	176	15981	265	4121	2541	152795
Lentils	8	6238	1	3048	1	215	1	5	2	5	12	9506
Chick-peas	21	2751	0	2668	0	79	0	1	0	0	22	5499
Sugar beet	55138	0	3886	0	94	0	1652	0	21886	0	82766	0
Others	2615	5082	3154	2734	7304	793	6568	1	48876	0	68408	8750

Source: Ministry of Agriculture and Agrarian Reform.

A.12. PRODUCTION OF SUMMER FEILD CROPS AND PULSES IN THE SETTLEMENT ZONES IN 1993

(Thousands of tons)

	Zone 1		Zone 2		Zone 3		Zone 4		Zone 5		Total	
Crop	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed	Irrigated	Rainfed
Total	537.1	38.9	317.8	3.8	130.2	0.3	125.8	0.6	388.4	0	1499.3	43.6
Sugar beet	235.4	0	78.2	0	78.4	0	17.2	0	0	0	409.2	0
Cotton	200.6	0	212.1	0	34.2	0	42.8	0	149.2	0	638.9	0
Soybean	5.9	0	1.5	0	0.2	0	1.2	0	1.8	0	10.6	0
Sunflower	14.8	0	1.2	0	0.1	0	0	0	0	0	16.1	0
Others	80.4	38.9	24.8	3.8	17.3	0.3	64.6	0.6	237.4	0	424.5	43.6

Source: Ministry of Agriculture and Agrarian Reform.

A.13. THE SELECTED AGRICULTURAL PRODUCTS BALANCE SHEET

(Thousands of tons)

Crop	Item	Year									
		1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Wheat	Prod.	1612	1086	1714	1969	165613	2067	1020	2069	2140	3045
	Imports	969	1508	632	576	551.1	599.7	1002	954	1107	89
	Exports	0	0	0.3	0.8	37.1	7	11	10	0	34
	Balance	2581	2075	2345.7	2544	2170.3	2659.7	2011	3004	3247	3100
Barley	Prod.	1043	303	740	1116	576.3	2837	271	246	1000	1091
	Imports	0.06	299.3	144	0	29.9	4.9	0	0	208	82
	Exports	57	0	0	0	0	1772	0	0	0	0
	Balance	986.06	603	884	1116	606.2	2663.7	271	846	1208	1173
Lentils	Prod.	61	36	48	63	71	171	64	110	50	75
	Imports	0	0	0	0	0	0	0	0	0	0
	Exports	9	0	4	6	2	32.5	95	35	30	18
	Balance	52	36	44	57	69	138.4	0	75	20	56
Chick	Prod.	75	35.8	50.4	28	43.1	55	13	36	22	74
Peas	Imports	0	0	0	0	0	0	0	0	0	0
	Exports	20	41.4	0	3	0	5.9	19	0	3	0
	Balance	55	0	50.4	25	43.1	49	0	36	25	74
Maize	Prod.	227	60	76.5	74	56.9	90	116	180	225	na
	Imports	124	249	209.6	2.2	144.5	80.9	126	249	262	na
	Exports	0	0	0	0	0	0	0	0	0	na
	Balance	151	309	286.1	76.2	201.4	170.9	242	429	487	na
Sunflower	Prod.	6	601	9.1	12.5	14.7	14	10	17	238	20
	Imports	0	0	0	0	0	0	0	0	262	0
	Exports	1	0	0	0	0	0	0	0	0	0
	Balance	4	6.1	9.1	12.5	14.7	14	10	17	500	20
Cotton	Prod.	194	164	172	419	350.9	179	163.8	441	555	55
(Lint)	Imports	0	0	0	0	0	0	0	0	0	0
	Exports	106.4	148	90.8	98	60.1	31.6	59	7	81	37
	Balance	87.6	16	81.9	320	290.8	147.4	104.8	434	474	19
Sugar	Prod.	1186	1229.3	389.7	440	457.4	222	187	422	653	1365
Beet	Imports	0	0	0	0	0	0	0	0	0	0
	Exports	0	0	0	0	0	0	0	0	0	0
	Balance	1186	1229.3	389.7	440	457.4	222	187	422	653	1365

ANNEX B

B.1 SUMMARY OF DIFFERENT PAMS { ALEPPO }

CROP SYSTEM	P-PROFITS	S-PROFITS	POLICY IMPACTS ON REVENUE	INPUTS	FACTORS	PROTECTION COEFFICIENTS NPC	EPC	DRC
WHEAT DEEP WELL IRRIGATION	11514.7	189.9	5441.9	-1464.9	-4418.0	1.12	1.26	0.99
WHEAT SHALLOW WELL IRRIGATION	14651.3	4002.8	5441.9	-1464.9	-3741.7	1.12	1.26	0.85
WHEAT RIVER IRRIGATION	16617.6	5654.0	5441.9	-1464.9	-4056.8	1.12	1.26	0.79
WHEAT GRAVITY IRRIGATION	17877.8	6251.5	5441.9	-1464.9	-4719.5	1.12	1.26	0.77
COTTON DEEP WELL IRRIGATION	3933.1	23322.5	-15528.9	2528.6	1332.0	0.85	0.77	0.71
COTTON SHALLOW WELL IRRIGATION	10066.9	30778.9	-15528.9	2528.6	2654.6	0.85	0.77	0.61
COTTON RIVER IRRIGATION	13912.1	34007.9	-15528.9	2528.6	2038.4	0.85	0.77	0.57
COTTON GRAVITY IRRIGATION	16376.4	37690.6	-15528.9	2528.6	3256.7	0.85	0.77	0.53
SUG-BEET-DEEP WELL IRRIGATION	-3092.2	-30061.4	31750.2	1644.7	3136.3	1.41	1.91	1.90
SUG-BEET-SHALLOW WELL IRRIGATION	2867.4	-22816.8	31750.2	1644.7	4421.3	1.41	1.91	1.69
SUG-BEET-RIVER IRRIGATION	6603.4	-19679.5	31750.2	1644.7	3822.6	1.41	1.91	1.59
SUG-BEET-GRAVITY IRRIGATION	8997.7	-16176.2	31750.2	1644.7	4931.5	1.41	1.91	1.49
MAIZE DEEP WELL IRRIGATION	-12202.9	-965.0	-21849.2	-4632.4	-5978.9	0.60	0.59	1.02
MAIZE SHALLOW WELL IRRIGATION	-6394.4	6096.0	-21849.2	-4632.4	-4726.4	0.60	0.59	0.85
MAIZE RIVER IRRIGATION	-2753.1	9153.8	-21849.2	-4632.4	-5309.9	0.60	0.59	0.78
MAIZE GRAVITY IRRIGATION	-419.4	12501.6	-21849.2	-4632.4	-4295.8	0.60	0.59	0.70

B.2 SUMMARY OF DIFFERENT PAMS { AL-HASSAKA }

CROP SYSTEM		P-PROFITS	S-PROFITS	POLICY IMPACTS ON REVENUE	INPUTS	FACTORS	PROTECTION COEFFICIENTS NPC	EPC	DRC
HYWHEAT	PAM WITH DEEP WELL IRRIGATION	4035.7	355.9	-3163.0	-998.3	-5844.6	0.93	0.91	0.99
HYWHEAT	PAM SHALLOW WELL IRRIGATION	6649.6	3533.3	-3163.0	-998.3	-5281.0	0.93	0.91	0.86
HYWHEAT	PAM WITH RIVER PUMP IRRIGATION	8288.2	4909.3	-3163.0	-998.3	-5543.5	0.93	0.91	0.80
HYWHEAT	PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	9338.3	6131.7	-3163.0	-998.3	-5371.3	0.93	0.91	0.75
COTTON	PAM WITH DEEP WELL IRRIGATION	8464.4	26642.8	-16976.5	2754.9	-1553.0	0.84	0.77	0.69
COTTON	PAM SHALLOW WELL IRRIGATION	14598.2	34099.3	-16976.5	2754.9	-230.3	0.84	0.77	0.60
COTTON	PAM WITH RIVER PUMP IRRIGATION	18443.4	37328.3	-16976.5	2754.9	-846.5	0.84	0.77	0.57
COTTON	PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	20907.8	40196.7	-16976.5	2754.9	-442.5	0.84	0.77	0.53
MAIZE	PAM WITH DEEP WELL IRRIGATION	-23269.7	745.5	-22711.0	3209.4	-1905.2	0.59	0.35	0.98
MAIZE	PAM SHALLOW WELL IRRIGATION	-17461.2	7806.5	-22711.0	3209.4	-652.7	0.59	0.35	0.80
MAIZE	PAM WITH RIVER PUMP IRRIGATION	-13819.9	10864.3	-22711.0	3209.4	-1236.2	0.59	0.35	0.73
MAIZE	PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	-11486.2	13580.6	-22711.0	3209.4	-853.6	0.59	0.35	0.66

B.3 SUMMARY OF DIFFERENT PAMS (DAMASCUS)

CROP SYSTEM	P-PROFITS	S-PROFITS	POLICY IMPACTS ON REVENUE	INPUTS	FACTORS	PROTECTION COEFFICIENTS NPC	EPC	DRC
HYWHEAT PAM WITH DEEP WELL IRRIGATION	13170.4	5809.6	1856.1	-3841.4	-1663.4	1.03	1.15	0.84
HYWHEAT PAM SHALLOW WELL IRRIGATION	16481.3	9834.4	1856.1	-3841.4	-949.5	1.03	1.15	0.73
HYWHEAT PAM WITH RIVER PUMP IRRIGATION	18556.8	11577.3	1856.1	-3841.4	-1282.1	1.03	1.15	0.69
HYWHEAT PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	19887.0	13125.6	1856.1	-3841.4	-1064.0	1.03	1.15	0.64
COTTON PAM WITH DEEP WELL IRRIGATION	-4251.1	6098.5	-13037.0	-5430.7	2743.2	0.86	0.88	0.91
COTTON PAM SHALLOW WELL IRRIGATION	4461.7	16690.0	-13037.0	-5430.7	4621.9	0.86	0.88	0.74
COTTON PAM WITH RIVER PUMP IRRIGATION	9923.7	21276.6	-13037.0	-5430.7	3746.6	0.86	0.88	0.67
COTTON PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	13424.2	25351.1	-13037.0	-5430.7	4320.6	0.86	0.88	0.61
SUG-BEATSPAM WITH DEEP WELL IRRIGATION	11609.1	-8035.2	26975.2	1217.2	6113.7	1.38	1.95	1.30
SUG-BEATSPAM SHALLOW WELL IRRIGATION	15094.3	-3798.6	26975.2	1217.2	6865.2	1.38	1.95	1.14
SUG-BEATSPAM WITH RIVER PUMP IRRIGATION	17279.0	-1963.9	26975.2	1217.2	6515.1	1.38	1.95	1.07
SUG-BEATSPAM WITH IRRIGATION FORM GOVERNMENT PROJEC	18679.2	-334.1	26975.2	1217.2	6744.7	1.38	1.95	1.01

B.4 SUMMARY OF DIFFERENT PAMS { HAMAH }

CROP SYSTEM	P-PROFITS	S-PROFITS	POLICY IMPACTS ON REVENUE	INPUTS	FACTORS	PROTECTION COEFFICIENTS NPC	EPC	DRC
HYWHEAT PAM WITH DEEP WELL IRRIGATION	14232.1	-6.9	8829.6	-2243.0	-3166.3	1.18	1.43	1.00
HYWHEAT PAM SHALLOW WELL IRRIGATION	16323.1	2535.0	8829.6	-2243.0	-2715.4	1.18	1.43	0.90
HYWHEAT PAM WITH RIVER PUMP IRRIGATION	17634.0	3635.9	8829.6	-2243.0	-2925.5	1.18	1.43	0.86
HYWHEAT PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	18474.1	4613.7	8829.6	-2243.0	-2787.7	1.18	1.43	0.82
COTTON PAM WITH DEEP WELL IRRIGATION	17760.4	39628.6	-19814.6	-248.0	2301.6	0.84	0.80	0.59
COTTON PAM SHALLOW WELL IRRIGATION	23197.2	46237.7	-19814.6	-248.0	3473.9	0.84	0.80	0.52
COTTON PAM WITH RIVER PUMP IRRIGATION	26605.5	49099.8	-19814.6	-248.0	2927.7	0.84	0.80	0.49
COTTON PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	28789.8	51642.3	-19814.6	-248.0	3285.9	0.84	0.80	0.46
SUG-BEATSPAM WITH DEEP WELL IRRIGATION	12514.6	-11304.2	30163.7	2644.7	3700.1	1.38	1.77	1.32
SUG-BEATSPAM SHALLOW WELL IRRIGATION	15999.7	-7067.6	30163.7	2644.7	4451.6	1.38	1.77	1.20
SUG-BEATSPAM WITH RIVER PUMP IRRIGATION	18184.5	-5232.9	30163.7	2644.7	4101.5	1.38	1.77	1.15
SUG-BEATSPAM WITH IRRIGATION FORM GOVERNMENT PROJEC	19584.7	-3603.1	30163.7	2644.7	4331.1	1.38	1.77	1.10
MAIZE PAM WITH DEEP WELL IRRIGATION	-7829.3	-4545.6	-15645.2	-3603.1	-8758.4	0.61	0.58	1.16
MAIZE PAM SHALLOW WELL IRRIGATION	-5041.2	-1156.3	-15645.2	-3603.1	-8157.2	0.61	0.58	1.04
MAIZE PAM WITH RIVER PUMP IRRIGATION	-3293.4	311.4	-15645.2	-3603.1	-8437.3	0.61	0.58	0.99
MAIZE PAM WITH IRRIGATION FORM GOVERNMENT PROJEC	-2173.2	1615.2	-15645.2	-3603.1	-8253.6	0.61	0.58	0.94
SUNFLOWERPAM WITH DEEP WELL IRRIGATION	-11741.3	8249.9	-29069.9	-2806.5	-6272.2	0.58	0.51	0.85
SUNFLOWERPAM SHALLOW WELL IRRIGATION	-6536.9	14576.6	-29069.9	-2806.5	-5149.9	0.58	0.51	0.73
SUNFLOWERPAM WITH RIVER PUMP IRRIGATION	-3274.3	17316.4	-29069.9	-2806.5	-5672.8	0.58	0.51	0.68
SUNFLOWERPAM WITH IRRIGATION FORM GOVERNMENT PROJEC	-1183.3	19750.2	-29069.9	-2806.5	-5329.9	0.58	0.51	0.63

B.5 SUMMARY OF DIFFERENT PAMS FOR AGROCLIMATICAL ZONES 1, 2, 3, AND 4.

CROP	P-PROFITS	S-PROFITS	POLICY IMPACTS ON REVENUE	INPUTS	FACTORS	PROTECTION COEFFICIENTS NPC	EPC	DRC
ECO-ZONE #: ZONE # 1								
WHEAT	7905.1	10508.6	2227.8	-2433.9	7265.2	1.09	1.39	0.12
BARLEY	2396.4	4904.9	-2129.3	-2401.3	2780.5	0.88	1.04	0.23
LENTILS	5063.5	14248.9	-7695.2	-4273.3	5763.5	0.74	0.82	0.25
CHICKPEA	6788.7	10484.7	-1827.3	-3748.0	5616.6	0.93	1.13	0.28
ECO-ZONE #: ZONE # 2								
WHEAT	7579.1	7753.3	743.1	-1857.4	2774.8	1.04	1.29	0.14
BARLEY	3284.4	5320.3	-1885.9	-2166.5	2316.5	0.88	1.04	0.16
LENTILS	4330.6	12462.3	-7413.1	-3579.2	4297.7	0.70	0.77	0.25
CHICKPEA	7917.7	9638.0	-1559.8	-3361.0	3521.5	0.93	1.14	0.25
ECO-ZONE #: ZONE # 3								
WHEAT	1888.0	2647.9	46.5	-905.7	1712.1	1.00	1.29	0.19
BARLEY	943.8	1781.2	-641.6	-956.8	1152.6	0.91	1.14	0.23
LENTILS	3570.2	6369.1	-2649.1	-2199.2	2349.0	0.82	0.95	0.35
ECO-ZONE #: ZONE # 4								
BARLEY	-486.3	580.6	-955.6	-529.3	640.6	0.76	0.56	0.40

ANNEX C

C.1 Private Budget of selected crops in Aleppo governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEET	MAIZE
Total Gross Output (SP/hect)	50905.0	86500.0	109400.0	32270.0
Crop produce : (SP/hect)	47905.0	85750.0	106400.0	31570.0
By- product : (SP/hect)	3000.0	750.0	3000.0	700.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	17117.3	24645.6	46077.0	7679.2
Seed/seedlings (SP/hect) or (SP/hect)	3891.2	734.4	4266.0	720.0
Fertilizer:				
Nitrogen (SP/hect)	2309.1	3150.4	3454.7	2864.0
Phosphate(SP/hect)	2318.4	2281.6	3551.2	1692.8
Potash (SP/hect)	0.0	0.0	3285.1	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	1000.0	776.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	400.4	272.2	399.6	400.0
Land preparation (SP/hect)	2201.4	3298.0	3280.0	0.0
Fertilization (SP/hect)	170.0	0.0	400.4	0.0
Protection (SP/het)	375.0	0.0	0.0	0.0
Sowing/planting (SP/hect)	399.0	798.0	0.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	1260.0	0.0	0.0
Harvesting (SP/hect)	2310.8	8575.0	10640.0	0.0
Transportation (SP/hect)	1742.0	3500.0	16800.0	2002.4
DOMESTIC FACTORS				
T-Domestic Factors Cost W/deep well	22273.0	57921.3	66415.2	36793.7
T-Domestic Factors Cost W/shallow well	19136.4	51787.5	60455.6	30985.2
T-Domestic Factors Cost W/river	17170.1	47942.3	56719.6	27343.8
T-Domestic Factors Cost W/G.projects	15909.9	45478.0	54325.3	25010.2
Manure (SP/hect)	0.0	0.0	336.0	0.0
Labor requirment:				
Flatinning (SP/hect)	700.0	315.0	399.6	525.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	59.5	455.0	742.0	350.0
Protection (SP/het)	245.0	840.0	0.0	0.0
Sowing/planting (SP/hect)	49.0	70.0	2544.0	1050.0
Husbandary, weeding...etc (SP/hect)	0.0	2899.0	5928.0	3120.0
Harvesting (SP/hect)	0.0	9680.0	10710.0	2880.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Thinning (SP/hect)	0.0	1430.0	4128.0	520.0
Replanting (SP/hect)	0.0	338.0	696.0	0.0
Irrigation (SP/hect)	4095.0	9835.0	6580.0	5110.0
Land-crop (SP/hect)	7185.8	12862.5	15960.0	6314.0
Sacks or package (SP/hect)	875.0	1300.0	0.0	1025.0
Water according to source (SP/hect):				
Deep tubewell	7839.3	15330.2	14894.6	14517.2
Shallow tubewell	4800.2	9387.0	9120.4	8889.2
Rivers	2895.0	5661.3	5500.5	5361.1
Government projects	1674.0	3273.6	3180.6	3100.0
Cost of working capital w/D-well (SP/hect)	1224.5	2566.7	3496.9	1382.5
Cost of working capital w/Sh-well (SP/hect)	1127.0	2376.0	3311.7	1201.9
Cost of working capital w/Rivers (SP/hect)	1065.9	2256.5	3195.5	1088.7
Cost of working capital w/G.Proj (SP/hect)	1026.7	2179.9	3121.1	1016.2
T- private costs w/deep well (SP/hect)	39390.3	82566.9	112492.2	44472.9
T- private costs w/shallow well (SP/hect)	36253.7	76433.1	106532.6	38664.4
T- private costs w/rivers (SP/hect)	34287.4	72587.9	102796.6	35023.1
T- private costs w/G.projects (SP/hect)	33027.2	70123.6	100402.3	32689.4
Private profits w/deep well (SP/hect)	11514.7	3933.1	-3092.2	-12202.9
Private profits w/shallow well (SP/hect)	14651.3	10066.9	2867.4	-6394.4
Private profits w/rivers (SP/hect)	16617.6	13912.1	6603.4	-2753.1
Private profits w/G.Projects (SP/hect)	17877.8	16376.4	8997.7	-419.4

C.2 Social Budgets of selected crops in Aleppo governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEET	MAIZE
Total Gross Output (SP/hect)	38518.8	83592.6	61980.8	45290.9
Crop produce : (SP/hect)	35518.8	83592.6	61978.8	45287.9
By- product : (SP/hect)	3000.0	0.0	2.0	3.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	17887.7	20273.4	42865.4	11428.8
Seed/seedlings (SP/hect) or (SP/hect)	4124.7	778.5	4522.0	763.2
Fertilizer:				
Nitrogen (SP/hect)	1790.6	2443.0	2679.0	2220.9
Phosphate(SP/hect)	2072.8	2039.9	3175.0	1513.5
Potash (SP/hect)	0.0	0.0	5411.5	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	1060.0	822.6	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	400.4	272.2	399.6	400.0
Land preparation (SP/hect)	2201.4	0.0	3280.0	0.0
Fertilization (SP/hect)	170.0	0.0	400.4	0.0
Protection (SP/het)	375.0	0.0	0.0	0.0
Sowing/planting (SP/hect)	399.0	798.0	0.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	1260.0	0.0	0.0
Harvesting (SP/hect)	3551.9	8359.3	6197.9	4528.8
Transportation (SP/hect)	1742.0	3500.0	16800.0	2002.4
DOMESTIC FACTORS				
T-Domestic Factors Cost W/deep well	26654.6	56492.6	63196.7	42726.2
T-Domestic Factors Cost W/shallow well	22841.6	49036.2	55952.1	35665.2
T-Domestic Factors Cost W/river	21190.4	45807.1	52814.8	32607.4
T-Domestic Factors Cost W/G.projects	20593.0	42124.5	49311.5	29259.6
Manure (SP/hect)	0.0	0.0	336.0	0.0
Labor requirment:				
Flatinning (SP/hect)	700.0	315.0	399.6	525.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	59.5	455.0	742.0	350.0
Protection (SP/het)	245.0	840.0	0.0	0.0
Sowing/planting (SP/hect)	49.0	70.0	2544.0	1050.0
Husbandary, weeding...etc (SP/hect)	0.0	2899.0	5928.0	3120.0
Harvesting (SP/hect)	0.0	9680.0	10710.0	2880.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Thinning (SP/hect)	0.0	1430.0	4128.0	520.0
Replanting (SP/hect)	0.0	338.0	696.0	0.0
Irrigation (SP/hect)	4095.0	9835.0	6580.0	5110.0
Land (SP/hect)	10150.0	10150.0	10150.0	10150.0
Sacks or package (SP/hect)	875.0	500.0	0.0	1025.0
Water according to source (SP/hect):	0.0	0.0	0.0	0.0
Deep tubewell	8259.2	16151.4	15692.5	15294.9
Shallow tubewell	4636.5	9066.9	8809.3	8586.1
Rivers	3067.6	5999.0	5828.5	5680.8
Government projects	2500.0	2500.0	2500.0	2500.0
Cost of working capital w/D-well (SP/hect	2221.8	3829.2	5290.5	2701.3
Cost of working capital w/Sh-well (SP/hec	2031.6	3457.2	4929.1	2349.1
Cost of working capital w/Rivers (SP/hect	1949.3	3296.2	4772.6	2196.6
Cost of working capital w/G.Proj (SP/hect)	1919.5	3112.5	4597.9	2029.6
T- Social costs w/deep well (SP/hect)	44542.3	76766.0	106062.0	54155.0
T- Social costs w/shallow well (SP/hect)	40729.4	69309.6	98817.4	47094.0
T- Social costs w/rivers (SP/hect)	39078.2	66080.5	95680.1	44036.2
T- Social costs w/G.projects (SP/hect)	38480.7	62397.9	92176.9	40688.4
Social profits w/deep well (SP/hect)	-6023.6	6826.6	-44081.2	-8864.1
Social profits w/shallow well (SP/hect)	-2210.6	14283.1	-36836.7	-1803.1
Social profits w/rivers (SP/hect)	-559.4	17512.1	-33699.4	1254.7
Social profits w/G.Projects (SP/hect)	38.0	21194.7	-30196.1	4602.5

C.3 Private Budgets of selected crops in Al-Hassakh governorate (SP/hectare)

Item	WHEAT	COTTON	MAIZE
Total Gross Output (SP/hect)	40935.0	89425.0	32200.0
Crop produce : (SP/hect)	37935.0	89425.0	32200.0
By- product : (SP/hect)	3000.0	0.0	0.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	18334.2	22981.2	18265.2
Seed/seedlings (SP/hect) or (SP/hect)	4500.0	806.4	892.5
Fertilizer:			
Nitrogen (SP/hect)	2273.3	1718.4	2559.7
Phosphate(SP/hect)	2318.4	1527.2	1692.8
Potash (SP/hect)	0.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	500.0	779.0	0.0
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	400.0	807.7	399.0
Land preparation (SP/hect)	2680.0	4000.0	1920.0
Fertilization (SP/hect)	400.0	0.0	400.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	400.0	0.0	0.0
Husbandary, weeding...etc (SP/hect)	500.0	0.0	0.0
Harvesting (SP/hect)	2655.5	8942.5	8000.0
Transportation (SP/hect)	1707.1	4400.0	2401.2
DOMESTIC FACTORS			
T-Domestic Factors Cost W/deep well	18565.0	57979.4	37204.5
T-Domestic Factors Cost W/shallow well	15951.2	51845.6	31396.0
T-Domestic Factors Cost W/river	14312.6	48000.4	27754.7
T-Domestic Factors Cost W/G.projects	13262.5	45536.0	25421.0
Manure (SP/hect)	0.0	0.0	0.0
Labor requirment:			
Flatinning (SP/hect)	387.5	515.0	215.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	162.5	287.5	25.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	25.0	3200.0	800.0
Husbandary, weeding...etc (SP/hect)	120.0	2150.0	260.0
Harvesting (SP/hect)	0.0	10950.0	1375.0
Transportation (SP/hect)	0.0	770.0	0.0
Thinning (SP/hect)	0.0	2880.0	600.0
Replanting (SP/hect)	0.0	800.0	0.0
Irrigation (SP/hect)	3500.0	7150.0	6688.0
Land-crop (SP/hect)	5690.3	10000.0	10000.0
Sacks or package (SP/hect)	1000.0	1430.0	1000.0
Water according to source (SP/hect):			
Deep tubewell	6532.7	15330.2	14517.2
Shallow tubewell	4000.2	9387.0	8889.2
Rivers	2412.5	5661.3	5361.1
Government projects	1395.0	3273.6	3100.0
Cost of working capital w/D-well (SP/hect)	1147.1	2516.7	1724.3
Cost of working capital w/Sh-well (SP/hect)	1065.8	2326.1	1543.8
Cost of working capital w/Rivers (SP/hect)	1014.9	2206.5	1430.6
Cost of working capital w/G.Proj (SP/hect)	982.2	2129.9	1358.0
T- private costs w/deep well (SP/hect)	36899.3	80960.6	55469.7
T- private costs w/shallow well (SP/hect)	34285.4	74826.8	49661.2
T- private costs w/rivers (SP/hect)	32646.8	70981.6	46019.9
T- private costs w/G.projects (SP/hect)	31596.7	68517.2	43686.2
Private profits w/deep well (SP/hect)	4035.7	8464.4	-23269.7
Private profits w/shallow well (SP/hect)	6649.6	14598.2	-17461.2
Private profits w/rivers (SP/hect)	8288.2	18443.4	-13819.9
Private profits w/G.Projects (SP/hect)	9338.3	20907.8	-11486.2

C.4 Social Budgets of selected crops in Al-Hassakh governorate (SP/hectare)

Item	HYWHEAT	COTTON	MAIZE
Total Gross Output (SP/hect)	37376.9	87175.2	45906.5
Crop produce : (SP/hect)	34376.9	87175.2	45906.5
By- product : (SP/hect)	3000.0	0.0	0.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	18660.4	24133.8	14155.3
Seed/seedlings (SP/hect) or (SP/hect)	4770.0	854.8	946.1
Fertilizer:			
Nitrogen (SP/hect)	1762.8	1332.5	1984.9
Phosphate(SP/hect)	2072.8	1365.4	1513.5
Potash (SP/hect)	0.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	530.0	825.7	0.0
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	400.0	807.7	399.0
Land preparation (SP/hect)	2680.0	5830.1	1920.0
Fertilization (SP/hect)	400.0	0.0	400.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	400.0	0.0	0.0
Husbandary, weeding...etc (SP/hect)	500.0	0.0	0.0
Harvesting (SP/hect)	3437.7	8717.5	4590.6
Transportation (SP/hect)	1707.1	4400.0	2401.2
DOMESTIC FACTORS			
T-Domestic Factors Cost W/deep well	24374.3	59737.5	39062.4
T-Domestic Factors Cost W/shallow well	21196.9	52281.1	32001.4
T-Domestic Factors Cost W/river	19820.9	49052.1	28943.7
T-Domestic Factors Cost W/G.projects	18598.5	46183.6	26227.3
Manure (SP/hect)	0.0	0.0	0.0
Labor requirment:			
Flatinning (SP/hect)	387.5	515.0	215.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	162.5	287.5	25.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	25.0	3200.0	800.0
Husbandary, weeding...etc (SP/hect)	120.0	2150.0	260.0
Harvesting (SP/hect)	0.0	10950.0	1375.0
Transportation (SP/hect)	0.0	770.0	0.0
Thinning (SP/hect)	0.0	2880.0	600.0
Replanting (SP/hect)	0.0	800.0	0.0
Irrigation (SP/hect)	3500.0	7150.0	6688.0
Land (SP/hect)	10150.0	10150.0	10150.0
Sacks or package (SP/hect)	1000.0	550.0	1000.0
Water according to source (SP/hect):	0.0	0.0	0.0
Deep tubewell	6882.7	16151.4	15294.9
Shallow tubewell	3863.7	9066.9	8586.1
Rivers	2556.4	5999.0	5680.8
Government projects	1395.0	3273.6	3100.0
Cost of working capital w/D-well (SP/hect	2146.6	4183.6	2654.6
Cost of working capital w/Sh-well (SP/hec	1988.1	3811.7	2302.4
Cost of working capital w/Rivers (SP/hect	1919.5	3650.6	2149.8
Cost of working capital w/G.Proj (SP/hect)	1858.5	3507.5	2014.3
T- Social costs w/deep well (SP/hect)	43034.7	83871.3	53217.8
T- Social costs w/shallow well (SP/hect)	39857.3	76414.9	46156.8
T- Social costs w/rivers (SP/hect)	38481.3	73185.8	43099.0
T- Social costs w/G.projects (SP/hect)	37258.9	70317.4	40382.6
Social profits w/deep well (SP/hect)	-5657.8	3303.9	-7311.3
Social profits w/shallow well (SP/hect)	-2480.4	10760.3	-250.3
Social profits w/rivers (SP/hect)	-1104.4	13989.3	2807.5
Social profits w/G.Projects (SP/hect)	118.0	16857.8	5523.8

C.5 Private Budgets of selected crops in Hamah governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEET	MAIZE	SUNFLOWER
Total Gross Output (SP/hect)	58237.0	102620.0	109200.0	24303.0	40000.0
Crop produce : (SP/hect)	55737.0	99120.0	105450.0	23303.0	40000.0
By- product : (SP/hect)	2500.0	3500.0	3750.0	1000.0	0.0
TRADABLE INPUTS					
Total Tradable Inputs Cost (SP/hect)	21348.2	26168.3	45891.0	7641.6	12609.5
Seed/seedlings (SP/hect) or (SP/hect)	4768.0	1064.0	5400.0	626.5	1350.0
Fertilizer:					
Nitrogen (SP/hect)	2976.0	2945.0	5681.0	1330.0	570.0
Phosphate(SP/hect)	2660.0	2356.0	4997.0	627.0	760.0
Potash (SP/hect)	0.0	0.0	2850.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0	0.0
Chemicals:					
..... (SP /hect)	1000.0	1238.0	1425.0	225.0	1234.0
..... (SP /hect)	0.0	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0	0.0
Costs of hired machinery :					
Flatinning (SP/hect)	1320.0	838.2	2000.0	615.9	1320.0
Land preparation (SP/hect)	3490.0	4610.0	3490.0	3383.0	2370.0
Fertilization (SP/hect)	159.0	198.8	318.0	159.2	159.0
Protection (SP/het)	350.0	1400.0	350.0	0.0	0.0
Sowing/planting (SP/hect)	159.0	254.0	0.0	159.0	159.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	2292.5	9912.0	10545.0	0.0	4000.0
Transportation (SP/hect)	2173.7	1352.4	8835.0	516.0	687.5
DOMESTIC FACTORS					
T-Domestic Factors Cost W/deep well	22656.7	58691.2	50794.4	24490.7	39131.8
T-Domestic Factors Cost W/shallow well	20565.6	53254.5	47309.3	21702.7	33927.4
T-Domestic Factors Cost W/river	19254.7	49846.2	45124.5	19954.8	30664.8
T-Domestic Factors Cost W/G.projects	18414.6	47661.9	43724.3	18834.7	28573.8
Manure (SP/hect)	0.0	0.0	0.0	0.0	0.0
Labor requirment:					
Flatinning (SP/hect)	860.0	1728.0	864.0	0.0	864.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	175.0	160.0	240.0	50.1	60.0
Protection (SP/het)	317.0	316.0	667.0	350.0	318.0
Sowing/planting (SP/hect)	60.0	75.0	2200.0	50.1	60.0
Husbandary, weeding...etc (SP/hect)	0.0	8569.2	5500.0	3500.0	1025.0
Harvesting (SP/hect)	0.0	11682.0	8840.0	1500.0	0.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0	0.0
Thinning (SP/hect)	0.0	0.0	0.0	0.0	0.0
Replanting (SP/hect)	0.0	0.0	0.0	0.0	0.0
Irrigation (SP/hect)	5490.0	4563.0	4950.0	7338.0	15389.0
Land-crop (SP/hect)	8360.6	14868.0	15817.5	3495.5	6000.0
Sacks or package (SP/hect)	800.0	504.0	0.0	240.0	800.0
Water according to source (SP/hect):					
Deep tubewell	5226.2	13588.1	8710.3	6968.3	13007.4
Shallow tubewell	3200.1	8320.3	5333.5	4266.8	7964.8
Rivers	1930.0	5018.0	3216.7	2573.3	4803.6
Government projects	1116.0	2901.6	1860.0	1488.0	2777.6
Cost of working capital w/D-well (SP/hect)	1367.9	2637.9	3005.6	998.9	1608.4
Cost of working capital w/Sh-well (SP/hect)	1302.9	2468.9	2897.2	912.2	1446.6
Cost of working capital w/Rivers (SP/hect)	1262.2	2363.0	2829.3	857.9	1345.2
Cost of working capital w/G.Proj (SP/hect)	1236.1	2295.1	2785.8	823.0	1280.2
T- private costs w/deep well (SP/hect)	44004.9	84859.6	96685.4	32132.3	51741.3
T- private costs w/shallow well (SP/hect)	41913.9	79422.8	93200.3	29344.2	46536.9
T- private costs w/rivers (SP/hect)	40603.0	76014.5	91015.5	27596.4	43274.3
T- private costs w/G.projects (SP/hect)	39762.9	73830.2	89615.3	26476.2	41183.3
Private profits w/deep well (SP/hect)	14232.1	17760.4	12514.6	-7829.3	-11741.3
Private profits w/shallow well (SP/hect)	16323.1	23197.2	15999.7	-5041.2	-6536.9
Private profits w/rivers (SP/hect)	17634.0	26605.5	18184.5	-3293.4	-3274.3
Private profits w/G.Projects (SP/hect)	18474.1	28789.8	19584.7	-2173.2	-1183.3

C.6 Social Budgets of selected crops in Hamah governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEET	MAIZE	SUNFLOWER
Total Gross Output (SP/hect)	41327.7	100311.1	63087.5	33431.7	57664.2
Crop produce : (SP/hect)	41325.7	100311.1	63085.5	33428.7	57664.2
By- product : (SP/hect)	2.0	0.0	2.0	3.0	0.0
TRADABLE INPUTS					
Total Tradable Inputs Cost (SP/hect)	22783.3	24204.0	41651.4	10593.1	14275.4
Seed/seedlings (SP/hect) or (SP/hect)	5054.1	1127.8	5724.0	664.1	1431.0
Fertilizer:					
Nitrogen (SP/hect)	2581.8	2151.5	4150.3	971.6	416.4
Phosphate(SP/hect)	2303.1	2039.9	4326.6	542.9	658.0
Potash (SP/hect)	0.0	0.0	4638.5	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0	0.0
Chemicals:					
..... (SP /hect)	1060.0	1312.3	1510.5	238.5	1308.0
..... (SP /hect)	0.0	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0	0.0
Costs of hired machinery :					
Flatinning (SP/hect)	1320.0	838.2	2000.0	615.9	1320.0
Land preparation (SP/hect)	3490.0	3498.0	3490.0	3383.0	2370.0
Fertilization (SP/hect)	159.0	198.8	318.0	159.2	159.0
Protection (SP/het)	350.0	1400.0	350.0	0.0	0.0
Sowing/planting (SP/hect)	159.0	254.0	0.0	159.0	159.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	4132.6	10031.1	6308.6	3342.9	5766.4
Transportation (SP/hect)	2173.7	1352.4	8835.0	516.0	687.5
DOMESTIC FACTORS					
T-Domestic Factors Cost W/deep well	25780.6	56273.5	47010.5	33214.9	45344.1
T-Domestic Factors Cost W/shallow well	23238.6	49664.4	42773.9	29825.6	39017.5
T-Domestic Factors Cost W/river	22137.8	46802.3	40939.2	28357.9	36277.7
T-Domestic Factors Cost W/G.projects	21159.9	44259.9	39309.4	27054.1	33843.8
Manure (SP/hect)	0.0	0.0	0.0	0.0	0.0
Labor requirment:					
Flatinning (SP/hect)	860.0	1728.0	864.0	0.0	864.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	175.0	160.0	240.0	50.1	60.0
Protection (SP/het)	317.0	316.0	667.0	350.0	318.0
Sowing/planting (SP/hect)	60.0	75.0	2200.0	50.1	60.0
Husbandary, weeding...etc (SP/hect)	0.0	8569.2	5500.0	3500.0	1025.0
Harvesting (SP/hect)	0.0	11682.0	8840.0	1500.0	0.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0	0.0
Thinning (SP/hect)	0.0	0.0	0.0	0.0	0.0
Replanting (SP/hect)	0.0	0.0	0.0	0.0	0.0
Irrigation (SP/hect)	5490.0	4563.0	4950.0	7338.0	15389.0
Land (SP/hect)	10150.0	10150.0	10150.0	10150.0	10150.0
Sacks or package (SP/hect)	800.0	700.0	0.0	750.0	800.0
Water according to source (SP/hect):	0.0	0.0	0.0	0.0	0.0
Deep tubewell	5506.2	14316.0	9176.9	7341.5	13704.2
Shallow tubewell	3091.0	8036.6	5151.7	4121.3	7693.1
Rivers	2045.1	5317.3	3408.5	2726.8	5090.0
Government projects	1116.0	2901.6	1860.0	1488.0	2777.6
Cost of working capital w/D-well (SP/hect	2422.4	4014.3	4422.6	2185.2	2973.9
Cost of working capital w/Sh-well (SP/hec	2295.6	3684.6	4211.2	2016.1	2658.3
Cost of working capital w/Rivers (SP/hect	2240.7	3541.9	4119.7	1942.9	2521.7
Cost of working capital w/G.Proj (SP/hect)	2191.9	3415.1	4038.4	1877.9	2400.2
T- Social costs w/deep well (SP/hect)	48563.9	80477.5	88661.9	43808.0	59619.5
T- Social costs w/shallow well (SP/hect)	46021.9	73868.4	84425.3	40418.7	53292.9
T- Social costs w/rivers (SP/hect)	44921.1	71006.3	82590.6	38951.0	50553.1
T- Social costs w/G.projects (SP/hect)	43943.3	68463.8	80960.8	37647.1	48119.3
Social profits w/deep well (SP/hect)	-7236.2	19833.6	-25574.4	-10376.3	-1955.3
Social profits w/shallow well (SP/hect)	-4694.2	26442.7	-21337.8	-6987.0	4371.3
Social profits w/rivers (SP/hect)	-3593.4	29304.8	-19503.1	-5519.2	7111.1
Social profits w/G.Projects (SP/hect)	-2615.5	31847.3	-17873.3	-4215.4	9544.9

C.7 Private Budgets of selected crops in Damascus governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEETS
Total Gross Output (SP/hect)	55498.0	81208.5	98617.0
Crop produce : (SP/hect)	43078.0	79208.5	95584.0
By- product : (SP/hect)	12420.0	2000.0	3033.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	12920.0	23604.6	45763.3
Seed/seedlings (SP/hect) or (SP/hect)	2911.0	1104.0	5400.0
Fertilizer:			
Nitrogen (SP/hect)	2864.0	3454.7	3347.3
Phosphate(SP/hect)	2024.0	1840.0	2392.0
Potash (SP/hect)	0.0	0.0	2825.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	0.0	1238.0	1425.0
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	950.0	709.2	800.0
Land preparation (SP/hect)	2550.0	3092.9	2265.5
Fertilization (SP/hect)	0.0	0.0	0.0
Protection (SP/het)	0.0	975.0	2250.0
Sowing/planting (SP/hect)	925.0	2300.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	7920.9	9558.4
Transportation (SP/hect)	696.0	969.9	15500.1
DOMESTIC FACTORS			
T-Domestic Factors Cost W/deep well	29407.6	61855.0	41244.5
T-Domestic Factors Cost W/shallow well	26096.7	53142.2	37759.4
T-Domestic Factors Cost W/river	24021.2	47680.3	35574.6
T-Domestic Factors Cost W/G.projects	22691.0	44179.8	34174.4
Manure (SP/hect)	0.0	0.0	1252.1
Labor requirment:			
Flatinning (SP/hect)	480.0	695.6	250.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	300.8	319.6	300.8
Protection (SP/het)	0.0	940.0	1128.0
Sowing/planting (SP/hect)	157.9	137.2	2707.2
Husbandary, weeding...etc (SP/hect)	112.5	8250.0	43.8
Harvesting (SP/hect)	7486.0	10329.0	4023.2
Transportation (SP/hect)	0.0	0.0	0.0
Thinning (SP/hect)	0.0	0.0	0.0
Replanting (SP/hect)	0.0	0.0	0.0
Irrigation (SP/hect)	379.8	451.2	2124.4
Land-crop (SP/hect)	10000.0	15000.0	18000.0
Sacks or package (SP/hect)	900.0	1300.0	0.0
Water according to source (SP/hect):			
Deep tubewell	8274.8	21775.8	8710.3
Shallow tubewell	5066.9	13333.9	5333.5
Rivers	3055.8	8041.7	3216.7
Government projects	1767.0	4650.0	1860.0
Cost of working capital w/D-well (SP/hect)	1315.8	2656.6	2704.7
Cost of working capital w/Sh-well (SP/hect)	1212.9	2385.8	2596.4
Cost of working capital w/Rivers (SP/hect)	1148.4	2216.0	2528.5
Cost of working capital w/G.Proj (SP/hect)	1107.0	2107.1	2484.9
T- private costs w/deep well (SP/hect)	42327.6	85459.6	87007.8
T- private costs w/shallow well (SP/hect)	39016.7	76746.8	83522.7
T- private costs w/rivers (SP/hect)	36941.2	71284.8	81337.9
T- private costs w/G.projects (SP/hect)	35611.0	67784.3	79937.7
Private profits w/deep well (SP/hect)	13170.4	-4251.1	11609.1
Private profits w/shallow well (SP/hect)	16481.3	4461.7	15094.3
Private profits w/rivers (SP/hect)	18556.8	9923.7	17279.0
Private profits w/G.Projects (SP/hect)	19887.0	13424.2	18679.2

C.8 Social Budgets of selected crops in Damascus governorate (SP/hectare)

Item	WHEAT	COTTON	SUG-BEETS
Total Gross Output (SP/hect)	46243.2	77215.7	57185.2
Crop produce : (SP/hect)	37843.2	77215.7	57183.2
By- product : (SP/hect)	8400.0	0.0	2.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	16021.5	27332.2	43100.5
Seed/seedlings (SP/hect) or (SP/hect)	3085.7	1170.2	5724.0
Fertilizer:			
Nitrogen (SP/hect)	2220.9	2679.0	2595.7
Phosphate(SP/hect)	1809.6	1645.1	2138.6
Potash (SP/hect)	0.0	0.0	4597.8
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	0.0	1312.3	1510.5
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	950.0	709.2	800.0
Land preparation (SP/hect)	2550.0	7850.0	2265.5
Fertilization (SP/hect)	0.0	0.0	0.0
Protection (SP/het)	0.0	975.0	2250.0
Sowing/planting (SP/hect)	925.0	2300.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	3784.3	7721.6	5718.3
Transportation (SP/hect)	696.0	969.9	15500.1
DOMESTIC FACTORS			
T-Domestic Factors Cost W/deep well	31032.2	59022.4	35054.9
T-Domestic Factors Cost W/shallow well	27007.4	48430.9	30818.3
T-Domestic Factors Cost W/river	25264.4	43844.3	28983.6
T-Domestic Factors Cost W/G.projects	23716.1	39769.8	27353.8
Manure (SP/hect)	0.0	0.0	1252.1
Labor requirment:			
Flatinning (SP/hect)	480.0	695.6	250.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	300.8	319.6	300.8
Protection (SP/het)	0.0	940.0	1128.0
Sowing/planting (SP/hect)	157.9	137.2	2707.2
Husbandary, weeding...etc (SP/hect)	112.5	8250.0	43.8
Harvesting (SP/hect)	7486.0	10329.0	4023.2
Transportation (SP/hect)	0.0	0.0	0.0
Thinning (SP/hect)	0.0	0.0	0.0
Replanting (SP/hect)	0.0	0.0	0.0
Irrigation (SP/hect)	379.8	451.2	2124.4
Land (SP/hect)	10150.0	10150.0	10150.0
Sacks or package (SP/hect)	900.0	500.0	0.0
Water according to source (SP/hect):	0.0	0.0	0.0
Deep tubewell	8718.1	22942.3	9176.9
Shallow tubewell	4894.1	12879.1	5151.7
Rivers	3238.1	8521.2	3408.5
Government projects	1767.0	4650.0	1860.0
Cost of working capital w/D-well (SP/hect	2347.1	4307.5	3898.5
Cost of working capital w/Sh-well (SP/hec	2146.3	3779.2	3687.2
Cost of working capital w/Rivers (SP/hect	2059.4	3550.4	3595.6
Cost of working capital w/G.Proj (SP/hect)	1982.2	3347.1	3514.3
T- Social costs w/deep well (SP/hect)	47053.6	86354.7	78155.4
T- Social costs w/shallow well (SP/hect)	43028.9	75763.2	73918.8
T- Social costs w/rivers (SP/hect)	41285.9	71176.5	72084.1
T- Social costs w/G.projects (SP/hect)	39737.6	67102.0	70454.3
Social profits w/deep well (SP/hect)	-810.5	-9139.0	-20970.2
Social profits w/shallow well (SP/hect)	3214.3	1452.5	-16733.6
Social profits w/rivers (SP/hect)	4957.2	6039.2	-14898.9
Social profits w/G.Projects (SP/hect)	6505.6	10113.7	-13269.1

C.9 Private Budgets of selected crops in agro-zone 1 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS	CHICKPEA
Total Gross Output (SP/hect)	27900.0	15080.0	21600.0	23100.0
Crop produce : (SP/hect)	26750.0	14280.0	18000.0	22600.0
By- product : (SP/hect)	1150.0	800.0	3600.0	500.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	11290.8	8409.3	6147.4	6644.2
Seed/seedlings (SP/hect) or (SP/hect)	3120.0	2012.5	3000.0	3348.0
Fertilizer:				
Nitrogen (SP/hect)	1109.8	930.8	0.0	0.0
Phosphate(SP/hect)	1288.0	1472.0	1122.4	1159.2
Potash (SP/hect)	0.0	0.0	0.0	0.0
Compound or other fertilizer (SP/hec	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	350.0	350.0	100.0	100.0
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	1195.0	1025.0	1025.0	1025.0
Fertilization (SP/hect)	140.0	140.0	140.0	140.0
Protection (SP/het)	133.0	71.0	140.0	140.0
Sowing/planting (SP/hect)	280.0	140.0	140.0	280.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	2675.0	1428.0	0.0	0.0
Transportation (SP/hect)	1000.0	840.0	480.0	452.0
DOMESTIC FACTORS				
Total Domestic Factors Cost (SP/hect)	8704.1	4274.3	10389.1	9667.1
Manure (SP/hect)	0.0	0.0	0.0	0.0
Labor requirment:				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	25.0	25.0
Protection (SP/het)	132.5	280.0	25.0	105.0
Sowing/planting (SP/hect)	25.0	25.0	25.0	25.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	3500.0	2950.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Land (SP/hect)	7400.0	3000.0	6000.0	5830.0
Sacks or package (SP/hect)	500.0	550.0	300.0	225.0
Cost of working capital (SP/hect)	621.6	394.3	514.1	507.1
Working Capital (SP/hect)	19373.3	12289.3	16022.4	15804.2
Total private costs (SP/hect)	19994.9	12683.6	16536.5	16311.3
Private profits (SP/hect)	7905.1	2396.4	5063.5	6788.7

C.10 Social Budgets of selected crops in agro-zone 1 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS	CHICKPEA
Total Gross Output (SP/hect)	21661.5	14541.7	24351.9	20809.3
Crop produce : (SP/hect)	20511.5	13741.7	24348.9	20807.3
By- product : (SP/hect)	1150.0	800.0	3.0	2.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	13323.7	10543.8	9926.4	9980.4
Seed/seedlings (SP/hect) or (SP/hect)	3125.5	2016.0	3005.3	3353.9
Fertilizer:				
Nitrogen (SP/hect)	856.8	718.6	0.0	0.0
Phosphate(SP/hect)	1147.2	1311.1	999.7	1032.5
Potash (SP/hect)	0.0	0.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	350.6	350.6	100.2	100.2
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	1195.0	1025.0	1025.0	1025.0
Fertilization (SP/hect)	140.0	140.0	140.0	140.0
Protection (SP/het)	133.0	71.0	140.0	140.0
Sowing/planting (SP/hect)	280.0	140.0	140.0	280.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	2051.1	1374.2	2434.9	2080.7
Transportation (SP/hect)	4044.4	3397.3	1941.3	1828.1
DOMESTIC FACTORS				
Total Domestic Factors Cost (SP/hect)	1417.8	1479.8	4599.6	4028.8
Manure (SP/hect)	0.0	0.0	0.0	0.0
Labor requirment:				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	25.0	25.0
Protection (SP/het)	132.5	280.0	25.0	105.0
Sowing/planting (SP/hect)	25.0	25.0	25.0	25.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	3500.0	2950.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Land (SP/hect)	0.0	0.0	0.0	0.0
Sacks or package (SP/hect)	500.0	550.0	300.0	225.0
Cost of working capital (SP/hect)	735.3	599.8	724.6	698.8
Working Capital (SP/hect)	14006.2	11423.8	13801.4	13310.4
Total Social costs (SP/hect)	14741.5	12023.6	14526.0	14009.2
Private Social (SP/hect)	6920.0	2518.1	9825.9	6800.1

C.11 Private Budgets of selected crops in agro-zone 2 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS	CHICKPEA
Total Gross Output (SP/hect)	20530.0	13448.0	17000.0	20500.0
Crop produce : (SP/hect)	20330.0	12648.0	15000.0	20000.0
By- product : (SP/hect)	200.0	800.0	2000.0	500.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	8952.2	6847.6	4150.6	5891.2
Seed/seedlings (SP/hect) or (SP/hect)	2624.0	1840.0	2750.0	3180.6
Fertilizer:				
Nitrogen (SP/hect)	823.4	859.2	0.0	0.0
Phosphate(SP/hect)	956.8	864.8	772.8	625.6
Potash (SP/hect)	0.0	0.0	0.0	0.0
Compound or other fertilizer (SP/hec	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	350.0	0.0	0.0	100.0
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	1025.0	931.8	227.8	1025.0
Fertilization (SP/hect)	140.0	140.0	0.0	140.0
Protection (SP/het)	100.0	63.0	0.0	140.0
Sowing/planting (SP/hect)	140.0	140.0	0.0	280.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	2033.0	1264.8	0.0	0.0
Transportation (SP/hect)	760.0	744.0	400.0	400.0
DOMESTIC FACTORS				
Total Domestic Factors Cost (SP/hect)	3998.8	3315.9	8518.8	6691.1
Manure (SP/hect)	0.0	0.0	0.0	0.0
Labor requirment:				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	75.0	25.0
Protection (SP/het)	198.8	0.0	0.0	25.0
Sowing/planting (SP/hect)	25.0	25.0	75.0	25.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	3250.0	2275.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Land (SP/hect)	3375.0	2500.0	4500.0	3750.0
Sacks or package (SP/hect)	375.0	450.0	225.0	200.0
Cost of working capital (SP/hect)	0.0	315.9	393.8	391.1
Working Capital (SP/hect)	12951.0	9847.6	12275.6	12191.2
Total private costs (SP/hect)	12951.0	10163.6	12669.4	12582.3
Private profits (SP/hect)	7579.1	3284.4	4330.6	7917.7

C.12 Social Budgets of selected crops in agro-zone 2 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS	CHICKPEA
Total Gross Output (SP/hect)	16738.7	12971.2	20293.7	18415.5
Crop produce : (SP/hect)	15588.7	12171.2	20290.7	18413.5
By- product : (SP/hect)	1150.0	800.0	3.0	2.0
TRADABLE INPUTS				
Total Tradable Inputs Cost (SP/hect)	10504.8	8777.8	7317.8	8887.7
Seed/seedlings (SP/hect) or (SP/hect)	2628.6	1843.2	2754.8	3186.2
Fertilizer:				
Nitrogen (SP/hect)	635.7	663.3	0.0	0.0
Phosphate(SP/hect)	852.2	770.3	688.3	557.2
Potash (SP/hect)	0.0	0.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0	0.0
Chemicals:				
..... (SP /hect)	350.6	0.0	0.0	100.2
..... (SP /hect)	0.0	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0	0.0
Costs of hired machinery :				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	1025.0	931.8	227.8	1025.0
Fertilization (SP/hect)	140.0	140.0	0.0	140.0
Protection (SP/het)	100.0	63.0	0.0	140.0
Sowing/planting (SP/hect)	140.0	140.0	0.0	280.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	1558.9	1217.1	2029.1	1841.4
Transportation (SP/hect)	3073.8	3009.1	1617.8	1617.8
DOMESTIC FACTORS				
Total Domestic Factors Cost (SP/hect)	1208.0	987.1	4199.5	3150.5
Manure (SP/hect)	0.0	0.0	0.0	0.0
Labor requirment:				
Flatinning (SP/hect)	0.0	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	75.0	25.0
Protection (SP/het)	198.8	0.0	0.0	25.0
Sowing/planting (SP/hect)	25.0	25.0	75.0	25.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	3250.0	2275.0
Transportation (SP/hect)	0.0	0.0	0.0	0.0
Land (SP/hect)	0.0	0.0	0.0	0.0
Sacks or package (SP/hect)	375.0	450.0	225.0	200.0
Cost of working capital (SP/hect)	584.2	487.1	574.5	600.5
Working Capital (SP/hect)	11128.5	9277.8	10942.8	11437.7
Total Social costs (SP/hect)	11712.8	9764.9	11517.3	12038.2
Private Social (SP/hect)	5026.0	3206.3	8776.4	6377.3

C.13 Private Budgets of selected crops in agro-zone 3 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS
Total Gross Output (SP/hect)	10515.0	6644.0	12000.0
Crop produce : (SP/hect)	10165.0	5644.0	9000.0
By- product : (SP/hect)	350.0	1000.0	3000.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	6274.8	4023.0	2717.8
Seed/seedlings (SP/hect) or (SP/hect)	2080.0	1150.0	2250.0
Fertilizer:			
Nitrogen (SP/hect)	572.8	411.7	0.0
Phosphate(SP/hect)	368.0	423.2	0.0
Potash (SP/hect)	0.0	0.0	0.0
Compound or other fertilizer (SP/hec	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	350.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	0.0	0.0	0.0
Land preparation (SP/hect)	1127.5	1001.7	227.8
Fertilization (SP/hect)	140.0	0.0	0.0
Protection (SP/het)	100.0	0.0	0.0
Sowing/planting (SP/hect)	140.0	140.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	1016.5	564.4	0.0
Transportation (SP/hect)	380.0	332.0	240.0
DOMESTIC FACTORS			
Total Domestic Factors Cost (SP/hect)	2352.2	1677.2	5712.0
Manure (SP/hect)	0.0	0.0	0.0
Labor requirment:			
Flatinning (SP/hect)	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	0.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	25.0	25.0	75.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	2750.0
Transportation (SP/hect)	0.0	0.0	0.0
Land (SP/hect)	1834.0	1250.0	2500.0
Sacks or package (SP/hect)	200.0	200.0	125.0
Cost of working capital (SP/hect)	268.2	177.2	262.0
Working Capital (SP/hect)	8358.8	5523.0	8167.8
Total private costs (SP/hect)	8627.0	5700.2	8429.8
Private profits (SP/hect)	1888.0	943.8	3570.2

C.14 Social Budgets of selected crops in agro-zone 3 (SP/hectare)

Item	WHEAT	BARLEY	LENTILS
Total Gross Output (SP/hect)	8944.4	6231.2	12177.4
Crop produce : (SP/hect)	7794.4	5431.2	12174.4
By- product : (SP/hect)	1150.0	800.0	3.0
TRADABLE INPUTS			
Total Tradable Inputs Cost (SP/hect)	7028.1	4874.4	4669.8
Seed/seedlings (SP/hect) or (SP/hect)	2083.7	1152.0	2254.0
Fertilizer:			
Nitrogen (SP/hect)	442.2	317.8	0.0
Phosphate(SP/hect)	327.8	376.9	0.0
Potash (SP/hect)	0.0	0.0	0.0
Compound or other fertilizer (SP/hect)	0.0	0.0	0.0
Chemicals:			
..... (SP /hect)	350.6	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
..... (SP /hect)	0.0	0.0	0.0
Costs of hired machinery :			
Flatinning (SP/hect)	0.0	0.0	0.0
Land preparation (SP/hect)	1127.5	1001.7	227.8
Fertilization (SP/hect)	140.0	0.0	0.0
Protection (SP/het)	100.0	0.0	0.0
Sowing/planting (SP/hect)	140.0	140.0	0.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	779.4	543.1	1217.4
Transportation (SP/hect)	1536.9	1342.8	970.7
DOMESTIC FACTORS			
Total Domestic Factors Cost (SP/hect)	632.1	519.0	3350.0
Manure (SP/hect)	0.0	0.0	0.0
Labor requirment:			
Flatinning (SP/hect)	0.0	0.0	0.0
Land preparation (SP/hect)	0.0	0.0	0.0
Fertilization (SP/hect)	25.0	25.0	0.0
Protection (SP/het)	0.0	0.0	0.0
Sowing/planting (SP/hect)	25.0	25.0	75.0
Husbandary, weeding...etc (SP/hect)	0.0	0.0	0.0
Harvesting (SP/hect)	0.0	0.0	2750.0
Transportation (SP/hect)	0.0	0.0	0.0
Land (SP/hect)	0.0	0.0	0.0
Sacks or package (SP/hect)	200.0	200.0	125.0
Cost of working capital (SP/hect)	382.1	269.0	400.0
Working Capital (SP/hect)	7278.1	5124.4	7619.8
Total Social costs (SP/hect)	7660.2	5393.4	8019.9
Private Social (SP/hect)	1284.2	837.8	4157.6

C.15 Private Budget of Barley in zone 4

Item	BARLEY
Total Gross Output (SP/hect)	2970.0
Crop produce : (SP/hect)	2720.0
By- product : (SP/hect)	250.0
TRADABLE INPUTS	
Total Tradable Inputs Cost (SP/hect)	2423.8
Seed/seedlings (SP/hect) or (SP/hect)	920.0
Fertilizer:	
Nitrogen (SP/hect)	0.0
Phosphate(SP/hect)	0.0
Potash (SP/hect)	0.0
Compound or other fertilizer (SP/hec	0.0
Chemicals:	
..... (SP /hect)	0.0
..... (SP /hect)	0.0
..... (SP /hect)	0.0
Costs of hired machinery :	
Flatinning (SP/hect)	0.0
Land preparation (SP/hect)	931.8
Fertilization (SP/hect)	0.0
Protection (SP/het)	0.0
Sowing/planting (SP/hect)	140.0
Husbandary, weeding...etc (SP/hect)	0.0
Harvesting (SP/hect)	272.0
Transportation (SP/hect)	160.0
DOMESTIC FACTORS	
Total Domestic Factors Cost (SP/hect)	1032.4
Manure (SP/hect)	0.0
Labor requirment:	
Flatinning (SP/hect)	0.0
Land preparation (SP/hect)	0.0
Fertilization (SP/hect)	0.0
Protection (SP/het)	0.0
Sowing/planting (SP/hect)	25.0
Husbandary, weeding...etc (SP/hect)	0.0
Harvesting (SP/hect)	0.0
Transportation (SP/hect)	0.0
Land (SP/hect)	700.0
Sacks or package (SP/hect)	200.0
Cost of working capital (SP/hect)	107.4
Working Capital (SP/hect)	3348.8
Total private costs (SP/hect)	3456.3
Private profits (SP/hect)	-486.3

C.16 Social Budget of Barley in zone 4

Item	BARLEY
Total Gross Output (SP/hect)	3417.5
Crop produce : (SP/hect)	2617.5
By- product : (SP/hect)	800.0
TRADABLE INPUTS	
Total Tradable Inputs Cost (SP/hect)	2902.3
Seed/seedlings (SP/hect) or (SP/hect)	921.6
Fertilizer:	
Nitrogen (SP/hect)	0.0
Phosphate(SP/hect)	0.0
Potash (SP/hect)	0.0
Compound or other fertilizer (SP/hect)	0.0
Chemicals:	
..... (SP /hect)	0.0
..... (SP /hect)	0.0
..... (SP /hect)	0.0
Costs of hired machinery :	
Flatinning (SP/hect)	0.0
Land preparation (SP/hect)	931.8
Fertilization (SP/hect)	0.0
Protection (SP/het)	0.0
Sowing/planting (SP/hect)	140.0
Husbandary, weeding...etc (SP/hect)	0.0
Harvesting (SP/hect)	261.7
Transportation (SP/hect)	647.1
DOMESTIC FACTORS	
Total Domestic Factors Cost (SP/hect)	389.2
Manure (SP/hect)	0.0
Labor requirment:	
Flatinning (SP/hect)	0.0
Land preparation (SP/hect)	0.0
Fertilization (SP/hect)	0.0
Protection (SP/het)	0.0
Sowing/planting (SP/hect)	25.0
Husbandary, weeding...etc (SP/hect)	0.0
Harvesting (SP/hect)	0.0
Transportation (SP/hect)	0.0
Land (SP/hect)	0.0
Sacks or package (SP/hect)	200.0
Cost of working capital (SP/hect)	164.2
Working Capital (SP/hect)	3127.3
Total Social costs (SP/hect)	3291.5
Private Social (SP/hect)	126.0

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