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Final Report
on

Livestock Sub-Sector

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

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1. INTRODUCTION

Syria's agriculture sector, and the livestock sub sector, will have a significant impact on the future growth of the country's economy. Agriculture accounts for 30 percent of the GDP, with livestock providing over 30 percent of the total value of agricultural production. Agriculture also accounts for 20 percent of the value of total exports and more than 50% of exports of all non-oil and gas revenues, while the livestock sector contributes 15 percent of the value of agricultural exports. Agriculture employs 29 percent of the total Syrian labor force (about 1.4 million people) and includes a high percentage of all active women. Moreover, most of the country's low income families live in rural areas and mainly depend on agricultural and/or livestock production for their livelihood. Growth in the livestock sub sector is therefore important for poverty reduction and overall growth of the economy.

Over the past twenty years there has been significant progress by Syria in meeting the growing demand for food. Syria has traditionally used a number of support mechanisms to support agriculture over the manufacturing sector. Production of cereals (wheat, barley and maize) has increased by about 36% from 3.87 million tonnes in 1980 to 5.27 million tonnes in 1998. Livestock products (milk and meat) grew by more than 94 percent to about 2,800 thousand tonnes by 1998. Syria is now nearly self sufficient in food grains and most livestock products.

While livestock is a major consumer of crop products for feed, the support to the sector continues to favour the production of crops over livestock. There is an interactive relationship between agriculture and livestock and between the various classes of livestock under production. This relationship is quite complex and does not justify the simple approach to support used in the past. The livestock sector and dairy production in particular, competes directly with crops for land and water, while sheep raising occurs predominantly in those areas where production of other forms of agricultural or livestock are not viable. However, cropping also encroaches on the margins of the pastoral lands. As sheep numbers and sheep production in Syria increases, sheep are increasingly and directly in competition with dairy, beef and poultry for the main resources of livestock feed – the crop residues and concentrates.

Recent moves to float the Syrian Pound (SP) and Government's increasing interest in improving the export competitiveness of the entire economy, supports a general shift in emphasis towards agriculture. Agriculture is thus expected to attract an increasing share of resources from the private sector over the next few years. Against this background, Syria's programme of reform and economic liberalisation also opens significant market-led opportunities for the livestock sector. Between 1993 and 1998, the value of livestock production, at 1995 constant prices, increased by 24 percent to SP 8.6 billion, and livestock accounted for 28.5 percent of the value of agricultural production by 1998. The export of live sheep is the major contributor to export revenues.

Livestock sector development has a significant beneficial impact in generating employment and reducing rural poverty. The sector employs 11 percent of Syria's total labour force, including many low income families in the rural areas. More than 8 million people are rural dwellers, 2.5 million of these are low income earners. More than 35 percent of all rural households own livestock; income derived from livestock in these households accounts for 15-100 percent of total family incomes. Improving the productivity of, and increasing the incomes from, livestock enterprises would benefit Syria's rural poor. However, the large livestock populations in Syria have resulted overgrazing and land degradation, particularly in the drier regions. The continuing growth in sheep numbers coupled with the diminishing areas of

traditional grazing, has put intense pressure on the rangelands, and has contributed to the degradation of Syria's land resources.

Development of the livestock sector must therefore be balanced with measures to conserve the environment. Thus, any development strategy for the sector, must attempt not only to achieve growth and reduce poverty, but also to maintain agricultural and environmental sustainability. This study assesses the structure, constraints, imperfections and opportunities within the livestock sector. It also explores possible policy options for improving the main livestock products derived from it. This report reviews the livestock sector and the support which the government provides to the sector. A number of recommendations are made on possible changes of focus of that government support.

2. Livestock Production and Performance Trends

A. Recent Population and Output Trends

Livestock Population. Syria's livestock population grew rapidly during the 1980's and then less slowly during the 1990's (**Table 1**).

Table 1 Livestock Population, 1960 - 1998 (thousands)

Year	Sheep	Cattle	Goats	Camels	Horses
Average					
1960-65	4035	453	668	11	67
1965-70	5899	506	803	10	67
1970-75	5312	513	709	8	61
1975-80	7645	687	1011	8	53
1980-85	13650	769	1097	7	50
1985-90	13309	753	1013	4	49
Annual					
1989	14011	800	1011	3.1	43
1990	14508	787	1000	4.6	41
1991	15193	771	962	5.0	39
1992	14665	765	951	2.9	37
1993	10147	680	986	5.4	27
1994	11256	720	1034	6.5	27
1995	11800	780	1200	6.5	27
1996	12000	800	1250	6.8	28
1997	13829	857	1100	7.5	27
1998	15424	931	1101	8.9	26

Source: MAAR - The Annual Agricultural Statistics Abstract

The national sheep flock almost doubled during the 1980's but increased by only seven percent over the decade from 1989 to 1998. The population slow-down occurred as the opportunity for exploiting rangeland and crop residues through more intensive management diminished while over exploitation caused an overall decrease in the productivity of the Syrian rangeland. By the beginning of 2000, the sheep population may have fallen below 1989 levels because of increased sales and lower productivity during the severe drought of 1999-2000. Conversely, cattle have shown more steady growth over both decades, with the national herd growing by 16 percent to more than 900,000 head in the last decade. The growth in dairy cattle was greater than in non-dairy animals, reflecting the increasing demand for dairy products and the liberalisation of the milk processing sector. The goat population has remained static over the decade, but there have been some fluctuation between years due to seasonal conditions. The average annual population of poultry has risen by 50 percent during the decade, while the average broiler population has doubled in line with population growth and demand for poultry meat. Camel numbers have reversed their long-term decline and have more than doubled during the decade, albeit from the low base of 3000 head. The population of horses declined by 40 percent, continuing a long term trend.

Livestock Yields and Output Trends. As the livestock populations expanded, output of the main livestock categories also grew (**Table 2**). Over the last decade, beef and poultry meats displayed the highest annual growth rates with output increasing by 138 percent and 97 percent respectively. By 1998, cow's milk accounted for 62 percent of the total milk supply, with sheep milk accounting for another 33 percent and goat milk providing the balance.

In the same year, sheep meat accounted for 55 percent of the total domestic production of meat, down from its contribution of just over 60 percent the year before. During the last ten years, domestic production of poultry meat doubled. Poultry contributed the main increase in meat production and contributed an extra 50 thousand tonnes over the decade.

Table 2 Livestock Production 1989-1998 (thousands of tonnes and litres)

	Sheep		Cattle		Goats		Poultry	
Year	Meat	Milk	Meat	Milk	Meat	Milk	Eggs mill	Meat
1989	113	438	18	777	6.2	60	1378	49
1990	114	497	19	771	6.0	63	1520	60
1991	124	513	20	780	4.8	58	1611	61
1992	113	512	29	776	4.6	62	1982	83
1993	92	437	29	742	5.9	64	2026	77
1994	120	395	31	764	5.4	67	2050	75
1995	131	454	34	889	5.8	71	2060	85
1996	143	499	40	934	7.4	75	2230	82
1997	148	524	42	1009	5.4	77	2273	93
1998	154	582	43	1119	5.9	79	2228	97

Source: MAAR - The Annual Agricultural Statistics Abstract

Milk yields from cross-bred cattle improved considerably between the 1980's and the 1990's due to better nutrition and management (**Table 3**). Per-animal yield for other livestock products remained static however, with any increase in production coming from larger livestock populations. Much scope exists to increase the per-head productivity for non-milk items, particularly through intensive feeding systems for beef and mutton, and improved conversion of feed into animal products. The expansion of the dairy cattle cross-breeding programme will continue to lift dairy cow yields, provided the resulting increase in their genetic potential is complemented by corresponding improvements in husbandry, nutrition and health care.

Table 3 Average Annual Animal Yields (kilograms per animal)

Commodity	Yield per Animal 1998	Average Annual Output per Adult Female	
		1980 –89	1989-98
Cows Milk			
indigenous	734	797	781
crossbred	2424	2165	2424
Sheep Milk	58	59	58
Meat			
mutton	15	13	15
beef	97	88	88
goat	8	9	8
eggs	169	166	169

Source: derived from MAAR data

In 1998, the sheep industry produced 15,000 tonnes of clean wool and skins worth SP 110 million.

Between 1994 and 1998, the value of animal production grew by more than 30 percent at 1995 constant prices and, by 1998, was worth SP 86 billion.

B. Consumption of Livestock Products

Despite the continuing increase in supply, Syria's per capita consumption of livestock products, with the exception of milk, is considerably lower than in industrial countries. Per capita consumption of milk is higher than in Australia and the US[1], while consumption of beef and poultry is about 10 percent and 14 percent of US consumption (**Table 4**).

Table 4 Per Capita Consumption of Livestock Products in Syria and Selected Countries, 1998 (kilograms per year)

Product	Syria	Other Countries
Sheep and goat meat	9.6	New Zealand - 20; Turkey - 6; Saudi Arabia - 19; China 1
Beef	2.7	Australia - 36; US - 43; China - 2; Philippines - 2.4
Poultry meat	5.8	US - 43; China - 4; Hong Kong - 43;
Milk (fluid milk)	110	Australia - 104; US - 104; China - 3; India - 65;
Eggs (pieces)	134	Australia - 170; US - 181; Turkey – 122; Japan - 276; China - 163;

Source: Syria - MAAR Annual Agricultural Statistical Abstract. Other countries- various and as quoted from USDA Livestock and Poultry: World Markets and Trade

Overall per capita consumption of livestock food products has remained fairly constant over the last fifteen years with per capita consumption of poultry meat and eggs slightly decreasing, and milk showing a small increase (**Table 5**). The relatively low levels of consumption of sheep meat, beef, poultry and eggs offer considerable opportunity for growth. Given that prices for most livestock products have risen slowly over the last decade, overall consumption of livestock food products has just kept pace with the rate of increase of the population.

Table 5 Per Capita Consumption of Livestock Products 1985 to 1998 (kilograms per capita)

Product	1985	1990	1992	1994	1996	1998
Beef	2.9	2.7	2.4	2.5	2.7	2.7
Sheep and Goat Meat	9.6	8.5	9.8	10.3	10.7	9.6
Poultry Meat	7.8	3.8	4.6	5.6	5.6	5.8
Eggs	148	119	152	143	145	134
Milk	109	109	104	89	100	111
Fish	0.6	0.5	0.5	0.7	0.7	0.7

Source: derived from MAAR Annual Agricultural Statistical Abstracts

Elasticity of Demand for Livestock Products. Animal products (dairy, meat and eggs) are an important and increasing component of consumer budgets (**Table 6**)(**Table 7**), although urban per capita expenditure is about 10 percent higher than in rural households. Having increased in recent years, the per capita household budget averaged just below SP 8,000 in 1995. The national per capita expenditure on food accounted for SP 4,160 of this, or 52 percent of the household budget.

[1] Figures for USA and Australia are for fresh milk consumption and based on a milk equivalent. Syria's consumption figure refers to both fresh milk (accounts for 40% of total milk production) as well as dairy products such as cheese, butter, yogurt, etc. processed milk.

Table 6 Rural and Urban Price Elasticities for Livestock Products

	Red Meat	Poultry	Eggs	Cheese	Milk
Rural	- 1.98	+ 1.46	- 0.15	+ 0.28	- 1.50
Urban	- 1.51	- 0.43	- 0.63	- 0.23	- 1.49

Source: Derived from MAAR Department of Agricultural Economics Household Survey 1994

In the decade earlier, expenditure on food items was significantly lower. In 1985 – 86 for example, while meats, eggs and dairy products still accounted for a large share of family expenditure on food items (34 percent) they were a significantly lower (17.6 percent) proportion of the average annual household expenditure of SP 47,319.

Table 7 Average Per Capita Rural and Urban Expenditure on Food and Non-food Commodities 1985-1986 in Syrian Pounds

Item	Urban	Rural	Average	Percentage of Total Food Expenditure	Percentage of All Expenditure	Average Family Expenditure
Non food commodities	4002	3615	3809	na	48.3	22852
Food Commodities	4247	3909	4078	na	51.7	24467
Meat and eggs	853	665	759	18.6	9.6	4554
Dairy products	694	572	634	15.5	8.0	3802

Source: Central Bureau of Statistics

While consumption of livestock products has remained relatively constant over the last fifteen years, prices have increased for all livestock products consumed. Given the social and cultural importance of meat and milk products in the Syrian diet, the demand for livestock products in Syria could be considered highly income elastic. No estimates of this elasticity are available. Experience from other countries in respect of consumption, indicates that demand increases as per capita gross domestic product (GDP) rises.

Consumer preferences for better quality and differentiated products is also increasing particularly in urban areas. For example, the urban market for poultry has changed from live birds to dressed birds, and more recently, to carcass segments. Urban butchers in the higher income areas also report an increasing demand for specific cuts of beef, and for mutton with a lower fat content.

C. Demand and Supply Projections

The population grew by more than three percent from 1998 to 1999, and this high rate of increase will slow some of the expected growth of the Syrian economy. The high price elasticity of livestock products however, will ensure a growing demand for these products, which is expected to be at least in line with the rate of population increase. Assuming the economy consistently grows at modest 3 percent per year while the population growth, price and income elasticities of the past ten years continue unchanged, estimates for 2020 indicate that the demand for meat, milk and poultry will increase by 34, 14 and 49 percent respectively.

If output growth rates between 1989 and 1999 are maintained over the same period however, the growth in demand for red meat can not be met from domestic production alone.

Table 8 Consumption of Selected Livestock Products in 2010 and 2020 at different rates of GDP Growth (thousand tonnes)

Commodity	Demand in 1998	Demand - GDP Annual Growth of					
		2%		3%		6.6%	
		2010	2020	2010	2020	2010	2020
Red Meat	198	220	241	223	265	281	352
Milk	1780	1754	1883	1832	2025	2122	2552
Eggs	2153	2669	2970	2850	3301	3526	4528
Poultry Meat	97	114	129	123	145	156	205

Source: Deducted from MAAR Department of Agricultural Economics - Household Survey 1994

Weather, technological advances, changes in price of inputs and the availability of alternative products will effect the domestic supply of livestock products. Variations in seasonal rainfall will impact on the supply of livestock, particularly the availability of young stock for fattening purposes and the productivity of sheep and goats, which rely on grazing rangeland for part of their feed requirements. Technological advances, particularly improvements in the efficiency of feed conversion, could substantially decrease the cost of production of meat and milk products which would result in increased supply of livestock products from within the existing natural resources of Syria. Similarly changes in prices of livestock feed would impact on the cost of production and hence the supply of livestock products from domestic production.

D. Livestock Production Systems

Syria's livestock production systems are changing. There is an increasing emphasis on intensive feeding in all production systems and a decreasing reliance on natural grazing alone. While there remain a large number of pastoral sheep and cattle production units, both the small and large ruminant systems are moving from methods of low input and low productivity to more intensive feedlotting. By following international trends, the poultry industry has already intensified and now has levels of productivity equivalent to those achieved in industrialised countries. While the dairy industry has also undergone some intensification, average milk production levels are still low compared to the major exporting countries of milk products.

Most sheep and cattle are raised in small herds and flocks (Table 9). Cattle production occurs on small farms where livestock production is a complementary activity to agricultural pursuits. The majority of sheep owners own less than 50 sheep and many of these smaller flocks belong to sedentary livestock producers who own land and are involved in either irrigated and/or dryland agricultural production. The major proportion of sheep production occurs on the rangelands, where the average size of flocks is much larger.

Table 9 Distribution of Cattle and Sheep Ownership by Size of Herd and Flock, 1998

Governerate	Sheep						Cattle				
	No. of holders	1-100	101-300	301-500	501-1000	> 1000	no. of holders	1-5	6-10	11-15	> 15
Hama	11767	9454	1832	315	132	34	17155	15875	1089	136	51
Homs	17786	7728	6115	2406	1218	319	26894	19967	5729	910	844
Raqqa	21648	17504	3235	536	253	120	2424	2254	149	11	10
Aleppo	37447	34405	2656	279	91	16	11643	10197	1055	226	165
To AlGhab from other governerates	484	268	167	37	9	3	67	67	0	0	0
In AlGhab	1691	1493	165	20	11	2	8613	8037	506	52	18
Total	90823	70852	14170	3593	1714	494	66796	56397	8528	1335	1088

Source: Data collected from Governerates sources by Task Force

Sheep Production Systems.

Traditionally sheep production has been concentrated in the more arid areas of eastern and south eastern Syria. Very little cropping occurs in these areas and the main feed source for the sheep is from grazing rangeland pastures. The sheep production system has been based on seasonal movement between the rangelands in the east and south east, and the dry and irrigated cropping areas in the west where the sheep are grazed on crop residues. This system is now changing. A decreasing proportion of the national sheep flock's nutritional requirements is obtained from grazing the rangelands, with an increasing proportion being provided through supplementary feeding. As a result, flocks are spending longer periods in the cropping zones and migration patterns have given way to an increase in sedentary production systems based on early weaning, and the feedlotting of young animals. This change in the system of sheep production has been facilitated by improvements to transportation and infrastructure, as well as the securing of national boundaries, an increasing sheep population and higher prices for young sheep. Live sheep for export, and meat and milk are the main products from sheep production. Sheep provide about 30 percent of the total milk consumed by the domestic market.

An estimated 150,000 families produce sheep in the Syrian rangelands. Most of these families own less than 300 head (Table 10).

Table 10 Flock size owned by Sheep Producing Families in the Al Badia

Flock Size (head)	Number of Families	Percentage of Total Sheep Owning Families
Less than 100	59,000	47
100 to 300	47,000	37
300 to 500	15,000	12
500 to 1000	3,750	3
More than 1000	625	> 1

Source: Al Badia Directorate

Constraints. The diminishing rangeland resource and a lack of feed and fodder continues to constrain the productivity of the sheep industry. The movement into feedlotting young sheep for meat and keeping lactating ewes for producing milk further increases the demand for

quality feed inputs, as these activities depend on the availability of quality formulated feeds for profitable rates of feed conversion.

Bovine Production Systems.

Syria's cattle industry is based on local and imported dairy breeds with beef production a by-product of the dairy industry. Of the one million cattle in the national herd, 70 percent are categorised as dairy cows. Government supports improvement of the low milk yields of indigenous breeds through breed improvement programmes based mainly on imported Friesian semen. This cross-breeding programme has substantially increased per-head milk production. The Livestock Production Department implements an artificial insemination programme for the private, public and cooperatives producers.

Dairy cattle have limited access to grazing and are mainly stall-fed with concentrates, crop residues and green fodder. Young males are either raised for veal on surplus milk or are sold at weaning to specialised beef producers who use a feedlotting system to grow out these young animals for meat production.

Constraints. Economic cattle production depends on converting feed into milk and meat efficiently. The inconsistent availability of good quality feed ingredients for preparing balanced rations, means achievement of high feed conversion efficiencies is often not possible. In addition, and notwithstanding the shortages of quality feed, the low productivity of local cattle is constrained by the lack of suitable genetic material through the herd improvement programmes, and the overall production of milk and meat per animal remains low.

Poultry Production

Most poultry are raised in intensive production systems. Both broiler and layer production stock are based on imported grandparent stock whose supply is controlled by a small number of importers. Parent stock is produced in specialised privately or publicly owned production units. About 40 breeders dominate the market for day-old broilers and layer chicks.

Constraints to Poultry Production. The supply and price of all major feed ingredients (maize, fishmeal, soybean meal and other oilseed cakes) varies throughout the year with some ingredients disappearing completely from the market at some times during the year. Further, access by the poultry industry to domestically produced ingredients is in direct competition with the dairy industry and the sheep and cattle feedlots operations. Poor feed quality has also been an issue for the industry, particularly the quality of imported maize and oilseed cake.

E. Conclusion

The ability of the Syrian livestock sector to meet the domestic demand for livestock products, will depend on its ability to intensify production and improve the quality of its animals, rather than from increasing animal numbers as happened in the past.

The opportunity to increase sheep production by better utilising the rangeland feed resource is limited, and as with cattle, sheep production gains will come from intensification. The trend towards sedentary production of Awassi sheep for the domestic and export markets requires improved husbandry practices and nutrition. These will involve increased levels of supplementary feeding, as well as earlier weaning with weaned animals grown out in feedlots.

Sheep production will also need to become more specialised, with the grazing/supplementary feeding system producing store animals for feedlotters for growing out and fattening for the

domestic and export markets. The changing economics of the export sheep market will require Syrian producers of Awassi sheep for export to improve their production efficiencies, through improved reproductive performance of their flocks. Increasing the off-take of young animals per breeding ewe and by improving feed conversion in the feedlots will be important determinants of future profitability of the sheep industry. Achieving these efficiencies will require new approaches to research and extension by the MAAR services. These services should be targeted at increasing the *profitability* of production rather than production *per se.* Greater involvement of the private sector in establishing livestock research priorities will also help MAAR to meet the needs of the producers.

More intensive production in the dairy sub-sector will be based on the use of genetically superior animals, increased stall feeding, improved utilisation of crop residues and use of more farm-produced fodder. This will more closely integrate crop and livestock production and it will improve efficiency in using crop and agro-processing by-products. Increased reliance on imported feed ingredients will also make feed ingredients such as barley, maize and cotton seed cake locally available at internationally competitive prices. More intensified dairy enterprises will result in more specialised cattle meat production units, and use of specific beef breeds in cross breeding programmes with dairy cattle.

Poultry production will continue to intensify, with growth in the sector coming mainly from the expansion of intensive production systems in the private sector. The development of a cold storage infrastructure will permit greater access to regional markets for frozen or chilled birds, as well as creating a more stable domestic market by enabling a larger reserve of processed birds to be held.

The most critical factor determining the ability of the Syria livestock producers to meet the increased domestic and international demand for livestock products will be the availability of high quality feed at international prices which will determine the profitability of their livestock enterprises - dairy stall feeding, intensive sheep and cattle feedlotting, and the efficiency and regional competitiveness of the poultry industry. The supply and demand of livestock feed is analysed in the following Chapter.

3. Livestock Feed and Fodder Supply

Ensuring an adequate supply of reasonable quality feed and fodder is one of the major challenges facing the Syrian livestock sector. Estimates of the exact size of the current feed deficit vary with seasonal conditions and assumptions made on the contribution of the range lands and crop residues to the national feed production. However, there is general agreement that the volume and quality of future animal feed supplies will be of vital importance in sustaining the growth of the livestock sector. This chapter reviews the current status of the feed and fodder system in Syria and identifies constraints that hamper its development. Structural problems and public sector policies influencing performance of the sector are examined.

A. Feed Sources and Consumption in Syria

The major sources of livestock feed in Syria come from natural pastures and rangeland, cultivated green and conserved fodder, crop residues, crop products and by-products, agro-processing by-products and slaughterhouse and hatchery residues.

Grazing provides the most important source of fodder for ruminants. In the western higher rainfall zones, crop stubbles and pastures on the borders of the cropping areas and the extensive rangelands in the drier eastern areas, provide the major source of grazing. As the livestock population increases and production intensifies, an increasing proportion of the dietary requirements of ruminants is being met through supplementary feeding with cereals and crop and agroprocessing byproducts.

Grazing. About half of Syria's land mass is classified as rangeland (*Al Badia*) covering 8 million hectares providing an estimated 15 percent or more of the national sheep flock's nutritional requirements in a "normal" rainfall year. While sheep are in the Al Badia (November to April), grazing is supplemented by barley during a period of about 90 days during winter. For the rest of the year, grazing takes place in the cropping and higher rainfall zones in the west of the country. The complementarity between intensive cropping systems and livestock production is exploited through the migration of sheep from the Al Badia to the wheat, barley and cotton growing areas after harvesting, to feed on the agricultural residues. Notwithstanding the dependence on these grazing lands, most of the natural grazing lands in Syria are considered to be degraded and the 1999-2000 drought has resulted in further degradation of the range land feed resource.

Concentrates. Barley, which is produced under dryland conditions, accounts for over 85 percent of cereal and legume grains grown for livestock feed. About 20 percent and eight percent of the area sown to barley and wheat is grazed as a standing crop. In years of lower rainfall, crops which are not economical to harvest for grain, are an important source of fodder for ruminants (Table **11**).

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

Table 11 Cereals and Legumes produced for Livestock Feed 1993- 1997 (thousands tonnes)					
	1993	**1994**	**1995**	**1996**	**1997**
Cereals					
Barley	1553	1482	1705	1653	983
Oats	neg	neg	neg	neg	1
Maize	200	204	199	250	303
Sorghum	6	4	5	6	3
Legumes					
Dry rambling vetch	15	6	15	9	7
Dry flowering sern	5	6	7	5	6
Dry bitter vetch	7	3	6	3	5

Source: MAAR

Green Fodders. The area under green fodder production is about 63,000 hectares with most of the production coming from irrigated fodder crops, predominantly barley, flowering sern and maize (Table 2). The area sown to fodder crops has increased by about 10 percent from 1990, with most of the increased sowing on irrigated land. The area under green fodder has only marginally increased since 1990, making a small contribution to the livestock feed budget, as other forms of crop production remain much more profitable for irrigation farmers.

Table 12 Cultivated Fodder Production, 1998 (thousands of hectares and tonnes)

Fodder Crop	Area	Production	Note
Grazing Flowering Sern	8	126	63% irrigation
Grazing Barley	42	373	55 % irrigated
Clover pasture	0.2	5	irrigation
Alf alfa	4	117	irrigation
Grazing maize	7	127	70 to 80 % irrigation
Other	2	21	

Source: Annual Agricultural Statistical Abstract 1998

Industrial Residues. Of the 3 million tonnes of industrial crop residues produced each year in Syria, residues from sugar beet, cotton and peanuts account for over 85 percent. Only an estimated 30 percent of this residue is currently used for feed for livestock production.

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

Table 13 Major crops - Area and Production 1998 (thousands of hectares and tonnes)

Crop	Area	Production
Wheat	1721	4111
Barley	1543	868
Lentils	142	154
Chick peas	108	85
Grazing barley	41	373
Bitter Vetch	14	8
Rambling Vetch	18	13
Maize	72	285
Sorghum	4	5
Cotton	274	1018
Soybean beans	4	7

Source: Annual Agricultural Statistic Abstract

Feed Supply. The supply of feed, fodder and feed ingredients is seasonal both in terms of quality and quantity. The availability and cost of feed and fodders is regarded as a major constraint to increasing the livestock production and the profitability of all livestock enterprises. Procurement of feeds and fodder accounts for a high percent of the cost of production of all categories of livestock (Table **14**). Although grazing of rangelands and crop stubbles provides a major proportion of the total nutritional requirements for goats and sheep, the cost of purchasing supplementary feed accounts for over 50 percent of the total cash cost of production.

Table 14 Contribution of Cash Cost of Fodder and Feed to Cost of Livestock Production, 1999

Enterprise	Cost of Concentrate Feeds and Fodders Syrian Pound	Feed Cost as Percentage of Total Production Cost
Dairy production		
- milk	7 to 8 /litre of milk	75
Layer production	80 to 90/bird	43
Egg production	2.1/egg	53
Broiler production	25/kg	40
Beef production - feedlot	8.5/kg	90

Source: Department of Economics MAAR, Farmer estimates

B. Fodder Marketing.

Due to the increasing intensity of animal production in all classes of livestock production, the market in feeds and fodders is well developed in both the public and private sectors. The public sector procures, stores and markets feed and fodders through the General Establishment for Cereals and the General Establishment for Fodder. The cooperative sector through the General Peasants Federation is the most important vehicle for distribution of this public sector feed and fodder. The major focus of the public sector activities in the marketing of fodder, until recently, had been provision of feed and fodder on concessional terms to sheep producers and to participants in government sponsored dairy and cattle development programmes. The marketing of poultry feeds is predominantly a private sector concern and most of the requirements of the poultry industry are imported. Concentrate (grains) feed is supplied by both the private and public sectors, although the private sector's role is restricted mainly to the manufacture of poultry feed using imported ingredients. Cattle and sheep feeds are produced from local feed ingredients. Three General Establishment for Fodder factories manufacture pellets or mixed feed for cattle and fish.

In 1998, the national production of livestock feed grains was 1178 tonne and 755 tonne were imported, of which the requirement for poultry was 666 tonnes of maize and 174 tones of soybean bean cake

C. The Feed Deficit

Estimates of the feed availability are about 8.9 million tonnes of dry matter per year with a requirement of about 10.7 million tonnes based on 1998 livestock population and production data. Slight changes in the assumptions regarding natural grazing yields have a considerable impact on the size of the deficit (**Table 15**)(Table 16).

Table 15 Livestock Feed Consumption 1998 (thousand tonnes of dry matter, total digestible nutrients and crude protein)

Source	Dry Matter	Crude Protein	Total Digestible Nutrients
Rangeland	958.6	76	551
Uncultivated land and fallow	224.5 (89.6)	14	121
Crop stubbles and residues, and unharvested crops	4963 (5166)	111	2362
Agro processing by products	864 (625)	121	639
Green Fodder	117	11	87
Concentrated feed	1063 (1482)	89	822
Total Domestic Production (Roughage 76% and concentrated feed 24%)	8189	422	4582
Imported feed	670	112	542
Total Feed Utilisation	10193	883	5919

Source: Study calculations

Table 16 Requirements and Availability of Feed (millions of tonnes of Dry Matter DM, Total Digestible Nutrients TDN and Digestible Protein DP) 1998

	Type	Roughage	Concentrate Feed	TDN	Digestible Protein	DM
Supply	Grazing	1.95	-	0.76	0.10	1.30
	Crop		1.18	0.82	0.09	1.06
	Crop Residues	5.84	-	2.36	0.11	4.96
	Industrial Residues	-	0.97	0.64	0.10	0.86
Total domestic production		7.80	2.15	4.58	0.42	8.19
Imports			0.76	0.54	0.11	0.67
Total				5.12	0.53	8.8
Requirements	Cattle			1.21	0.15	2.41
	Sheep			3.84	0.37	6.30
	Goat			0.24	0.03	0.32
	Poultry			0.61	0.08	0.67
	Others			0.22	0.02	0.47
Total				6.12	0.65	10.17
Balance				-1.00	-0.12	-1.31

Source: study calculations

The livestock feed deficit is expected to grow in the future with a further widening of the gap between domestic production and the livestock sector requirements. Maintaining the sheep population at its theoretical level of 15 million, and maintaining the other sectors at their present rates of growth, by 2010 the livestock feed requirement will increase to 11 million tonnes of dry matter, 24 percent above current domestic level of feed and fodder production

Table 17 Annual Demand for Livestock Feed by 2010 and 2020 (thousands of tonnes of dry matter)							
	Growth Rate of Species Population	2010			2020		
		Dry Matter	Protein	Total Digestible Nutrients	Dry Matter	Protein	Total Digestible Nutrients
Sheep	0	5764	343	3515	5764	343	3515
	0.5	6119	364	3732	6432	382	3923
	1.0	6495	368	3961	7174	427	4376
Cattle	2	3280	215	1723	4613	317	2505
Goats	2	413	35	324	512	45	417
Poultry	9	1497	221	1383	3018	454	2802

Source: study calculations

D. Addressing the Feed Deficit

Managing the Common Grazing Areas[2]

An estimated 500,000 Syrian families rely on sheep production for a substantial proportion of their income. Most of this production has its roots in the Al Badia region although most of the sheep owning families migrate out of the Al Badia during the summer months to graze their animals on the crop residues in the higher rainfall areas of the country. This movement of sheep out of the Al Badia occurs generally in May with flocks returning in October/November depending on the opening rains. Estimates of the contribution of the feed production of the Al Badia to the total requirements of the sheep population vary according to the assumptions made as well as the annual rainfall. In 1998, the Al Badia had an estimated production of about one million tonnes of dry matter which met over 15 percent of the total digestible nutrient requirements of the Syrian sheep population.

Recent increases in sheep numbers have resulted in a decline in the productivity of the rangelands due to overgrazing of vegetation resulting in lower plant productivity. In years of "average" rainfall, sheep owners would graze their flocks in the Badia for about 140 days (during the short spring growing period) a year before moving flocks into the higher rainfall zones during the summer. The shortfall in rainfall in 1998/99 season has resulted in further deterioration of the rangeland. The availability of feed from grazing crop residues also declined during this period. The lower availability of feed has caused a significance increase in mortality, lower reproductive performance and lower productivity of the sheep flocks. Imports of barley to meet the shortfall in animal feed during 1998/9 was 711 thousand tonnes.

Some cropping is undertaken with surplus water at the margins of the Al Badia and within the larger oases, despite a Government edict issued in 1995 banning cropping in the Al Badia. The most common crop is rainfed winter barley. Yields are very low and such production would be uneconomic[3].

[2] This section was prepared from several sources predominantly from project reports provided by FAO GCP/SYR/003/ITA.
[3] IFAD (1993) terms this practice pseudo-cropping

The size and number of sheep flocks have increased substantially over the last three decades with a corresponding greater pressure on the range resources from both livestock and human population. The increased availability of water tankers and trucks for transport of animals has allowed even more effective and in many cases destructive utilisation of the range resources. Tightening of cross border movement of flocks has limited access to range land feed resources in the broader region. Besides grazing and overstocking, the degradation and subsequent decline of the productivity of the Al Badia is also attributed to cutting of woody vegetation for fire wood, and the gathering of plants for food and medicinal purposes.

Whether the Al Badia can recover its lost productivity is uncertain, but evidence from the FAO Project GCP/SYR/003/ITA indicates judicious management of the rangeland can increase biodiversity and productivity of the range. Achievement of some form of management which addresses the long term productive decline of the rangeland and to help protect the Al Badia from over exploitation requires a community based approach involving all the users of the Al Badia resource. However changing social conditions with the diminishing of traditional social systems of authority and increasing economic individualism provides challenges to the re-introduction of a community based system of management.

Important changes which have gradually occurred over the course of this century in the Al Badia include: (i) increasing settlement of the Bedouin marginal lands; (ii) switch from camel production to sheep production; (iii) collapse of the traditional migration patterns through widespread use of motorised transport and the closing of national boundaries, and; (iv) increasing level of dependence on imported feeds

Based on international and local experience, desirable features of management of common property resources such as the Al Badia requires:

- users and boundaries of the range resource should be clearly defined. In addition, access to benefits from the area should be equal for all members. Within the Al Badia, water resources consist of wells and dams owned by the Government and designed in a way that distance between each two wells doesn't exceed 15 kms. Yet, inevitably, those who live near these water sources benefit more than those living far away;
- users groups should have legal status; and;
- preconditions of membership in the group should include a binding commitment to user obligations and usage regulations

Water. After feed, water is the most important reason for migration of flocks within and out of the Al Badia. With an improved and expanded road network and an increased investment in water tanks and bores, trade in water for both stock and domestic purposes has increased rapidly over the last decade. Expenditure on water has become a significant cash cost for sheep producers. The increased access to transportable water and a greater density of water points has also intensified the exploitation of the feed resources and accelerated the degradation of the rangeland in some areas of the Al Badia

Land Policy Reform. The Syrian rangelands have been the focal point of state intervention for the past thirty years. State interventions have four major components: assertion of the state's ownership over the rangelands, settlement and transformation of livestock producers into farmers, formal reorganisation of the Bedouin population into range improvement and sheep

husbandry cooperatives, and the development of rangeland reserves. Each intervention has had land tenure implications and the rights of individuals and groups over the rangeland resource[4].

Over this period, considerable extension of cropping into the rangelands and the individualisation of the common range resources resulted in an estimated decrease the area of rangeland available to sheep decreasing from 7.9 hectare per sheep in 1961 to 2.6 hectare per sheep 1993. This decrease in availability of pasture has been accompanied by a decrease in the quality of the pasture.

Land policies implemented by the government have resulted in changes which are the root cause of the resource mismanagement and environmental degradation. With state assertion of ownership, customary institutions lost implicit control over their tribal lands; rangelands were taken out of traditional common property management into open-access and subsequent uncontrolled use and heavy degradation. Local communities have lost the ability to effectively control and manage the use of the rangeland resource. While individuals and communities in the Al Badia have developed an array of reciprocal access arrangements allowing members of neighbouring communities to use their pasture and water resources, these arrangements are being monetised and individualised.

One fact is clear from experience of successful management of common property resources, both from within Syria and internationally sustainable management of common property rangeland resources requires primary consideration of the human dimension and the direct participation in of the communities, who rely on the resource for their livelihood, in the conceptionalisation and implementation of rangeland development programmes. Fundamental to the human dimension is community participation in rangeland management in association with the granting of secure rights to communities. This requires a willingness of the government to recognise the role and rights of local communities and to provide the incentive for communities to be involved.

Crop and Crop residues. Increasing and intensifying crop production will result in increased availability of crop stubbles and crop by-products, and further intensification of livestock and crop production will result in greater livestock and crop production integration both horizontally and vertically. Opportunity exists for greater efficiency of utilisation of crop residues for livestock production through the wider application and adoption of local and international livestock feeding technology. Increased support to applied livestock nutrition research will be a key to achieving greater utilisation efficiency of all classes of Syria's domestic feed resource. Integrated multi-disciplinary approaches to both research and extension will be required, to seek strategies for practical application of known livestock nutrition technologies and management.

E. Government Interventions in Feed and Feed Ingredient Marketing

While livestock production is essentially a private sector activity, the government through a number of agencies, participates in the supply of inputs such as feed, credit, animal health products and services. The government supports a number of programmes to address the livestock feed and fodder demand and supply imbalance, which include import and export regulation, provision of storage and distribution infrastructure, support to research and extension services, and regulation of feed quality, quantity and price on the domestic market.

[4] IFAD (1996) Badia Rangelands Development Project - Appraisal Report Annex VI: Land Tenure and Property Rights

Table 18 National Production of Livestock Feed marketed by the General Establishment of Fodder 1985 - 1998 (thousands of tonnes)

		1985	1990	1995	1996	1997	1998
Barley	Production	740	846	1705	1653	983	867
	Marketed	67	75	73	8	53	60
	%	9	9	4	neg	5	7
Maize	Production	80	180	199	250	303	285
	Marketed	53	113	76	76	155	118
	%	66	62	38	30	51	41
Soybean Bean	Production	n/a	11	11	9	6	7
	Marketed	n/a	6	10	8	2	6
	%	n/a	54	90	88	33	86
Cotton seed cake	Marketed	83	52	87	78	72	59
Cotton seed husk	Marketed	31	14	52	57	59	75
Bran	Marketed	331	342	466	537	543	484

Source: General Establishment of Fodder

Feed and Fodder Prices Setting Mechanisms. The government manipulates livestock feed prices in an attempt to manage the supply of feed onto the domestic market and to ensure strategic stocks of feeds are produced and procured on favourable terms to the government.

Prices for strategic agricultural products, wheat, cotton, tobacco and sugar are determined by government and these products must be delivered to public sector processing facilities. Prices paid to producers are established on an estimated cost of production plus a profit margin. Since the late 1980's, all other grain and food crops have been were removed from the compulsory acquisition provisions of the government.

The main livestock feed grains, barley, maize and soybean, are subject to various interventions by the government through the network of parastatal "Establishments". These are vested with the responsibility to acquire, store, process and market agricultural products on behalf of the government. They endeavour to achieve national self sufficiency where possible and to minimise imports, with the overall objective of supplying the livestock sector with its feed requirements at stable prices. Prices are established on estimates of costs of production with an added margin for profit.

The government attempts to use price to influence the flow of imports and exports, and manages the supply of the main feeds onto the market to stabilise prices and acquire strategic reserves. Prices for livestock feeds have remained stable for the last three years for the main livestock feed grains and products. The prices are determined and declared before the start of the harvest season. For example, the General Establishment of Fodder, which plays a key role in the public sector intervention in the livestock feed market, has two primary roles: (i) distributing domestically produced livestock feed grain (barley and maize) and the by-products of processing wheat and cotton to the private and cooperative sectors in support of government development programmes, and; (ii) maintaining strategic reserves of livestock feed. While it markets less than 10 percent of the national production of barley, General Establishment of Fodder markets most of the maize, soybean, bran, cotton seed cake and cotton seed husk produced in Syria.

The main feeds of concern to the livestock sector are barley, maize, bran and cotton seed cake. Cattle and poultry are fed mainly on maize (only for poultry) and barley and imported grains

and concentrates. Imported soybean and fish and meat meal are utilised by the poultry sector. Barley is the main grain used to supplementary feed sheep.

Barley The General Establishment for Cereal Trade and Processing, procures and stores Barley on behalf of the General Establishment for Fodder at prices determined by the Supreme Agricultural Council (SAC), charging General Establishment of Fodder for transport and storage costs. In 1999, the trade in barley was liberalised with the removal of import restrictions and the barley tax levy. Recently, and as an emergency measure to support producers face the grought, the General Establishment of Fodder had to drop its prices 17 percent below its procurement prices and sold producers on bedt, including those who didn't even repay their old debts

Maize and Soybean The General Establishment for Feed procures its own requirements for maize and soybean directly at "official" prices which attempt to balance the incentive to farmers to produce, with the anticipated requirements of the General Establishment of Fodder. Delivery of both soybean and maize to General Establishment for Cereals Trade and Processing is optional but, until recently, the prices set by the General Establishment for Cereals Trade and Processing and the limited grain drying capacity in the private sector has resulted in the Establishment procuring all the maize produced in the country. Domestic production of soybean bean is less than 8,000 tonnes. Recently, the private sector has commenced taking a small role in the processing of soybean bean and maize to produce feed concentrate for the poultry sector. Private sector oil extraction plants are entitled to import soybeans after the end of the domestic production season. Barley quantities delivered to the Government have declined significantly in recent years as the Government prices have not increased since more than 5 years in order to encourage private marketing.

Cotton Seed Cake. The General Establishment for Fodder procures its requirements for cotton and cotton seed processing by-products, cake etc, from the General Establishment for Food Processing (affiliated to the Ministry of Industry) at cost price. Production from private sector oilseed extraction plants is sold in the free market, in line with prices set by the General Establishment for Fodder. The private sector processes about 50 percent of Syria's cotton seed and this capacity is expanding. In 1998, the public and private sectors produced 140,000 tonne and 119,000 tonnes of cotton seed cake respectively. Since local production covers local demand, no cotton seed cake is imported in the country.

Formulated Feeds. The General Establishment for Fodder produces feed mixes both in its own facilities and by utilising capacity of other processing facilities, both in the private and public sector. The Establishment establishes prices for its feed mixes in consultation with the Ministry of Supply based on a cost of production calculation. During the last three years, the prices established by the government and the market prices for feed grains, feed additives, feed ingredients and feed mixes have been more or less at parity, although import and export figures indicate a number of anomalies.

Poultry Feed Market. The poultry feed market is dominated by imported feed ingredients, a predominantly private sector activity. Importers require a licence and poultry feed ingredient imports are subject to tariffs and quotas.

The Fodder Fund

The Fodder Fund was established through World Bank support in the seventies to provide sheep producers with in-kind short term loans for fodder during the winter months (the so called "critical period"). The loans are repaid during the production season although

repayments can be deferred under certain circumstances such as drought. The Fund is administered by the MAAR, with the loan portfolio managed by the Agricultural Cooperative Bank. District "Peasants Federation" apply for their allocation of fodder, based on members' sheep numbers and MAAR guidelines, to the General Peasants Federation who in turn informs the General Establishment of Fodder and the MAAR. Funds are released by the Agricultural Cooperative Bank to the General Establishment of Fodder under instruction from the Ministry of Agriculture and Agrarian Reform to its financial capacity and to the General Establishment for Fodder prices and quantities. The allocation of fodder to a particular cooperative is based on the sheep owned by its members and the allocation per head decided by the General Establishment of Fodder and the MAAR. In the past this amount has been as high as 180 kilogram per sheep for the four month period but the allocation has declined to 35 kilogram per head in 2000 reflecting the financial capacity of the Fund and the feed reserves held by the General Establishment of Fodder. The allocation represents about 20 percent of a breeding sheep's winter maintenance ration. As with other feed allowances, the amount of benefit being delivered to sheep producers through this support scheme is decreasing while the overhead costs of delivery are increasing.

The Fund has also been used to establishing sheep breeding, steppe improvement extension centers and fodder stores. Recently the Fund has been supported by a number of international donors and agencies as a mechanism to deliver both human food and livestock fodder to the drought effected rural communities.

F. Impact of the Government's Pricing Mechanisms on Prices of Livestock Feed Prices

The cost of livestock feeds on the domestic market have in general been at a premium to international prices (Table 19) resulting in increased cost of production of livestock products. As consumer prices are based on cost of production calculations, the increased cost of livestock feed is passed onto the consumers, hence the crop producer is being supported by the livestock producer and the consumer.

Table 19 Nominal Protection Coefficients for Selected Feed Ingredients, 1990 –99

	1990	1995	1996	1997	1998	1999
Barley	1.38	1.14	1.24	1.43	1.84	1.69
Maize	1.30	0.89	1.38	1.60	1.87	1.90
Cotton seed cake	1.23	0.96	1.00	1.39	1.49	na
Soybean bean cake	1.56	1.30	1.21	1.98	1.81	na

Source: Appendix 2 Annex 3 tables

The General Establishment for Fodder product prices for fodder fluctuates above and below the "free market" price (Table 20). Most of the feed sold by the General Establishment of Fodder is sold through in-kind credit arrangements where the borrower is only able to source his feed from the General Establishment of Fodder. The ability of the General Establishment of Fodder to meet the demand of feed purchased through in-kind loans is dependent on its procurement of the domestic production, where prices are established on cost of production estimates, de-linked from domestic and international prices.

Table 20 Market and General Establishment for Fodder Feed Prices, Syrian Pound/kg, 1985 – 1998

	1985		1990		1995		1996		1997		1998	
	M	GEF	M	GEF	M	GEF	M	GEF	M	GEF	M	GEF
Barley	1.60	1.55	8.10	9.00	7.75	9.00	7.25	9.00	8.3	9.00	8.15	7.00
Maize	4.20	2.60	9.60	8.20	9.50	8.20	10.7	11.25	11	11.25	10.6	11.25
Soybean	-		10.6		10.20		12.0		14.4		15.4	

Source: MAAR - Department of Agricultural Economics

More than one million tonnes of grains, agro processing by-product and feed additives were traded during 1998, not including the free market trade between cereal producers and livestock producers.

Table 21 Import and Export of Livestock Feed Products 1985 - 1998 (thousands of tonnes)

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Barley									
import	106	199	82	0	0	0	0	0	
export	103	0	0	156	379	594	556	297	18
Maize									
import	249	262	104	347	0	317	0	597	505
export	0	0	0	0	379	0	556	0	0
Wheat flour									
import	0	945	752	89	79	0	0	0	0
export	10	0	34	7	11	59	278	885	428
Concentrate									
import	30	28	20	36	21	29	29	20	2
export	0	0	0	0	0	0	0	0	0

Source: Ministry of Foreign Trade

G. Impact and Implications of Recent Drought for a Drought Policy

Syria experienced a prolonged period of unusually low rainfall in 1998 and 1999 culminating in the severest drought since the 1950's. The full impact of the drought on the Syrian economy and the incomes and livelihood of livestock producers in particular is yet to be established, however sheep producers in the Al Badia have been particularly hard hit. A review of the government's assistance programme to relieve some of the impact of the drought on livestock producers was prepared by one of the National Consultants.

By February 2000, some of the impact of the drought included: (i) increased indebtedness of the livestock producers; (ii) decreased sizes and value of producers' herds and flocks; (iii) increased number of non-viable family livestock enterprises particularly amongst sheep producing families; (iv) substantially decreased livestock family incomes; (v) overgrazed, depleted and less productive Badia, and; (vi) decreased productivity potential of the national herd and flock

Government programmes to alleviate some of the impact of the drought include: (i) providing extra rations to sheep producers on a subsidised and deferred payment basis; (ii) providing extra financial resources to feed the Fodder Fund and price support; (iii) increasing the level of lending by the Agricultural Bank for in-kind loans, through Farmer Cooperatives, for feed and fodder; (iv) authorising the General Establishment for Cereals Trade and Processing to import additional barley to meeat local demand, but the Establishment didn't import barely because

the imprts made by the private sector covered the local demand; (v) authorising grazing of conservation areas in the Badia; (vi) allowing the private sector to import feed, particularly barley, and; (vii) allowing the Farmers Association and the General Establishment of Meat to export Awazi sheep to the Gulf with exemptions to the two for one sheep import export requirement.

The drought in 1999 cost the sheep producers an estimated SP 8.8 billion due to loss of meat, milk and wool production and a further SP 37 billion due to increased expenditure on feed and water. Support through the Fodder Fund of about SP 700 million was offered as loans in the form of feeds, even to those who have not been able to clear their earlier debts.

Several key factors need to be considered in formulating a drought policy which makes the most efficient use of government support while ensuring such support is delivered equitably. A drought policy would be expected to have the possible aim to encourage farmers to manage droughts and difficult seasons (periods of unusually low rainfall) from their own resources, just as they do for other livestock production activities. Traditionally livestock producers, without government intervention, adjusted livestock numbers, sought alternative grazing areas in difficult periods and/or purchased more feed for their animals. A drought policy would ideally encourage greater self reliance or greater financial self sufficiency. The current approach is encouraging greater dependency on the government with a number of adverse effects.

Interest subsidies. Generally, interest subsidies indirectly penalise more successful farmers who make provision for droughts through building up cash or other reserves. They also encourage higher levels of debt for the less prepared, making their livestock business more vulnerable to failure. However, most of the livestock producers are small holders who can hardly keep a reserve for drought.

Entitlement to benefits from interest subsidies, or to repayment moratoria is assessed on the number of sheep owned by a livestock producer. Hence, as confirmed through informal discussions in the field, a major share of the government drought relief support is being received by the larger and more financially able livestock producers.

H. Conclusions and Recommendations

To be able to meet the future demand for livestock products, Syria's livestock production will need to improve substantially in terms of per-animal yield. Increasing flock and herd populations which is the alternative, will lead to lower per-animal yields due to lower levels of nutrition per productive animal.

The strategy for improving Syria's livestock feed deficit involves:

- increased integration of crop and livestock production systems
- improved management of common grazing lands, including introduction of appropriate forms of land tenure for common grazing land users
- integrated and multi-disciplinary approaches to improving the production and utilisation of feed and fodders
- elimination of unnecessary restrictions on the trade of feed and fodders

- changing the government support to applied research, technology adoption and feed standards

Improving the genetic pool within the cattle industry will increase productivity and improve feed efficiency. Increasing the integration of crop and livestock production systems would allow farmers to export the complementarity between these systems, since intensive cropping systems are important sources of crop residues.

Support to the vertical integration of the sheep production for both the domestic market and the live sheep export trade will lead to increase yields per breeding ewe, increasing incomes while decreasing pressure on the common grazing lands. Increasing the use of concentrate feeds would also help ease the pressure on grazing areas.

Access to standardised high quality feed products at world prices is a priority of all livestock enterprises. Government support to the feed and fodder industry must change to strengthening the regulation and monitoring of feed standards and the quality of feed and feed products formulated by the private sector.

Addressing the resource degradation problem

The proposed strategy of the Al Badia directorate to use participatory approaches to involve common grazing land users groups, will need to be supported by a commitment to changing current government policy on land tenure and land use within the Al Badia. More resources and greater integration of all parties concerned would ensure the aspirations of the development plans proposed for those communities who depend on the Al Badia resource for their livelihood, are met.

Allocating Legal Status to Users of the Common Property Resource of the AL Badia

Long term sustainable management of Al Badia will only be achieved if the resource users, as communities, are clearly defined and boundaries of the range resource are established with community participation. User groups must also have legal status. Provision of entitlements to the resource users - the sheep producers, would be matched by a reduction in the levels of unsustainable support such as feed and credit subsidies and water infrastructure development, as is presently provided to the sheep industry. Such a process will take time. In the meanwhile, the proposed US$ 100 million investment in mostly infrastructure development in the Al Badia should be submitted to an environmental impact assessment to ensure the activities proposed do not contribute to further degradation of the Al Badia.

Deregulation of the Feed and Fodder Sector.

Withdrawal of the Public Sector from the feed and fodder trade is a prerequisite for improving the efficiency of supply and the availability of quality livestock feeds. Removal of pricing mechanisms and the liberalising of the imports of livestock feeds will reduce their costs substantially, increase their availability and ensure more efficient utilisation of feed resources. As government input support to feed and fodder is allocated according to the number of animals owned, the benefits of price support and interest subsidies accrue to the larger and hence better-off producers. Alternative approaches need to be explored to support the majority of livestock producers who are poor and unable to access the government's fodder support programmes. Consideration of any future role of the General Establishment for Fodder in the livestock feed market, requires further study.

Promoting Greater Financial Self Sufficiency Ahead of Drought or Downturn in Prices

Government's role, when applying the principle of public good (discussed in Section 6), would be better directed to promoting improved preparedness of the livestock producers. Improving skills in a range of livestock management and planning areas would assist livestock producers to be better prepared. Investment in improving the availability of information on drought related issues such as better utilisation of supplementary feeds and improved weather forecasts (through support to research and participation in early warning systems) would be a more sustainable and equitable government contribution.

A drought policy embracing such approaches would be relevant to those producers in the cropping zones. A drought strategy to promote greater financial self sufficiency of livestock producers dependent on the Al Badia for grazing would also be needed to work in conjunction with the land tenure entitlement of the common property resource. A drought strategy would also need to define when assistance would be provided following an event of "exceptional circumstances" such has just occurred in Syria. This was the severest drought in thirty years, a rare and severe event outside those the livestock producer could be normally expected to manage.

4. Livestock and Livestock Product Marketing

The Syrian government supports a number of mechanisms for balancing production supply with consumer demand for livestock products at stable prices. Such support reflects a strategy which attempts to increase livestock production to meet local demand for livestock products while creating production surpluses for export, and protecting the local market from external competition where possible. The Syrian economy is also moving from a centrally managed one to a more market driven model. Policies issues and government investment in the livestock sector are under continual review and change due to the need of the government to respond to the dynamics of the internal economy as well as the international trade forces. This chapter reviews the livestock and livestock products markets as well as the impact of the government's market control mechanisms. It also assesses the impact of liberalising these markets through deregulation and strengthening the role of the private sector.

A. Livestock Marketing

Each governerate has markets where livestock and livestock products are traded. Some of these markets operate under the supervision of local government bodies, while others are privately managed. A more detailed description of the marketing channels for livestock and livestock products is presented in Appendix 4.

More than 90 percent of the national livestock production is marketed through the private sector. In the sheep and cattle markets (for live animals for breeding, store or slaughter), commission agents operate as the market facilitators. They provide a venue within the market place for the buyer and seller to negotiate a sale, facilitate the negotiation of prices according to traditional practices, guarantee both payment for and the quality of the animals sold, provide accommodation for unsold animals in the case of sheep, and may also provide purchaser finance. The market is dominated by a small number of well resourced commissioners who also trade and fatten animals themselves.

The major sheep and cattle domestic markets are in Aleppo and Hama. Aleppo is also the centre for the live sheep export trade and Hama is the focus for imported sheep. Livestock markets are held daily in the major urban centres. These markets cater for finished, store and breeding animals and are unregulated with no official data available on through-put. Live sheep and sheep meat market facilities are generally government owned and maintained. A number of live cattle market sites have been established on land purchased or leased by traders (commission agents) which operate independently of government. Poultry marketing occurs in urban wholesale and retail fresh markets which are supplied with either live or freshly slaughtered birds.

With a well developed road and communication infrastructure and the relatively short distances between markets, traders are able to actively compete in markets nationally. Market information and intelligence is in the private sector. The government, through the Ministry of Supply, gathers wholesale and retail market prices for price setting mechanisms, but no data is gathered on prices or numbers of animals sold through the main live animal markets.

B. Meat Processing

Most sheep and cattle slaughterhouses are owned and operated by the governerates. Government regulations stipulate sheep and cattle must be slaughtered in these government owned facilities to ensure quality control and to facilitate the implementation of public health and hygiene regulations. Each governerate has an abattoir which is let to private operators who contract slaughter animals on behalf of wholesale and retail traders. The General Establishment of Meat operates the abattoir in Damascus, built in the 1970's and regarded as the most modern in the country. In contrast to slaughterhouses elsewhere in the country, the General Establishment of Meat directly manages the Damascus facility, provides labour for the operation of the abattoir and charges a slaughter fee of SP 30/head for sheep and SP 150/had for cattle. The abattoir has a capacity, with two shifts, of 6000 sheep/day but in recent years the daily throughput has averaged about 500 sheep/day and a small number of cattle. Most traders, butchers and wholesalers prefer to slaughter their animals in the production governerates where the slaughter fees are lower as they are able to use their own labour, and where the enforcement of health and hygiene regulations is less rigorous.

Both sheep and cattle are slaughtered at a range of weights and ages according to consumer preference ranging from veal and milk lamb through to cast for age animals. Legislation exists which bans the slaughter of very young animals and most beef is produced from entire males of 350 to 500 kilogram live weight and over 10 months of age. The most popular sheep meat for domestic consumption is from entire males of 60 to 70 kilograms live weight and aged over 8 months (Table **22**).

Table 22 Sheep Meat Products - Definitions

Meat Product	Method of Feeding	Slaughter		Available
		Age	Weight	
1. Pink meat (*kharof wardi)*	Mother's milk	Less 2 months	7 to 11 kg	February and March
2. Weaner meat (*kharof muftoum)*	Mother's milk, grazing and some concentrate	3 to 4 months	30 kg	March April May
3. Not weaned (*kharof mharjun)*	Mother's milk, grazing, concentrate	5 to 6 months	50 kg	April, May June
4. Mature (*kharouf is'took'la)*	Weaners purchased and kept as a separate flock Only in good years in Al Badia	any		Autumn
5. Mature (*Kharouf mousaman)*	Weaners and store animals purchased and fed for 60 to 90 days	any	50 - 60 kg	all year - specialised job

Source: Field notes

Forward contracting is common practice between producers, fatteners, traders, wholesalers and retail butchers and is often associated with the provision of credit or a deposit. The traders and wholesalers most often organise and supervise the slaughter of animals. Animal fattening enterprise operators often secure their supply of young store animals through an advance payment to a producer or group of livestock producers. The "finished" animals are then sold to a trader who contract slaughters them and delivers the carcasses to the butcher shops.

Except for the GEM abattoir in Damascus, most slaughterhouses are old, unhygienic and lacking in essential services. While the slaughtering facilities and practices may be considered unsophisticated, meat quality is considered to be adequate although recovery rates of various

by-products such as hides and skins, tallow, blood, viscera, and organs is low. Estimates of under utilised by-products of sheep, goats and cattle is below 50 percent, particularly as only about 50 and 65 percent of sheep and cattle respectively are slaughtered in official facilities (Table 23). While some of this difference could be explained by the slaughter of animals for individual domestic consumption or for religious purposes, a considerable proportion of meat entering the meat markets is from animals slaughtered in unsupervised and unregulated conditions.

Table 23 Animals Slaughtered in Official Facilities, 1994 -1998 (thousand and percentage)

	Sheep		Cattle	
	Slaughtered in Official Facility	Percentage of Total	Slaughtered in Official Facility	Percentage of Total
1994	2352	49	104	67
1995	3189	61	124	73
1995	2756	48	111	55
1997	2423	41	119	55
1998	2380	37	104	48

Source: Derived from MAAR Statistical Compendium and Statistical Abstract Central Bureau of Statistics 1999

At the retail level, in the urban areas, most red meat is retailed in licensed butcher shops. There are about 1600 licensed butcher shops in the country, most with some cool storage facilities and a turnover of one to two sheep per day. The restaurant chains are supplied through contracts with traders and feedlot operators.

At this stage of the meat market's development, there is a trade-off between the cost of stricter regulations for domestic meat production and the benefits from consumer health protection. While regulations are essential for livestock product exports, enforcing similarly strict standards in domestic markets may not be economically feasible. In the longer term, the required capital investment in slaughterhouses will continue to be constrained by the general investment environment within Syria and the ongoing subsidised competition from government slaughterhouses. Inadequate processing facilities and poor enforcement of hygienic standards will continue to pose a health hazard to the public while constraining Syria's export competitiveness. The poor enforcement or absence of environmental standards of abattoir effluent and low levels of by-product utilisation will also increase the problems of pollution in the future.

C. Marketing and Processing of Wool

Wool production in Syria has varied in line with the fluctuating sheep population over the last decade with about 15,000 tonnes of clean wool produced in 1998. The Awassi sheep produce on average 5 kg of greasy wool of 35 micron or stronger and a fibre length of 9 to 13 cm. Yields are below 40% and fleeces are generally of mixed colour, heavily contaminated with vegetable matter and sand, and generally weather damaged. Most of the wool is consumed in cottage industries for the production of blankets, tenting, mattress filling and felted rugs.

The General Organisation for Wool has two 600 tonne (clean wool) capacity plants. The General Organisation imports about 1000 tonne of 35 micron greasy wool from New Zealand and, using minimal amounts of locally produced wool, produces yarn for carpet manufacture in the government owned carpet factories.

Prices paid to producers for wool, either wool from shearing or fellmongering, varies little and the producers regard wool as having little commercial value. Locally produced wool is marketed through private traders, with most of the domestic production exported to Turkey. A number of wool washing facilities operate around Hama, Hums and Aleppo, providing clean wool for the local cottage industry which produce mattresses, pillows and felted blankets.

The break-even price for imported NZ wool is estimated by the General Organisation for Wool at about SP 140/kg clean. Imported wool attracts a tariff of 5% with no other restrictions, except capacity, on imports.

In 2000, as the government proposes to further "liberalise" its business operations, General Organisation for Wool intends to process only imported wools. Up until 1999, the General Establishment of Wool marketed 5% of Syria's wool production. With the lifting of trade restrictions, private traders, who have become entitled to keep 75% of the export foreign currency earnings, have entered the trade and now market the total clip.

D. Marketing and Processing Skins and Hides

An estimated 5 million sheep skins and 200 thousand cattle hides are harvested annually. Besides consumption by the handicraft industry, the General Establishment for Tanning is the only domestic market for these skins and hides, operating two companies which have sheep skin and cattle hide processing plants. The sheep skin plants process 3000 skins per day producing leather for both clothing and footwear manufacturing companies in the private sector. The balance of the skins are exported mainly to Turkey. The local supply of cattle hides covers about 10 percent of the General Establishment for Tanning's requirements. The rest of its requirements are imported by traders under tender.

E. Marketing and Processing of Milk

Cow's Milk. In 1998, Syrian dairy farmers produced an estimated 1.1 million tonne of milk, mainly from small herds in the peri-urban areas. A small number of producers milk more than 150 cows and some of these production units are vertically linked to private milk processing units. The off-take of surplus animals from the dairy herds provides the basis for the beef industry, with young stock grown out under semi-intensive feeding regimes supplemented by fodder produced mainly under irrigation. While the private sector dominates the dairy industry, the government has a substantial investment in both production and processing units.

Most milk is distributed fresh to consumer households for consumption or domestic processing into yoghurt and cheese. Over 60 percent of the milk consumed in the major urban markets is delivered fresh in open containers to the consumer's door by a network of milk vendors and milk dealers who source their supplies from small dairies close to the urban areas. Processed milk, in bottles or cartons, make up a small proportion of the market, due to its higher cost and consumer preference for raw milk. While claims of adulteration of milk are common but undefined, milk quality is a major constraint to improved milk and milk products industry due to unhygienic handling, transport and storage of milk which is produced in small quantities by a large number of producers. Seasonal supply volumes fluctuate from peaks in summer to lows in winter, resulting in low levels of processing plant capacity in both the public and private sector.

The marketing of processed milk products is explored in detail in "Implications for the Agricultural Sector of Recent Developments in the Private and Public Agricultural Marketing

and Processing Activities in Syria" prepared by Danielle Rama for the FAO Assistance in Institutional Strengthening and Agricultural Policy Project.

Several government sponsored projects have promoted small scale milk production and collection through the cooperative sector in an effort to develop strategies to improve the quality of the milk supply chain. Most strategies involve the installation of milk chilling facilities at milk collection centres. While recognising the need for such facilities, the private sector does not consider this investment as "profitable" unless supply contracts with small producers and cooperatives can be enforced. In the medium term, the processed milk industry will become more vertically integrated as private processing plants link up with the larger producers who can afford the required investment in milk handling, storage and transport infrastructure.

Sheep Milk[5]. About 500,000 tonnes of sheep milk is produced annually, accounting for a significant share (about 30%) of the total milk production in Syria. This equates to a per-capita consumption of 35 kg/head - one of the highest levels in the world. While no formal figures are available on consumption, about one third of the sheep milk produced is consumed fresh either within the sheep producer families or distributed locally in neighbouring towns and villages. However production is highly seasonal with production surplus to lamb and family needs occurring between February and May. This surplus is processed into cheese, yoghurt, butter and ghee, mainly by small processors, although government and some private dairies do process some sheep milk. Consumers place a high value on sheep milk products which are regarded as more nutritious than milk products from cows. Most of the milk is processed into Laban (yoghurt) and Gibneh Akawi (fresh white cheese) with other items produced from these basic products or from the skimmed milk and whey by-products. Estimates of the milk production available for marketing range from 40 to 80 kg per lactating Awassi ewe per season.

The main issues with improving the marketing of sheep milk and sheep milk products are: (i) seasonal supply of the milk; (ii) quality and reluctance to sterilise milk which effects quality and poses a human health risk, and (iii) low prices paid to the producers

In spite of much lower surpluses due to the drought, pilot projects have demonstrated that: (i) traditional sheep milk processing methods and equipment can be adapted to produce profitable, wholesome products suitable for the high value urban market; (ii) low capacity utilisation of processing facilities can be in part off set by utilising some cow and goats milk; (iii) processing facilities as small as 500 kg per day are a profitable investment as minimum risk; (iv) utilising lower cost cows milk and goats milk at rates up to 10% of the milk do not adversely effect the traditional characteristics of the end products; (v) some sheep milk products are more profitable than others, and; (vi) the productivity of sheep can be improved through improved husbandry and nutrition.

F. Marketing of Poultry

Broilers are sold either live or fresh dressed. There is currently no market in chilled or frozen dressed poultry in Syria. The market is dominated by small retailers operating out of the wet markets in the major urban centres. Broiler farms are located in all governerates but most are located closer to the big cities where traders contract with broiler producers to supply the trade.

[5] Extracted from B.T. Dugdil and A. G. Ghadri, May 1999, Milk Collection and Processing Technical Report, FAO SYR/93/004 and GCP/SYR/003/ITA.

Larger producers market directly to consumers through their retail outlets. Egg marketing is handled by traders or commission agents, or sold directly from the larger production units directly to retail and wholesale outlets

The General Establishment for Poultry, which supplies mostly public institutions, produces about 10 percent of the domestic consumption.

G. Market Price Setting Mechanisms for Livestock Products

The government has a continuing strong commitment to controlling the prices of livestock products. It utilises a number of instruments for stabilising prices while pursuing the other objectives of matching supply with demand, ensuring self-sufficiency of production and preventing excessive profit taking by traders and retailers.

Prior to 1986, the Government set wholesale and retail prices for most agricultural products. These prices remained fixed for a long time without reference to changes in production costs and profitability of production enterprises. To compensate farmers for falling incomes resulting from fixed prices and increasing costs, subsidies were introduced for farm inputs. The outcome of this strategy was stable food prices at levels lower than the costs of production and an increased demand for food products. These price support polices caused growing shortfalls in meeting domestic demand for food products, stimulating the development of a black market. An extensive informal trade developed both within Syria and across its national borders, with products selling at substantial premiums to the official prices. The official pricing structure also discouraged farmers from producing the main commodities, who preferred to cultivate secondary crops which were outside the umbrella of the official pricing setting system. Commodity prices fluctuated sharply and Syria had a production shortage in the main food crops.

As a result of this experience and with increasing foreign exchange shortages, official price setting mechanisms have been used since 1986 as a tool for implementing production plans for the major crops. These plans were generally aimed at self sufficiency in all food products, with the prices of food products established using cost of production calculations plus a profit allowance. Subsidies on agricultural inputs were gradually removed in line with increased prices paid for the main agricultural commodities, encouraging expanded production in all major food crops and livestock. Although over 95 percent of livestock products are produced and traded in the private sector, the Government also uses these pricing mechanisms (*the State Pricing System*) to stabilise prices of livestock food products paid by consumers and product prices received by producers. This pricing system also has the objective of discouraging excessive profit taking by traders, wholesalers and retailers. The State Pricing System, managed by the Supreme Agricultural Council[6], applies to plant and livestock products and to agricultural inputs.

Maximum retail price limits are established on estimates of demand and supply. Retailers risk prosecution if they sell food above these set maximum prices. Eggs and milk maximum prices are issued weekly, while dairy and meat product prices are set seasonally. The MAAR Department of Agricultural Economics estimate the Government-set maximum prices vary no more than 10 percent from the "free market prices". The Ministry of Supply monitors

[6] The Supreme Agricultural Council gives an indicative price for milk procured by public plants. In general this price is applicable on milk produced by the General Establishment for Cattle and sold to public dairy plants. These plants can also buy milk at market price to cover their demand.

consumer food products traded in the domestic market, regularly publishing these prices to discourage excessive profiteering.

Live Sheep Prices. The domestic market price for live animals is not regulated by the government, however the live sheep export trade is subject to government interventions. Indicative live sheep export prices are established by a committee comprised of representatives from the Pricing Department of the Ministry of Supply, and the Animal Health and Agricultural Economics Departments of the Ministry of Agriculture. These indicative prices are used in issuance of export declarations and the calculation of fees and foreign currency earnings, but they can and do vary considerably from actual prices realised by the exporters.

H. Market Price Behaviour

Despite government price setting mechanisms and import and export bans and controls to stabilise meat and milk prices to consumers, official data from a number of variable sources, indicates a more than 20 percent fluctuation in the prices for meat and milk over the last three years. Wholesale prices for livestock products are more volatile than retail prices, as retailers are able to maintain higher margins within the official retail price ceilings compared to the wholesalers who operate in a more competitive and less regulated market.

There has been no significant relative wholesale price change between beef, mutton and poultry over the last decade to encourage significant shifts in consumption and resources (**Table 24**), although the cost of broiler meat relative to beef and mutton favours its increased consumption. Consumers report meat and milk prices exhibit some seasonality, perhaps influenced by festivals and changing consumption, and animal feed supply (particularly for milk and mutton production). Government price setting strategies have not insulated consumers or producers from these price fluctuations.

Table 24 Price Ratios of selected Livestock Products 1985 – 1999

	Poultry Price over		Beef Price over
	Beef Price	Mutton Price	Mutton Price
1985	1.00	0.803	0.806
1990	0.604	0.470	0.776
1995	0.463	0.318	0.685
1996	0.543	0.436	0.803
1997	0.549	0.339	0.726
1998	0.517	0.400	0.774
1999	0.508	0.415	0.816

Source: Appendix 2 Annex 3 Tables

I. Market Intermediaries and Market Information

Mistrust of traders is pervasive in Syria and has served as part of the justification for extensive government intervention in livestock and livestock products markets. The allegedly high margins between farmer and consumer may reflect excessive profit taking, but these high transaction costs (more than 50 percent for mutton and 20 percent for beef) may also be partly attributed to the costs of complying with or evading government market rules and regulations. A factor contributing to these uncertainties is the limited resources allocated to the collection and analysis of livestock marketing data. Experience from many countries indicates that returns to marketing activities by traders are generally reasonable if there are no barriers to entry and that the high margins can be traced to high transaction costs (transport, spoilage, unofficial taxation and poor market information). A more comprehensive livestock information system, covering livestock producers circumstances, production and marketing would be the key to developing clear policy and strategies for developing livestock markets and the livestock sector.

J. Impact of the Government's Pricing Mechanisms on Retail Prices of Livestock Food Products

The use of price setting mechanisms encourages possible price inefficiencies. The use of cost of production estimates plus a profit margin to establish prices of meat and milk products does not directly encourage more efficient production in the public sector, while such estimates allow excessive and non competitive profit taking by a presumably more efficient private sector. As a result consumers pay a higher price for food products than the free market could deliver without government intervention.

K. Conclusion and Recommendations

For the livestock sector to grow, livestock and livestock markets will need to become more efficient. High transaction costs indicate opportunities for making considerable gains in efficiency in the market to the benefit to the consumer and the producer. In a more open market system, the government's role would be to ensure greater and fairer competition, to protect the consumer and the producer against predatory pricing practices and dumping by any market participant. Public sector enforcement of hygiene and sanitary standards will become more critical and require the allocation of more resources as consumers demand better quality products and more private sector participants enter the meat processing industry. Identification of real market bottlenecks through improved livestock market information systems would facilitate government policy formulation and more efficient public sector resource allocation. Improved market information would also be critical to improved market competition and hence efficiency.

5. Livestock Sector Trade

Until 1986, Syria maintained a highly restrictive domestic and international trade regime. There were import and export bans on most agricultural products, and imports and exports of essential agricultural products and inputs were channelled through public sector organisations. Post 1986, this regime was relaxed through Degree 10 to include public sector/private sector joint ventures who were allocated import and export privileges. Investment Law No 10 was introduced in 1991 which further liberalised the domestic and international trade regulations allowing the domestic and international private sector to enter the domestic market in "non strategic" agricultural and livestock inputs and products. This chapter reviews the development of Syria's international livestock sector trade, particularly the live sheep trade and makes recommendations for increasing the efficiency of this trade.

A. Recent Trends in Livestock and Livestock Imports and Exports

Between 1991-2 and 1996-98, at current prices, the value of imports of livestock products, excluding live animals, increased by more than 200 percent due to increased imports of powdered milk and butter. During the same time, the value of livestock and livestock products exports dropped 30 percent from a high of over SP 1 billion in the middle of the decade. Poultry meat exports fell by 85 percent to SP 7 million, while the export of white cheese tripled at current prices.

From 1996 to 1998, live sheep accounted for 50 percent and 81 percent of the average annual value of livestock and livestock products imports and exports respectively. The average annual value of imported sheep declined between 1990-2 and 1996-8 by 23 percent, while exports of live sheep increased by two percent during the same period (Table 25). Most livestock product imports, except live sheep, are sourced from the European Community while all exports, including live sheep, are to countries in the immediate region. Romania and Bulgaria are the major suppliers of live sheep (*bela)* to Syria although very little official data is available on this trade.

Table 25 Main Livestock and Livestock Products Imported and Exported, 1990-1998 (Two year averages, millions of Syrian Pounds)

	Imports			Exports		
	1991-1992	1993-1995	1996-1998	1991-1992	1993-1995	1996-1998
Live sheep	547	956	423	669	663	684
Greasy wool	2	13	21	12	19	12
Clean wool	11	20	8	20	13	11
Sheep skins (untan)	0	0	0	97	78	3
Sheep skins	0	8	0	28	223	0
Live Goats	0	0	0	148	67	30
Live cattle	23	36	4	0.3	0	0
Offal	0	0	0	11	22	34
Poultry meat	31	26	25	47	45	7
Table eggs	0.3	0.3	1	35	53	30
Powdered milk	73	185	331	0	0	0
Butter	18	40	38	0	1	3
White cheese	0	0.5	0.4	9	15	23
Total	705.3	1284.8	851.4	1076.3	1199	837

Source: Appendix 2 Annex 4 Tables

The increased volume and value of imported dairy products, particularly milk powder (no differentiation is made between whole milk powder and skimmed milk powder), is attributed to the inability of domestic milk production to keep pace with domestic demand, particularly in the low domestic production seasons. This shorfall in domestic supply is partly met by reconstituted milk which is often combined with fresh milk for the domestic fresh milk market.

Clean wool imports have been replaced by greasy wool imports as the General Organisation for Wool takes advantage of increased local scouring capacity. Given the size of the Syria non-wool textile industry, considerable opportunity exists to extend Syria's fibre processing capability to include imported wools for value adding. The growing export of offal and slaughter byproducts represents an opportunity for value adding in-country, particularly as Syria imports more than 2000 tonnes of meat meal for the poultry industry alone.

B. The Live Sheep Trade

In 1998, Syria exported over 685,000 sheep mainly to the Gulf States (**Table 26**) in a trade which has grown from less than 200,000 head in 1985 to become the livestock sector's major foreign exchange earner. The Awassi sheep breed command a premium in the Gulf live sheep markets over other sheep breeds sourced from Australia, New Zealand and South Africa.

Table 26 Destination of Live Sheep Exports 1998 (volume, value and unit price FOB)

	Heads (thousands)	Value (SP millions)	Unit price/head SP
Saudi Arabia	474	377	795
Kuwait	115	95	820
Qatar	91	72	790
Lebanon	2	16	8000
Other	2	2	1000

The Exchange rate applied on these prices is 11.25 SP/US$ whereas the actual rate is 46

Source: Ministry of Foreign Trade

In 1986, a number of joint ventures were established under Decree No 10 between the public and private sector to export sheep to the Gulf. The trade was lucrative so volumes increased sharply in 1989 resulting in a substantial increase in the price of mutton on the local market. To prevent further escalation of the domestic price, the government introduced the "Two for One" policy which required exporters to import live sheep equivalent to twice the volume of the proposed export shipment, before they were permitted to export Awassi sheep. A trader was allowed to export only against documented verification of the required imports. Imported non-Awassi sheep, whose CIF price was much lower than the Awassi FOB price, were to be slaughtered within three weeks of arrival into Syria to supply the domestic sheep meat market. The expected benefit was the lowering of the domestic retail price for sheep meat.

Between 1988 and 1992, between 500,000 and 1,800,000 sheep were imported annually from Bulgaria, Turkey and Romania, mainly by barter trade, through the General Establishment for Meat. Since the disintegration of the Soviet Union in 1992, the General Establishment for Meat has not imported any live sheep due to its inability to access foreign exchange credit to finance its trading activities. The import

trade is now entirely in the private sector. About ten traders dominate the sheep import market while an estimated twenty traders dominate the sheep export trade to the Gulf. Sheep importers own their own land, facilities and transport including ships, and are the major suppliers of sheep to the region as well as Syria. As there are no trade financing facilities within Syria for this trade, entrants into this trade need to have access to external sources of finance.

The link established by the government between the numbers of sheep imported and exported into and out of Syria led to the development of specialist importers and exporters, with the importers selling their import documentation to the specialist exporters of Awassi sheep to the Gulf.

The live sheep export trade caters to two major markets, Saudi Arabia and Emirates, with Saudia Arabia the major market. Heavier animals are demanded in the Saudi Arabian market than in the Emirates (40 kg compared with 50 kg), although the price is about the same per kg in both markets. The sheep must be male and below 12 months of age. Higher prices are obtained from October to March. In 1999, Awassi sheep sold for about US$ 2,500/tonne CIF the Gulf while imported sheep (*bela*) from Bulgaria were about US $ 1,200 to US$ 1,400/tonne CIF Tartus. In an attempt to protect Syria's perceived competitive advantage in the supply of Awassi sheep, only males can be exported.

Indicative prices for export quality sheep are set by the General Establishment for Meat on market information gathered in the Gulf through the Syrian Embassy. The Establishment monitors prices with the objective to ensure price stability, sheep availability for export and to protect producers' interests.

Table 27 Export Awassi Sheep Prices (FOB, Syrian Pounds per kilogram)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Jan.	19.51	33.83	59.72	58.5	67	72	90.33	94	99	99.82	105	102	88.83	80
Feb.	21.84	33.56	63.94	54.5	73.83	72	97.33	97	105.5	102.8	105	103	90	81.5
Mar.	21.23	34.52	74.78	53	75.83	75	105.3	104	107	105.7	103	111	83.34	81.5
April	23.97	40.63	91.68	49	78.5	76	111.1	103.3	105	94.19	108.5	108.5	69.83	91
May	24.17	41.41	81.48	52.2	66	82.5	109	106.5	102	88	105.5	92	71.45	76.5
June	25.26	39.63	67.53	55	64.66	80	85	97.5	99	92.37	100	85.5	75.53	73
July	24.87	40.39	66.33	56	66.33	74	75.66	99	99	89.84	95	78	85.13	68
Aug.	24.59	38.48	63.75	62	64.66	68	78	102	99	89.87	91	83	84.21	66.5
Sep.	24.24	38.18	62.40	61.5	60.66	65	83.33	101	91.75	98.19	91	75	84.55	-
Oct.	23.93	38.18	60	64	61.33	67	85.33	98	89.29	86.92	89	82	81.87	-
Nov.	23.15	83.99	60	66	65.33	77	94.5	95	87.95	98.87	88	83	83.66	-
Dec	28.22	44.64	62	64.5	71	83	97	96.5	89.47	95.22	91	92	87.26	-
Aver	23.74	42.29	67.80	58.00	67.92	74.29	93.23	99.48	97.83	95.15	97.67	91.25	82.14	

Source: General Establishment for Meat, 1999

Trends in the Live Sheep Export Trade. According to a number of major traders, the live sheep export trade has declined by about 50 percent over the last three years. Since 1997, the trade from the Aleppo sheep market, the main market in Syria, has declined from 500 trucks per day to about 20 trucks per week. The overall trend according to both importers and exporters is the export trade is diminishing in value and volume while the import trade is increasing in volume. One of the reasons provided for the fall in the livesheep export trade is that Iraq, which has the largest Awassi flock in the region, has been exporting large numbers of sheep over the last two years, considerably depressing prices for fat-tailed sheep in the Gulf markets. On the other hand, the price of imported sheep has risen as eastern European countries have begun supplying the more lucrative markets in Western Europe.

C. Livestock Trade Policy Reform

Given the dominance of the live sheep trade in the livestock sector, the most significant recent trade reform has been the decision, in 1999, to grant exemptions to the General Organisation for Meat and the National Peasants Association from the "two for one" trade restriction on the import and export of live sheep. These exemptions were granted to relieve the over-supply of sheep onto the local market due to the very severe drought of 1999. Subsequent to exemptions to the export restrictions being granted to the General Organisation for Meat and the National Peasants Association, the price of live sheep import documents, which previously traded at about Syrian Pounds 100/head, fell to Syrian Pounds 50/head, which would be expected to allow Syrian exporters to supply the Gulf market at more competitive prices.

Since the disintegration of the Soviet Union, there has been a growing concern by Syrian authorities about the declining standards of livestock quarantine, disease control and regulation in some of the sheep supplying countries. However, current Syrian quarantine regulations requires that sheep be landed in Syria within 15 days of issuance of pre-shipment certificate of health in the country of origin (Article 41A), which effectively excludes a number of potential supplier countries from entering this market. Countries such as Australia and New Zealand, who have efficient and effective disease control and quarantine systems, would be able to supply good quality disease free sheep to the Syrian market at competitive prices.

The future domestic market for chilled and frozen meat will also pressure the local sheep meat prices. With 80 percent of the local sheep meat market still provided by the national Awassi flock, provision of the remaining 20 percent could be more efficiently procured as chilled meat, thereby also removing a major disease risk to the Syrian livestock industry.

D. International Competitiveness

Trade, health, hygiene and quarantine requirements elsewhere will prevent Syria from accessing most other high value markets for the immediate future. Syria's immediate international markets for livestock and livestock products are therefore limited to those in the region of the Middle East and western Mediterranean. Syria has a comparatively disease-free livestock industry and, although a relatively small livestock producer by global standards, produces large volumes of mutton, beef, poultry and milk compared, (with the exception of Iraq) to its immediate neighbours. Based on a preliminary analysis of limited data, Syria would be competitive in the export of Awassi sheep to the Gulf countries, although that market is changing as the consumption of chilled and frozen meat increases, and the demand for live sheep decreases. Iraq is the major competitor in the Awassi market with Syria and is now able to supply sheep to the Gulf at cheaper prices due to the devalued Iraqi dinar. Australia's exports in chilled mutton to the Middle East have increased by 30 percent since 1996. The volume of live sheep exported by Syria has fluctuated between 1.2 million to under 500,000 during the same period, with only 540,000 sheep exported in 1998.

Syrian poultry producers claim a competitive advantage in the supply of hatching eggs for both layers and broilers. The competitiveness of Syria's poultry meat exports is highly dependent on lowering the transaction costs of imported feeds. Syrian poultry producers also claim a higher productivity in poultry meat over European

levels in addition to having lower labour, electricity and transportation overhead costs.

E. Policy Implications and Its Recommendations

Syria is claimed to be reasonably competitive as a low cost producer of Awassi live sheep, table and hatching eggs, milk, beef and poultry meat compared to its immediate neighbours. While no data was available to assess the level of competitiveness of Syria's livestock sector with that of its neighbours, the volume of unofficial cross border trade in livestock and livestock products from Syria reported in Lebanon would in part support this claim.

Liberalisation of trade, particularly lifting of import restrictions on livestock products, would have a potential major positive impact on livestock producers. As an example, livestock producers pay a considerable premium over global prices for their livestock feed concentrates. Besides improving the profitability of livestock production, liberalisation of the trade in animal feed and lower feed prices would encourage greater intensification of livestock production decreasing the grazing pressure on the Al Badia.

Available data on the live sheep trade is incomplete and inconclusive. Given the importance of this trade to the livestock producers in the Al Badia, the live sheep trade warrants further study to assess the potential impact of liberalising the "two for one" rule and the "fifteen day" rule. It is also necessary to appraise Syria's competitiveness in the live sheep trade to the Gulf in the short to medium term. The official data for the live sheep trade does not reflect actual market prices nor the "two for one" import to export requirements. Active monitoring of the live sheep import and export trade would allow Government to keep producers better informed of market conditions as providing a basis on which to develop better long term strategies for the trade.

6. Livestock Support Services

The profitability of investments in the livestock sector is strongly influenced by the availability and quality of animal health and breeding services and access to improved technologies and credit. Animal health services substantially reduce livestock losses caused by sickness and premature death. Animal breeding services increase the productivity and efficiency of feed resource use. To achieve their full benefits, health and breeding services must be supported by a strong technology generation and dissemination service. Further, access to credit facilitates investments by producers, traders and processors in improved technology, infrastructure and management systems. Availability and access to competitive and open domestic and export markets assists the realisation of profits from these investments.

This chapter reviews the current status of agricultural support services for Syria's livestock sector, particularly veterinary services, animal breeding, research and extension, and livestock credit programmes. The nature and level of government spending on research in the sector is also discussed.

A. Government and the Livestock Sector

Agricultural issues, including animal husbandry, are largely the responsibility of the Ministry of Agriculture and Agrarian Reform (MAAR). The MAAR is responsible for all livestock issues, including livestock production and health, animal development programmes, slaughterhouses, dairy development and collection and dissemination of livestock statistics.

Several institutions under MAAR undertake production, production support and input procurement activities. The General Establishments produce livestock products for the public sector consumption and, in the case of poultry, also for the private sector.

The MAAR is also responsible for education, research, technology development and extension on livestock related activities. These activities are undertaken through a number of institutions and national research centres. Livestock sector education, research and extension is also supported through the University of Damascus and Aleppo Faculties of Agriculture and Veterinary Science. The International Centre for Agricultural Research in Dry Areas (ICARDA) at Aleppo, as part of its international responsibilities, conducts livestock sector research in Syria.

B. Public Spending in the Livestock Sector.

From 1989 to 1998, the MAAR total annual expenditure increased from just over SP 1 billion to 4.4 billion. The share of operational spending going to the livestock sector programmes and activities, excluding allocations to extension and the General Establishments, ranged from 11 to 20 percent over the same period. In 1998, the core livestock sector programmes received SP 272 million or six percent of the operational budget.

MAAR expenditure on the General Establishments of Poultry, Meat, Cattle and Feed rose to over SP 164 million during the middle of the decade before declining to SP 110 million in 1998 as the Establishment organisations increased their level of cost

recovery from their operations. However, MAAR expenditure on the General Establishments with livestock responsibilities accounted for more than 25 percent of the total operational expenditure on livestock related activities (Table **28**).

Table 28 Ministry of Agriculture and Agrarian Reform Expenditure 1987 to 1998 (3 year averages in millions Syrian Pounds)

	1987-1989	1990- 1992	1993 - 1995	1996 - 1998
Operational Expenditure	640	1357	2036	3675
Agricultural Research	20	45	98	153
Agric Extension Development	5	68	75	95
General Establishments	272	378	398	391
Livestock Related Establishments				
GE.Poultry	71	58	55	41
GE.Cattle	29	52	29	19
GE. Feed	14	54	80	50
GE.Fish	8	10	3	5
State Farms	74	86	74	39
Livestock Related Activities				
Livestock Production Research Stations	4	20	38	60
Veterinary Services	22	39	61	67
Local Cows Development	11	24	26	48
Al Badia Wells	14	24	46	67
Syrian Badia Development	23	54	79	104
Al Badia Wells Completion	9	23	37	48
Arab Horses Farm	0	4	42	37
Altanf Project	3	32	71	55

Source: MAAR .

An analysis of the 1998 government expenditure in the livestock sector indicates several points.

Overhead support to the General Establishments, whose activities are mostly of a commercial nature, (such as poultry production, feed production and processing, cattle breeding and dairy production) account for over fifty percent of the budget for livestock development activities (excluding the Al Badia development programmes). Al Badia development is supported through three core programmes which receive more than 50 percent of the total livestock programme budget although the Al Badia accounts for about 15 percent of the livestock production. Livestock research receives 30 percent of the total MAAR research.

C. Livestock Credit Programmes

All banking in Syria is in the public sector and agricultural credit is provided by the Agricultural Cooperative Bank (ACB) under the Ministry of Economics and External Trade. The ACB acts as a public monopoly providing short, medium and long term loans at subsidised interest rates to the private, cooperative and public sectors. The reference interest rate has been steady for several years at 9 percent while lending rates vary with economic, social and banking considerations. Interest rates for

agriculture and livestock vary between 4 and 7.5 percent depending on the borrower (public, cooperative or private) and the length and purpose of the loan.
In 1998, the ACB lent more than SP 10 billion to the agricultural sector which included medium and long terms loans of SP 734 million for livestock related activities (Table 29). Medium to long term credit is provided for the establishment of livestock enterprises including the purchase of genetically improved species. Loans to individuals for livestock production are provided against collateral of either land or personal belongings such as machinery. Loans to sheep producers, who mostly do not own land, is provided through the cooperative sector who act as guarantor for the individual producers. The livestock sector received less than 10 percent of the total agricultural loan portfolio and within the sector, poultry received over half the value of the total loans (Table 30).

With negative real interest rates, credit is the single most important conduit for government subsidies to rainfed agriculture and rainfed livestock production. Most of the loans to the livestock sector are short term for the purchase of feed from the General Establishment for Fodder. These loans are provided as in-kind as stock feed through farmers cooperatives. During the 1998/2000 drought, the major government support to livestock producers was the provision of in-kind loans for feed provided by the ACB. To February 2000, loans totally SP 700 million had been provided to livestock producers for the procurement of livestock feed. Due to the severity of the drought, the government provided a moratorium on loan repayments to ease the financial burden of the impact of the drought on family incomes. A substantial informal credit system operates in parallel to the official ACB credit system, ranging from seasonal advances to sheep producers from the sheep cheese makers (Jabbans) to provision of capital funds inter and intra families for agro-processing investments.

Table 29 Loans provided by the Agricultural Cooperative Bank, Total Loans and Livestock Enterprises 1991-1998 (millions Syrian Pounds)(All mid term loans except those for stores and barns which are long term loans)

	1991	1992	1993	1994	1995	1996	1997	1998
Poultry	250	202	211	285	419	na	na	324
Cattle	50	61	53	83	142	na	na	218
Sheep	362	147	0	80	52	na	na	30
Other animals	38	25	89	53	60	na	na	72
Stores & barns	32	74	113	125	151	na	na	86
Total (all loans)	11681	13318	13537	14380	15440			10156

Source: Agricultural Cooperative Bank

The livestock sector credit consumption has varied between four and seven percent of all medium and long term loans in the agricultural sector during the last decade. The requirement for collateral, compliance requirements of licensing and administrative procedures limits the ability of many livestock producers to access credit. Despite the considerable bureaucratic procedures and detailed loan compliance requirements, an undefined but considerable proportion of loans to the agriculture/livestock sector are considered to have been used for alternative purposes.

A livestock producer can receive credit from the ACB through a number of mechanisms. As a licensed producer of either poultry, milk or beef, the producer becomes entitled to development loans from ACB for the construction and establishment of facilities and equipment. If the producer is a member of the cooperative, he becomes entitled to in-kind loans for the purchase of feeds. Further, in

the case of cattle production, the producer becomes entitled to in-kind loans for feed if he participates in the MAAR herd improvement cross breeding programme. A sheep producer can access loans through either being a member of a cooperative or as an individual by applying through the cooperative movement.

Table 30 Distribution of Loans received by the livestock sector 1991-1998 (percentage of total loans)

	1991	1992	1993	1994	1995	1996	1997	1998
Livestock loans / All agricultural loans								
	6.2	3.8	3.5	4.3	5.3	na	na	7.1
Enterprises loans/Livestock Loans								
Poultry	35	40	46	61	51	na	na	44
Cattle	7	12	11	13	17	na	na	30
Sheep	50	28	0	13	7	na	na	4
Other animals	4	5	19	8	7	na	na	10
Stores and Barns	4	14	24	15	18	na	na	12

Source: Appendix 2 Annex 5 Tables.

For those who are able to access the ACB credit, the cost of credit is well below the "market" rate. For those who are unable to access credit, in most cases, the resource poor, credit is expensive.

D. Animal Health

A network of veterinary clinics provide services to the poultry, cattle and sedentary sheep production industries but no specific services are provided to the transient sheep industry. The supply of animal health services is dominated by the public sector although the private sector has a major input supply role in the poultry industry and to a much lesser extent in the dairy industry.

E. Livestock Research

Public sector livestock research is supported through the MAAR and the Faculties of Animal Husbandry and Veterinarian Science. The budget for livestock production research in 1998 within the MAAR was SP 63 million which was about 30 precent of the total research budget for the Ministry. Most of this expenditure was attributed to staff and administration overhead costs. The budget for the livestock research conducted by the Universities is provided through the Ministry of Higher Education. Livestock research within Syria is uncoordinated within little attention to priority setting based on producer constraints. The private sector, mostly producers, are involved in breeding and nutrition research, particularly in the poultry and cattle industries. For example, leading poultry producers have established international contacts with access to research and technology worldwide.

F. Livestock Extension

Public extension services are under the responsibility of the MAAR through the Directorate of Agricultural Extension, and organised at the Governerate level (muhafazat) through Agricultural Extension Units (800 units nation wide). Each extension unit covers about 8,000 ha of rainfed or 2,000 ha of irrigated agricultural land and most extension units include several livestock oriented engineers. The

government extension services employs over 5000 extension workers of which half are university graduates. The main contribution to livestock extension is in animal health delivered through a network of 300 veterinarians and 1200 veterinarian supervisors, whose major activity is the delivery and supervision of vaccination programmes. Much less extension emphasis occurs on animal production and management issues. In the cropping zones, the extension services have a major responsibility for licensing livestock production facilities, issuing input entitlement certificates (for example for feed or vaccines) to licensed livestock producers, and collecting data for planning purposes.

Within the Al Badia, the Al Badia Directorate of MAAR is responsible for extension to sheep producers. This service has a predominantly animal health focus. Up until recently, *no e*ffective extension services were provided within the Al Badia although the Al Badia communities may benefit/participate in extension activities held in the borders of the Al Badia. A number of extension units are located in the Al Badia which are concerned with the cropping activities of the sedentary farmers in the oases. Recently, the Al Badia Directorate commenced the introduction of more participatory and consultative approaches to extension focusing on the problems and constraints of the sheep producing community. The main activities of the Al Badia Department Animal Production Section are the distribution of rams from breeding cooperatives and providing assistance to production cooperatives.

Budgets for extension, as with all other governerate and district budgets, as allocated on project or programme basis through centrally established planning processes.

Public Sector Planning. Public sector agricultural sector planning is centralised within the national office of MAAR and coordinated through the Department of Planning and Statistics. The Director of Statistics and Planning acts as the secretary to the Supreme Agricultural Council, the peak agricultural planning body in the country. Medium to long term planning is conducted in five-year periods. The Ninth Five-Year Plan commenced in 2000. The MAAR produces both a production and an investment plan. The production plan focuses on the determining and securing of inputs required for agriculture and livestock production (vaccines, medicines, feed) and the issuing permits to the private sector to import any shortfall. The investment plan sets out the required services to be provided by the government. The plans set targets for inputs and production expected from the investment in these services. Targets are established in consultation with the governerate directorates identifying the government inputs to be made, usually established on an per hectare for cropping enterprises or on a per head of livestock entitlement. For example, the major "target" set for the sheep industry is the entitlement for allocation of feed, at a market discount price, which at the time of this study was 20 kg of barley per head of sheep owned.

G. Livestock Insurance

Livestock insurance was recently introduced in 2000 through the Agricultural Chambers which is under written by the Agricultural Cooperative Bank.

H. Policy Issues and Recommendations

Syria's livestock sector's ability to achieve its targeted growth in productivity and output will be greatly influenced by the quality, availability and accessibility of livestock services. Livestock services do not have to be supplied by the public sector. International experience shows that adequate supply of certain livestock services could be still assured if these services were provided by the private sector.

The projected livestock population growth, the increased emphasis on more cross breeding in the cattle industry, vertical integration in the poultry industry, and better health, animal husbandry and nutrition in the sheep industry, coupled with other sectors' competing demands for financial resources, driven by the rate of population growth, will increase budgetary and administrative pressures on the national and governerate-level government livestock services.

A more efficient allocation of resources is critical. Achieving needed objectives will require: (i) redefining public and private roles in the livestock sector; (ii) creating a level playing field, and; (iii) establishing appropriate incentives

Public and Private Sector Roles. The appropriate roles of the public and private sectors in providing livestock services are determined by the economic characteristics of each service. Public involvement is required when market failures exist. There are three categories of services where this applies.

(i) Delivery of public goods. The benefits from these types of services, which include sanitary controls and basic research, are available to the entire community, and it is impossible to restrict use to the individual or group who paid for the service. Because of the free-rider problem, the private sector has no incentive to provide these services. They must, therefore, remain a public responsibility.
(ii) Products or services whose quality cannot be immediately assessed. Also called moral hazard problems, where incentives exist to pass on substandard products such as veterinary drugs, adulterated feeds, vaccines, and semen since the quality cannot be judged at the time of purchase. Public sector regulation is necessary to ensure that products meet established quality and safety standards
(iii) When externalities or spillovers occur because the service is used. Serves such as vaccinating for infectious diseases protect an individual farmer's animals from diseases (private benefits), and at the same time reduce the risk of a disease transferring to other farmers' animals (extra social benefits). Since farmers purchasing the service do not consider these extra social benefits, they tend to use the service less often than is socially optimal. Consequently, the government needs to control or subsidize these services to increase their use by farmers.

A New Perspective for Government Livestock Services. The role of government in the Syrian livestock services sector must be adapted to market realities. The private

sector can efficiently and effectively provide those services classified as private good or toll goods. In the case of private goods, the user can exclusively appropriate the benefits and is thus willing to pay the private fees. Consequently, private suppliers can appropriate the returns for the delivery of the service. Examples include clinical services, artificial insemination, and the production and distribution of veterinarian pharmaceuticals. The private sector can also efficiently delivery toll goods. Toll goods are products or services whose supply does not diminish as a result of one person's use, but access to them can be restricted so that only those who pay for the product or service can enjoy their benefits. An example of a toll good would be a herd milk recording scheme.

Future policies should strengthen the capacity of the government to manage tasks that remain in the public sector, such as research and most agricultural extension activities. Policies should limit public sector involvement in the delivery of private goods and, more importantly, phase out all public sector involvement with these tasks as the private sector becomes more established. In addition, public responsibility does not necessary imply public implementation. Some services, such as vaccinations, food inspection and research, can be subcontracted by the government to the private sector for delivery. The government's role in these activities would be reduced to monitoring and regulation. In some countries, vaccinations and food inspections are subcontracted to private veterinarians, and delivery is regulated through the confirmation of vaccinations and inspection certificates.

Creating a level playing field. Public sector domination of livestock services also constrains private initiatives in commercial functions. To remove these barriers, establishing a level playing field between government and private veterinarians or government and private feed companies for example will be critical. Specifically, clinical care, veterinarian drugs, improved genetic stock and semen, feeds and fodders and artificial insemination services should be provided with full cost recovery. Otherwise, private practitioners are not able to compete against the subsidised public sector. However, because most of the livestock producers, as indicated earlier, are poor small holders, it is recommended to phase-out the public support provided over a short period of about five years in order to avoid having negative impacts.

Establishing appropriate incentives. Public veterinarians are allowed to work in their own clinics outside the normal official hours and can take special leaves that may reach four years. However, the government should cease all interventions in areas where private veterinarians operate subcontract services at the enumerative rates, leasing out existing public sector facilities to prospective veterinarians.

Experience of other countries has shown that farmers are willing to pay for services that are reliable and effective. For full cost recovery to succeed, the delivery of quality and consistent services must be guaranteed. Moreover, a promotional campaign must accompany the program to bolster farmer appreciation of the returns from investing in livestock services.

The extension services to the livestock sector need to focus on the smallholder sector in dairy, beef and sheep production. The poultry sector could be left to its own devices. The continual training of public sector staff in extension techniques, technologies and approaches will be necessary to ensure the effectiveness of these measures.

Table 31 Economic Classification of the Types of Livestock Services - Private and Public Sector Balance

Service	Type of Economic Good		Measures to correct for		Public Sector		Private Sector
	Public	Private	Externality	Moral Hazard	Funding	Provision	Provision
Clinical Interventions							
Diagnosis		X**					YY
Treatment		X**					YY
Preventative and Eradication Services							
Vaccination		X*			Y*	Y*, S	YY
Vector Control		X*				Y*,S	YY
Veterinary Surveillance							
Epidemiology	X				YY	YY,S	Y*
Diagnostic Support		X*			Y*	Y*,S	YY
Quarantine			X		YY	YY	
Drug Quality Control				X	YY	YY,S	
Public Health and Hygiene							
Abattoir inspections				X	YY	YY	
Food Hygiene				X	YY	YY	
Provision of Veterinary Supplies							
Production		X					YY
Distribution		X					YY
Quality control				X	YY	YY	
Production Services							
Semen production		X					YY
Artificial Insemination		X					YY
Importation of Breeding Stock		X			Y		YY
Animal Research							
basic	X				YY	YY,S	Y*
applied	X	X*			Y*	Y*,S	YY
Extension	X	X*			Y*	Y*,S	Y
poultry		X			Y*	S	Y
sheep	X				Y*	Y,S	
dairying	X	X			Y*	Y,S	Y
beef	X	X			Y*	Y,S	Y
Insurance		X					YY
Promotion of exports	X				Y	Y,S	Y

X* - private good with consumption externalities, X** - private good with some consumption externalities only in the case of infectious disease, YY - economically justified, Y* - economically justified in special circumstances, S - delivery can be subcontracted out. Adapted from D.Umali, G.Feder and C. de Hann, 1994 "Animal Health Services: Finding the Balance Between Public and Private Delivery", World Bank Observer, Vol 9 No1, as cited in Indian Livestock Sector Review 1996.

7. Development for Whom?

In Syria, livestock production is predominantly a private process, although the government is involved in the production of poultry meat, eggs and milk through the General Establishments of Poultry and Cattle and in the production improved breeding stock for the sheep, cattle and poultry industries. Syria has a strong functioning private market system. While the regulation of trade in goods and services is, and will remain, a function of Government, production and trade themselves should be in private hands, and the market itself should rule prices. Thus the trade in livestock inputs such as feed, fodder and medicine should become an entirely private sector process.

The production of livestock, just as savings and investment in the livestock sector, responds to market prices and incentives and, in this respect, many of the factors critical to the development of the sector fall outside the sector itself. Broader issues, such as exchange rate arrangements, banking (licensing laws, unofficial sector), property rights (land and water, tenure, foreign investment), general protection policy issues (imports banned or subject to licence) and administrative issues (official and real duty on imports and unofficial cross border trade) impact on the livestock sector.

However, the efficient functioning of the private livestock production and trading system will depend upon both the development of a legal/regulatory framework that facilitates market operations and the level and quality of technical services or inputs which impact upon livestock productivity. In the long term, for example, animal health and management will be a far more critical determinants of the evolution of the size and composition of the national herd and flock than any price and support programmes and, possibly, any subsidised credit schemes. A significant improvement in the utilisation of feed and feed products, whether domestically produced or imported, offers the possibility of accelerated sectoral development without major infusions of capital from outside the sector.

The basic principle of supply of government technical services should be that, to the extent practically possible, they should respond to effective demand, that users should support their cost, and that they should be purchased through the market -- in reflection of three considerations: that private benefits should be privately financed; that the public cost-bearing capacity is ultimately limited; and that market procurement of services maximizes relevance to user needs. In practice, many of the critical improvements in the animal production system can be undertaken by livestock producers within their existing resources, supported by effective applied research, extension and animal health services, while others such as epidemic disease control and meat inspection are not easily provided in an appropriate form under acceptable cost-recovery mechanisms, and must be provided by a public agency. As a consequence, a three-pronged "partnership" approach to service supply is recommended, involving the livestock producing community, private input suppliers and traders and the public sector supply of “social” good services.

The focus of government assistance must be clearly defined: *it should be focused not on animals, but on people*. Within the category of livestock producers, the focus of government support and assistance should be on those livestock producing families with the least resources in terms of livestock numbers, land and other capital assets, rather than the current practice of providing support according to numbers of sheep and land owned by an individual. The value of government assistance to livestock producers will depend upon the extent to which the assistance reflects farmer concerns, hence the emphasis must be placed upon demand led activities. A much greater participation of smaller livestock producers will be required in defining the priorities of public services and the cooperatives, which supposedly represent them, as well as a change in the effective administration of those services. In particular, decentralization of planning and decision-making would help to ensure government livestock development programmes respond to local requirements. The primary interfaces of smaller livestock producers with Government services are the extension services, animal health services and the cooperatives. Effective supply of assistance in livestock production will very much depend upon exploitation of these primary interfaces or, in the case of the existing cooperatives, seeking alternative mechanisms.

8. POLICY RECOMMENDATIONS AND INVESTMENTS FOR THE LIVESTOCK SECTOR

The assessment of the current status of the livestock sector, undertaken by this study, indicates sustained growth of the sector will require policy reform to promotes efficiency, complemented by an investment programme to facilitate the supply response by livestock farmers and investors to emerging opportunities. While the growth of the livestock sector will be predicated on the implementation of reforms which are expected to occur in the general economy such as the liberalisation of external trade, foreign exchange markets and the banking system, the government's livestock policy reforms should, in particular, focus on

- elimination of remaining commercial trade restrictions, including barriers to private sector entry, in the trade of livestock production inputs (particularly feed and feed ingredients) and livestock products
- promoting competition in livestock markets by removing government involvement in price setting mechanisms for livestock inputs and products
- formulating national guidelines to improve the management of the Al Badia
- establishing the legal and regulatory framework to improve the management of the Al Badia and other common property areas
- rationalising the government's delivery of agricultural support services (extension, research, animal health and breeding services) to focus on the delivery of public goods and the needs and requirements of the resource poor livestock producers

Investment programmes would improve the capacity of farmers, private traders, private input suppliers, processors and providers of support services to respond to emerging opportunities as the government implements its policy reforms.

The investment programmes should focus on:

- institutional reform of government support services to establish clearer definition of public and private responsibilities and to promote alternative service delivery systems for animal health and breeding and livestock extension with an emphasis on the private sector and user group involvement
- establishing and promoting a national drought management policy with a focus on community self help, the poorer sections of the livestock owning community and early warning systems
- improving collection and dissemination of livestock production and marketing information to assist in the development and monitoring of livestock sector policies and development strategies

  livestock research and extension addressing the problems of smaller producers and their production systems, particularly in the nutrition and husbandry of their livestock

APPENDIX 1

TECHNICAL ASSISTANCE AND INVESTMENT PROJECT PROFILES

Technical Assistance Project Profiles

A number of areas have been identified for further study to define the scope and scale of policy reforms needed in the livestock sector

1. Development of a Long Term National Drought Policy

The recent drought, the most severe in forty years, provides experience onto which to build a national drought policy. The development of a national drought policy which, in dryland agriculture, recognises the need for livestock producers to take responsibility, except in the event of extreme occurrences, for the management of their risk of the incidence of below average seasonal rainfall. Shifting the responsibility for drought management to the producer will ensure better resource allocation decisions by the livestock producer while freeing the resources of government to address the welfare requirements of the poorer livestock producer families in periods of below average rainfall. Technical assistance is required to review and assess the approaches and strategies applied to the management of the recent drought.

The output of such technical assistance would be a comprehensive, cohesive and nationally applicable set of principles and policy objectives to deal with droughts. This technical assistance would be a precursor to the preparation of an investment programme for the development of drought management strategies such as early warning systems, public awareness programmes and drought management training for livestock producers

2. Strengthening Gathering of Livestock Sector Statistics for Policy Formulation

Development of effective livestock policies within a changing national and international economic environment will require accurate and relevant information on the livestock sector. Information on socio-economic status of livestock producers, supply and demand of livestock products for policy formulation and trader use is poor and often not available in timely manner.

Available livestock information needs to be strengthened in the areas of socio-economic data on livestock producers, markets of livestock products, market transaction costs, and imports and exports of livestock and livestock products. Technical assistance is required to work with MAAR and other government agencies to prepare an investment project for the establishment of a more comprehensive livestock information system which covers both production and marketing.

Improved production and market information collection and dissemination systems including the use of mass media would assist formulation and monitoring of livestock sector policies and livestock sector development strategies, particularly the impact on the poorer livestock producers. Better marketing information would also contribute to the reduction of marketing costs.

3. Liberalising the Livestock Feed Trade

Syrian livestock producers pay above world prices for feed for their animals due to indirect trade restrictions and high transaction costs within the country. The General Establishment of Fodder plays a significant role in the trade, storage and distribution of livestock feed and feed products through either regulation or direct involvement in feed businesses. Technical assistance is required to review the role and activities of the General Establishment of Fodder. The output of this assistance would be recommendations on how the responsibilities of the General Establishment of Fodder are to be realigned with feed market requirements to realise potential efficiency gains in the livestock feed industry.

4. Live Sheep Import and Export Policy

Live sheep are the most significant traded commodity in the Syrian livestock sector. The importation of live sheep for the domestic market makes an important contribution to the supply of sheep meat to the domestic market. The export of live sheep to the Gulf is a significant income earner for the livestock sector and direct influences the prices of domestically produced sheep. The short and medium trends of the import and export trade need further investigation as the demand and supply situation changes in both Eastern Europe, the Gulf and in competing supplier nations. Technical assistance would define the existing market, identify short medium and long term trends, assess the impact on market efficiency of existing trade regulations, such as the "two for one" and "fifteen day" rules, and make recommendations on reform needed to improve market efficiency.

Investment Project Profiles

1. Institutional Reform of Government Livestock Support Services

An efficient livestock sector will require Government Livestock Support Services which complement the activities of the private sector through the provision of public good services such as sanitary control, production quality control, quarantine operations, and focused public livestock research and extension. Government Livestock Services would also progressively withdraw from private sector responsibilities.

Investment in institutional reform of government support services is needed to establish clearer definition of public and private responsibilities and to promote alternative delivery systems for animal health and breeding, production inputs, and livestock research and extension.

Key issues which need to be addressed in the delivery of government support services include:

- subsidization of public veterinary sector services acts as a barrier to private entry
- the public sector continues to maintain production and breeding stations which only crowd out private sector involvement

- the quality and quantity of supply of livestock production inputs (feed, feed ingredients, medicines and vaccines) is erratic and often untimely, constraining improvements in efficiency and profitability of production

Key steps which need to be undertaken include:

- creating a level playing field by instituting full cost recovery for services where private participation should be promoted
- creating appropriate incentives, such as leasing government facilities, opening private subcontracting opportunities and flexible civil service arrangements
- existing government veterinary services need to shift to a more extension development focus after appropriate training
- introduce full cost recovery of artificial insemination services to create a level playing field with the private sector
- withdrawal of government service responsibilities for input supply
- enhancing the role of government services in monitoring and enforcement of the quality of livestock production inputs
- strengthening the administration and enforcement of livestock public health and hygiene services

Investment is required in training, skilling and equipping of government livestock support services staff so they are better able to change current practises and be more capable of fulfilling their roles under the policy reforms. Government facilities and resources in product quality control, quarantine, public health and hygiene, and epidemiology will need to be upgraded to enable the government services to better execute their increased and better defined responsibilities in delivery of public good support services.

The expected impact of this investment would be:

- increased availability and quality of veterinary services
- reduced losses due to disease
- enhanced adoption of improved breeds
- increased public sector effectiveness in providing public services such as disease surveillance and disease control
- reduced costs to the government of service delivery
- improved availability and ensured quality of livestock production inputs
- ensured quality of livestock products to consumers

Monitoring would be required of the potential impact of any full cost recovery for livestock support services on access by the poorer livestock producers.

2. Livestock Research and Extension

Public research and extension activities suffer from a lack of client focus, especially for the smaller livestock producers, inadequate funding and insufficient well trained and skilled staff. Public livestock research and extension needs to focus more on sustainable small producer production systems. New and alternative extension delivery methods, with greater producer and result orientation, need to be explored and tested to improve extension delivery. Existing technologies, available both within Syria and internationally, need to be tested and adapted to the circumstances of the

small producer. Improved uptake of productivity enhancing technologies, particularly in the nutritional management of livestock, would increase the efficiency and profitability of production of all classes of livestock.

As livestock numbers and production increase, crop products and crop residues are making an increasing proportional contribution to the total feed resource for the livestock sector. Crop production is also increasing through additional inputs, changing crop rotation practises, use of new varieties, production of different crops, and better management and husbandry of land and water resources. Opportunity exists for much greater integration of smallholder livestock and crop production enterprises. As crop production output increases, livestock production and productivity can also increase through improving the utilisation of crop products, by products and residues.

Realisation of this potential to improve the efficiency of integration of livestock and crop production will require multi-disciplinary approaches to applied research and extension with active participation of crop producers and livestock producers. Improving the utilisation of crop residues could contribute significantly to increasing the incomes of some of the 40 percent of rural farming families who are assessed to be below the poverty line. Research should be reoriented to focus on smallholder farming systems management, feed utilisation and "available" livestock nutrition technology.

The key issues to be addressed include:

- shortage of trained and skilled research and extension staff with a knowledge of and access to current research and extension approaches and methodologies
- inadequate understanding of participatory research and extension processes
- limited access to national and international livestock research and technology
- linkages between producers, agribusiness, researchers and extension services

Key steps to address these issues include:

- increased emphasis on education, training and skill building of research and extension staff
- change of focus of current research to the problems of small producers and the sustainability of their production systems
- promotion of integration of extension and research between producers and feed

Investment is required in staff training and education, improving and upgrading of research facilities and equipment, better resourced extension services, and in more cooperative research and extension programmes involving small producers. These investments would increase the availability of improved technologies appropriate for smallholder production systems and would improve the uptake of productivity enhancing technologies. Investment in the government research and extension services would also improve the competitiveness of domestic livestock production relative to imports.

APPENDIX 2

STATISTICAL ANNEXES

ANNEX 1 - DEMOGRAPHICS, ECONOMY, LIVESTOCK SECTOR

ANNEX 2 - LIVESTOCK PRODUCTION

ANNEX 3 - FEED AND FODDER

ANNEX 4 - IMPORTS AND EXPORTS

ANNEX 5 - LIVESTOCK SUPPORT SERVICES

ANNEX 1

Annex 1 Table 32 Percentage of Governerate's Inhabitants and Annual Growth Rate According to 1970, 1981 and 1995 Censuses

Description	Annual Growth Rate Per 000		% of Govermerate Inhabitants to Total Population		
	1970-1981	1981-1994	1970	1981	1994
Damascus	26.3	18	13.4	12.3	10.1
Rural Damas.	36.2	45.9	9.9	10.1	12
Aleppo	33	36.1	21	20.7	21.6
Homs	37.2	31.6	8.8	9	8.8
Hama	33.2	23.6	8.1	8.2	8
Lattakia	32.7	43.6	6.2	6.1	5.4
Deir Ezzor	31	34.8	4.6	4.5	5.2
Idlib	38.4	33.1	6.1	6.4	6.6
Al Hassakeh	33.2	35.9	7.4	7.4	7.4
Al Raqqa	33.1	23	3.8	3.9	4
Al Sweida'	32.9	40.3	2.2	2.2	1.9
Dara	41.5	21.9	3.7	4	4.4
Tartous	35.6	48.8	4.5	4.9	4.3
Kuneitera	43.4	33	0.3	0.3	0.3
Total	33.5	33	100	100	100

Note: compound interest equation has been used in calculating growth rates

Annex 1 Table 33 Population Structure During the Period 1985-1998 (000)

age groups	1985			1990			1995			1996			1997			1998		
	Male	female	total	male	female	total	male	female	total	male	female	total	male	female	total	male	female	total
less than 1	194	182	376	228	214	442	209	196	405	219	202	421	224	207	431	239	213	452
1- 4	802	760	1562	947	214	1161	863	832	1695	902	852	1754	934	878	1812	956	908	1864
5-9	907	845	1752	1069	895	1964	1108	1070	2178	1155	1097	2252	1189	1128	2317	1227	1168	2395
10-4	719	651	1370	848	999	1847	1050	1014	2064	1092	1034	2126	1128	1069	2197	1163	1106	2269
15-19	498	482	980	587	768	1355	827	811	1638	864	832	1696	896	863	1759	924	893	1817
20-24	388	363	751	458	570	1028	640	650	1290	670	660	1330	695	679	1374	717	702	1419
25-29	273	300	573	323	428	751	540	537	1077	559	549	1108	579	568	1147	597	588	1185
30 –34	253	273	526	297	353	650	439	440	879	453	446	899	472	465	937	494	481	975
35-39	257	259	516	303	323	626	338	336	674	352	340	692	363	354	717	374	366	740
40-44	225	204	429	265	307	572	280	266	546	288	272	560	293	280	573	303	290	593
45-49	174	158	332	203	242	445	209	196	405	214	202	416	224	207	431	231	214	445
50-54	127	122	249	151	187	338	173	175	348	180	181	361	185	184	369	191	191	382
55-59	100	92	192	119	144	263	144	133	277	143	137	280	147	140	287	151	145	296
60-64	103	107	210	121	107	228	144	140	284	151	141	292	154	148	302	159	153	312
more than 65	224	225	449	270	262	532	230	196	426	235	197	432	240	207	447	239	214	453
Total	5244	5023	10267	6189	6013	12202	7194	6992	14186	7477	7142	14619	7723	7377	15100	7965	7632	15597

Source: Annual Statistical Abstract, Central Bureau of Statistics
** not including Syrians Abroad*

Annex 1 Table 34 Population, Labor Force, and Manpower by Gender

Years	Employed								Unemployed						total
	Urban			urban female labor force percentage	Rural			rural female labor force percentage	Urban			Rural			
	male	Female	total		male	female	total		male	female	total	male	female	total	
1978	813	106	919	11.5	856	159	1015	15.7	39	4	43	40	7	47	2024
1983	943	122	1065	11.5	943	238	1181	20.2	34	3	37	31	9	40	2323
1984	1138	133	1271	10.5	808	167	975	17.1	51	7	58	32	20	52	2356
1989	1307	171	1478	11.6	1146	273	1419	19.2	77	21	98	56	27	83	3078
1991	1459	186	1645	11.3	1251	354	1605	22.1	92	50	142	56	38	94	3486

Population estimates in this table are derived from the population sample results
Source: Statistical Abstract, Central Bureau of Statistics

Annex 1 Table 35 Population Distribution by Gender, Urban and Rural

Year	urban			rural			Total			%
	Male	female	total	male	female	total	male	Female	total	
1970	1418	1323	2741	1815	1749	3564	3233	3072	6305	56.53
1981	2199.5	2057	4256.5	2422	2367.3	4789.3	4621.5	4424.3	9045.8	52.95
1981	2199.5	2057	4256.5	2422	2367.3	4789.3	4621.5	4424.3	9045.8	52.95
1989	3025	2830	5855	2961	2903	5864	5986	5733	11719	50.04
1990	3146	2941	6087	3043	2986	6029	6189	5927	12116	49.76
1991	3274	3061	6335	3126	3068	6194	6400	6129	12529	49.44
1992	3408	3186	6594	3212	3152	6364	6620	6338	12958	49.11
1993	3547	3268	6815	3295	3283	6578	6842	6551	13393	49.12
1994	3702	3410	7112	3369	3363	6732	7071	6773	13844	48.63

Source: Statistical Abstract, Central Bureau of Statistics

Annex 1 Table 36 Population, Total, Agricultural and Livestock Labor Force

Source	Description	Population	Total labor force	Percentage of labor force to total population	Total agr. Labor force	Percentage of agricultural labor force to total labor force	Percentage of agricultural labor force to total population	Livestock labor force	Percentage of livestock labor force to total labor force	Percentage of livestock labor force to total population
CBS, 90 page 77	1984	9934	2246	22.61	571	25.42	5.748	1.811	32	0.0182
	1991	12529	3486	27.82	924	26.51	7.375	2.743	37	0.0219
Arab Organization	1994	13844	3997	28.87	1300	32.52	9.390	2.808	30	0.0203
	1995	14153	4237	29.94	1284	30.30	9.072	2.758	30	0.0195
	1996	14619	4165	28.49	1341	32.20	9.173	2.578	28	0.0176
Growth rate Estimates	1997	15100	4581	30.34	1340	29.25	8.874	2.831	32	0.0187
	1998	15597	4750.50	30.46	1384.22	29.14	8.875	3.328	38	0.0213

Source: Central Bureau of Statistics, Statistical Abstract, 1990

Arab Organization

Growth rate Estimates

Annex 1 Table 37 Distribution of Labor Force by Economic Activity and Gender for 1984/1991

Description	1984			1991		
	male	female	total	male	female	total
Agriculture, fish, forests	428954	142449	571403	630224	294050	924274
Mining	17364	300	17664	6852	0	6852
Manufacturing industries	301763	34932	336695	430361	35898	466259
energy, gas, water	18168	1104	19272	8067	766	8833
building & construction	361794	4817	366611	344186	6436	350622
Domestic & foreign trade	243437	9434	252871	374580	10345	384925
Transportation & storage	122572	5118	127690	161572	8607	170179
finance, insurance, real estates	13048	4215	17263	20578	4475	25053
Social & personal services	438491	97977	536468	776467	187455	963922
Total	1945591	300346	2245937	2752887	548032	3300919

Source: Central Bureau of Statistics, Statistical Abstract

Annex 1 Table 38 Percentage distribution of labor force by age and sex 1998 (urban -rural)

Age groups	Urban			Rural			Total		
	Males	Females	Total	Males	Females	Total	Males	Females	Total
(10-14)	2.4	1	2.2	2.3	6.4	3.2	4.7	7.4	2.7
(15-19)	13	6.7	12	15	21	16	28	28	14
(20-24)	16	17	16	14	20	15	30	37	16
(25-29)	14	22	15	15	15	15	29	36	15
(30-34)	13	18	14	13	12	12	26	30	13
(35-39)	11	15	11	11	7.9	10	22	23	11
(40-44)	9.1	9.5	9.1	8.2	6.3	7.8	17	16	8.5
(45_49)	7	5.2	6.7	6.5	4.5	6	14	9.7	6.4
(50-54)	5.6	3.6	5.4	5.3	4	5.1	11	7.6	5.2
(55_59)	3.6	1.2	3.2	3.6	1.8	3.2	7.2	3	3.2
(60-64)	2.6	0.8	2.4	2.9	1.3	2.6	5.5	2.1	2.5
More than 65	2.6	0.2	2.2	3.6	1	3	6.2	1.2	2.7
TOTAL	100	100	100	100	100	100	100	100	100

Source: Central Bureau of Statistics, Statistical Abstract

Annex 1 Table 39 Food Budget in Syria

Description		total	plant	animal	milk	fish
1992-1 995	Daily calorie	2853	2552	301	195	
	Daily protein (gr.)	78.6	61.2	17.4	9	
	Daily fat (gr.)	73.9	53.3	20.6		
1994-1997	Daily calorie	3036	2713	323	203	28
	Daily protein (gr.)	82.2	62	20.2	11.1	2.7
	Daily fat (gr.)	85	61.4	23.6		

Source: Agricultural Economics Dept., MAAR

Annex 1 Table 40 Development of Food Commodity Balance and Per capita Share

		1985	1990	1991	1992	1993	1994	1995	1996	1997	1998	
Population (000)		10276	12202	12529	12958	13393	13844	14186	15100	15597	16110	
Milk 000 ton	Production	1116	1331	1370	1351	1244	1226	1414	1508	1610	1780.2	
	Import	0	0	0	0	0	0	0	0.256	0.047	0	
	Export	0	0		0	0	0	0.07	0	0.018	0.008	
	T. supply	1116	1331	1370	1351	1244	1226	1413.9	1508.3	1610	1780.2	
Per capita share kg/year			**108.6**	**109.1**	**109.3**	**104.3**	**92.9**	**88.6**	**99.7**	**99.9**	**103.2**	**110.5**
Eggs Mil.	Production	1529	1519	1611	1981	2028	2049	2060	2229	2273	2228	
	Import	1	18	0	1.2	0.042	2	0	0.1	0.58	0	
	Export	0	84	73	17.6	96.1	75	25	47.1	74	75	
	T. supply	1530	1453	1538	1964.6	1932	1976	2035	2182	2200	2153	
Per capita share egg/year			**148.89**	**119.08**	**122.76**	**151.61**	**144.25**	**142.73**	**143.45**	**144.5**	**141.03**	**133.64**
Poultry Meat 000 tons	Production	80	47	60	61	83	77	75	85	82	93	
	Import	0	0	0	0	0	0	0	0	0	0	
	Export	0	0.767	0	1	0.2	0.1	0	0.07	0.015	0	
	T. supply	80	46.233	60	60	82.8	76.9	75	84.93	81.985	93	
Per capita share kg/year			**7.79**	**3.79**	**4.79**	**4.63**	**6.18**	**5.55**	**5.29**	**5.62**	**5.26**	**5.77**
Fish 000 tons	Production	5.8	6	6	6	9	9	10	11	12	11.8	
	Import	0	0.007	0	0	0.08	0.1	0.01	0.01	0.017	0.013	
	Export	0	0	0	0	0.008	0	0	0	0	0	
	T. supply	5.8	6.007	6	6	9.072	9.1	10.01	11.01	12.017	11.813	
Per capita share kg/year			**0.56**	**0.49**	**0.48**	**0.46**	**0.68**	**0.66**	**0.71**	**0.73**	**0.77**	**0.73**
Cattle beef 000 tons	Production	29.2	32.3	32.6	28.6	28.6	30.5	33.8	40	41.8	43.4	
	Import	0.22	1.2	1	2.4	1.45	3.8	0.4	1.24	0.4	0.06	
	Export	0	0	0	0	0	0	0.17	0.05	0.05	0	
	Supply	29.4	33.5	33.6	31	30.1	34.3	34.1	41.2	42.2	43.5	
Per capita share kg/year			**2.9**	**2.7**	**2.7**	**2.4**	**2.2**	**2.5**	**2.4**	**2.7**	**2.7**	**2.7**
Mutton 000 tons	Production	86.1	114	124	113	92.1	120	131	143	148	154	
	Import	10.2	1.44	20	32.4	42.3	35.1	19.6	21.9	15.2	7.31	
	Export	3.02	14.5	21.4	21.1	18.8	14.5	16.2	9.43	8.12	12.3	
	Supply	93.3	101	123	124	116	141	134	155	155	149	

Per capita share kg/year		**9.1**	**8.25**	**9.81**	**9.59**	**8.63**	**10.17**	**9.45**	**10.29**	**9.97**	**9.26**
Goat meat 000 tons	Production	6.4	5.98	4.82	4.65	5.9	5.36	5.84	7.38	5.37	5.89
	Import	0	0	0	0.02	0.09	0	0	0.04	0	0
	Export	0.9	3.53	0.72	1.55	2.38	2.95	0.99	1.17	0.59	0.36
	Supply	5.5	2.45	4.1	3.12	3.61	2.4	4.85	6.24	4.78	5.53
Per capita share kg/year		**0.5**	**0.20**	**0.33**	**0.24**	**0.27**	**0.17**	**0.34**	**0.41**	**0.31**	**0.34**
Total animal meat	Production	121.7	152	162	146	127	156	170	190	196	204
	Import	10.4	2.64	21	34.8	43.9	38.9	20	23.1	15.6	7.37
	Export	3.9	18.1	22.1	22.7	21.2	17.5	17.4	10.7	8.76	12.7
	Supply	128.2	137	161	158	149	177	173	203	202	198
Per capita share kg/year		**12.5**	**11.20**	**12.82**	**12.23**	**11.15**	**12.82**	**12.19**	**13.43**	**12.97**	**12.30**

Source: Agricultural Statistical Abstract, MAAR

Annex 1 Table 41 Average Livestock Share of GDP at market prices (1996-1998) (million SP)

	Total	Agr. Sector	Agr. Share of total	livestock sector	% to Agriculture	% to the total
G D P	1307211	307823	23.55	129901	42.20	9.94
Labor forces 000	4498	1355	30.12	441	0.33	9.80
Export	40319	8238	20.43	848	10.29	2.10
Import	47263	3004	6.36	856	28.50	1.81

Source : Central Bureau of Statistics

Annex 1 Table 42 Development of Area and Production of Some Vegetable Crops and Growth Rates for 1980-1998

	Area (000 ha.)		Production (000 ton)		growth rate 1980-1998	
	1980	1998	1980	1998	surface	production
Wheat	1450	1721	2238	4111.6	2.44	4.96
Lentils	85	142.6	83	154.1	-0.13	0.43
Broad Beans	7.3	7.8	13.5	15.7	3.47	3.96
Chick Peas	91.4	108	73.4	84.6	-1.21	-1.35

Source : Central Bureau of Statistics

ANNEX 2

Annex 2 Table 43 Table Milk Average Growth Development (number and yield) 1980-1998 – No. 000 heads, production 000 ton, yield: kg/year

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Average 1980-1998	growth rate 1989-1980	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average 1990 - 1998	Growth rate 1990-1998
Local cow production	214.1	190.8	152.1	147.0	142.9	133.5	117.7	80.7	86.3	76.5	134.2	-10.8	74.8	63.8	58.1	61.3	65.1	61.7	61.7	55.9	48.1	61.2	-5.36
No. Of local milky cow	267.8	246.4	208.1	194.7	181.9	147.0	124.0	100.8	112.0	110.5	169.3	-9.4	96.5	75.0	77.6	72.8	75.3	101.0	80.7	67.0	65.5	79	-4.72
Annual production of local cattle (Kg.)	799.3	774.5	730.9	754.7	785.7	908.5	949.3	801.1	770.5	692.7	796.7	-1.6	774.9	851.2	749.2	842.3	864.6	610.5	765.5	834.6	734.3	781	-0.67
Developed cow production	0.0	0.0	0.0	0.0	0.0	0.0	0.0	148	222	251	207.2	30.0	245.6	316.2	321.7	367.9	362.0	451.0	514.6	558.2	703.5	427	14.06
Local improved cattle	0	0	0	0	0	0	0	72	101	112	95.1	24.5	114.3	139.0	141.1	161.5	141.3	169.2	199.3	218.6	284.3	174	12.07
Annual production of improved cattle (kg.)	0	0	0	0	0	0	0	2050	2211	2234	2165.0	4.4	2149.1	2274.7	2279.7	2277.6	2561.1	2664.9	2581.9	2553.2	2474.8	2424	1.78
Sheep production	346	447	446	512	353	419	420	457	506	439	434.4	2.7	497.1	513.2	512.1	436.7	395.4	453.8	498.7	523.8	581.9	490	1.99
No. Of milking sheep	5874	6385	7007	8292	7811	7144	6950	7624	8403	8323	7381.2	3.9	8927.7	9498.5	9274.7	6396.2	7144.3	7819.9	8506.6	8980.4	10074.4	8514	1.52
Annual production of sheep (kg.)	59	70	64	62	45	59	60	60	60	53	59.1	-1.2	55.7	54.0	55.2	68.3	55.3	58.0	58.6	58.3	57.8	57.9	0.46
Goat production	70.1	78.5	85.8	82.3	73.3	74.7	71.6	66.9	68.4	59.6	73.1	-1.8	62.8	57.6	62.2	43.3	66.6	70.9	74.8	76.8	78.7	66	2.86
No. Of milk Goats	710	707	764	720	685	698	655	666	676	645	692.6	-1.1	658.6	634.3	624.3	687.2	704.0	724.4	745.4	754.0	770.4	700	1.98

Annual production of goat per kg.	98.7	111.1	112.3	114.3	107.0	107.0	109.3	100.5	101.2	92.4	105.4	-0.7	95.4	90.8	99.6	63.0	94.6	97.9	100.3	101.9	102.2	94	0.86

Annex 2 Table 44 Meat Average Growth Development (number and yield) 1980-1998 – No. 000 heads, production 000 ton, yield: kg/year

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	Average 1980 to 1998	Growth rate 1980 to 1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	Average 1990 to 1998	Growth rate 1990 to 1998
Beef production	26	33	36	34	29	29	30	23	30	30	30.0	1.7	32	33	29	29	31	34	40	42	43	35	3.76
No. Of dairy cattle	368	386	373	336	330	332	304	285	336	351	340.2	-0.5	331	333	329	316	304	367	375	390	448	355	3.87
Cattle production kg/year	71	84	97	100	87	88	99	82	89	87	88.4	2.2	98	98	87	90	100	92	107	107	97	97	-0.11
Sheep production	81	84	96	111	127	86	90	98	107	113	105.9	7.6	114	124	113	92	120	131	143	148	154	127	3.87
No. Of milk sheep	5874	6385	7007	8291	7811	7144	6950	7624	8403	8323	8116.6	4.5	8927.7	9498.5	9274.5	6396.2	7144.3	7819.9	8506.6	8980	10074	8514	1.52
Sheep production kg./ Year	14	13	14	13	16	12	13	13	13	14	13.0	3.0	13	13	12	14	17	17	17	17	15	15	2.31
Goat Meat production	7	6	7	9	8	6	6	5	5	6	6.5	-0.5	6	5	5	6	5	6	7	5	6	5.69	-0.21
No. Of milky goat	710	707	764	720	684	698	655	666	676	645	692.6	-1.1	659	634	624	687	704	724	745	754	770	700	1.98
Goat meat production	9	9	9	13	11	9	8	8	8	10	9.4	0.5	9	8	8	9	7	8	9	7	8	8	-1.94