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Comparative Advantages of Live Sheep Meat

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Foreword

The Syrian economy has been facing challenges dictated by the new global transformations (global economy, WTO, global technology and investment, the Syrian negotiation with the EU association, and GAFTA). Therefore, the Syrian Government seeks to grasp these transformations and adapt to them in order to increase its benefit from them and limit their negative impacts through the policy adjustment programs that applied to all sectors of the economy.

Based on the above, Syria's socio-economic policies have been pursuing the development of the whole agricultural sector in both crops and livestock branches (to guarantee improvement in the agricultural output that balance the population growth and the scarcity of natural resources), and more attention is also being placed on trade liberalization aiming at increasing export orientation. In this context, the concept of comparative advantage has emerged in Syrian agricultural policy.

A comparative advantages analysis aims to discern if a country has to produce a good with its own domestic resources (labor, capital, land) to supply the national market, and possibly to export, or to import the good and to reallocate saved domestic resources, which are limited by assumption to the production of another good enjoying comparative advantage.

In 2004, the National Agricultural Policy Centre (NAPC), with the assistance of the FAO and the Government of Italy, has carried out, a systematic review of the comparative advantage of selected agricultural commodities (cotton, wheat, olive, tomato, orange, beef and cow milk) which is published in the "*NAPC web1*". To further expand of this type of analysis, a new comparative advantage study of the new selected commodities (Sheep meat, Pistachio, and Potato) has been conducted, in order to provide the necessary information base for decision making.

This report presents the results for sheep, while the results for the other commodities have been published in separate similar commodity reports that are available from the NAPC. A working paper has been produced putting into perspective the status of each commodity and where the methodology applied is presented in details. The sheep farming plays a crucial role in the Syrian economy due to the following:

1. supply of animal protein for the local consumption,
2. provision of employment opportunities,
3. increase farm income especially in Al-Badia (the Syrian Steppe)
4. Contribution of foreign currency earning as an exported product.

The paper is composed of five chapters; chapter 1 reviews the applied policies on sheep sector with regard to the whole system - including breeding, fattening, marketing activities and their impacts on local and international markets. Also, it presents the position of sheep in Syrian agricultural and trade sectors in particular, and their regional and international counterparts. Chapter 2 presents the geographical distribution of sheep in Syria and describes the live sheep meat commodity chain from the primary production to final consumption to determine the internal relationships among the agents. Chapter 3 provides the reader with source of information and methodology of data gathering in addition it presents the individual budgets for each agent involved in production up to the final consumption, distinguishing within each cost category between tradable goods and domestic factors (labor and capital). Chapter 4 and 5 are devoted to the investigation of the economics and performance of the sheep sector through the "Policy Analysis Matrix" (PAM) in order to assist policy makers to formulate relevant

¹ www.napcsyr.org

policies required to facilitate the adjustment of the sheep sector in particular and agricultural sector in general.

Table of contents

<i>Executive Summary</i>	1
<i>Terminology</i>	3
Introduction	5
1.1 Applied policies	5
1.2 Importance of Syrian sheep sector	7
<i>Awassi Strain</i>	8
1.2.1 <i>Annual domestic production and fattening</i>	8
1.2.1.1 <i>Improvement of Sheep(meat & milk) production</i>	9
1.2.2 <i>Syrian Live Sheep Trade</i>	10
1.2.3 <i>Sheep Trade in the Arab Countries</i>	11
1.2.4 <i>Global Live Sheep Meat Trade</i>	13
1.2.5 <i>The main markets of live sheep:</i>	14
1.3 objectives of the study	14
<i>Chapter 2 - The Description of the Commodity System</i>	17
2.1 Geographical distribution of sheep in Syria	17
2.2 The state of sheep fattening in Syria	17
2.3 The commodity chain of concentrated fattening of Awassi sheep	17
2.4 Procedure for sheep export	19
<i>Chapter 3- Agents' Characteristics</i>	21
3.1 Information sources	21
3.2 The fattening system	21
3.3 Breeder budget	22
3.1.1 <i>Fixed costs</i>	22
3.1.2 <i>Flock composition according to technical coefficient</i>	22
3.1.3 <i>Direct labor</i>	23
3.1.4 <i>Intermediate Input:</i>	23
3.4 Fattener Budget:	25
3.5 Exporter Budget:	26
<i>Chapter 4 Comparative Advantage of Awassi Sheep Meat</i>	29
4.1 Policy Analysis Matrix	29
4.2 Macro economic environment	30
4.3 Parity prices	30
4.4 PAM of live sheep meat	31
4.5 The main Indicators	32
4.6 Break even point	33
4.7 Sensitivity Analysis	34
<i>Chapter5-Outcomesand Recommendations</i>	37
5.1 Outcome:	37
5.2 Recommendations:	37
5.3 Export Recommendations:	37
<i>Annex</i>	41

Executive Summary

The Syrian economy has been facing challenges dictated by new global transformations: globalization, the WTO, global technology and investment, the Syrian negotiations with the EU concerning an association agreement, and the GAFTA. Consequently, the Syrian Government seeks to comprehensively assess these transformations and adapt to them in order to increase its benefit from them and limit their negative impacts. This is done through the policy adjustment programs that apply to all sectors of the economy.

Based on the above, Syria's socio-economic policies have been pursuing the development of the whole agricultural sector in both the crop and the livestock sector to guarantee improvement in the agricultural output that balance the population growth and the scarcity of natural resources. More attention is also being placed on trade liberalization aiming at increasing export orientation. In this context, the concept of comparative advantage has emerged in Syrian agricultural policy.

A comparative advantages analysis aims to discern if a country has to produce a good with its own domestic resources (labor, capital, land) to supply the national market, and possibly to export, or to import the good and to reallocate saved domestic resources, which could be redirected towards the production of another good enjoying a comparative advantage.

Syria is famous for Awassi sheep rearing, which is mostly concentrated in Al-Badia (Syrian Steppe). Furthermore, the importance of Syrian sheep meat results from its position as the primary source of red meat for human consumption in Syria, with a share of 75%, and as export-oriented commodity with a share of 16.1% of the total agricultural exports value (2005). Therefore, sheep rearing has a fundamental role to play by supplying local and foreign markets. To this end, a comparative advantage study for sheep meat has been conducted.

To obtain the necessary estimates of private and social profitability, breeder, fattener and exporter budgets data are needed. Both primary and secondary sources have been used. The primary data has been obtained from field surveys in three districts: Al-Badia, Aleppo, and Hama. Data has been collected through interviews and structured questionnaires. The respondents were 3 breeders, 16 fatteners, 8 exporters and 1 transitor, this data was then used in coordination with the official data of the MAAR and the trade ministry (secondary data).

A representative system was developed, based on the common type of fattener in terms of scale and feed. Lamb fattening operation varies in size, from small-scale with less than 100 heads to large scale with more than 100 heads. The study neglects the small scale because such holders have limited capital and the revenue of their livestock activities their main source of income and their production either goes only to local markets or operates in partnership with a large scale producer. Furthermore, research focused on the fattened system that relies on the concentrated feed which is the most common and stable system. The targeted market of such holders is Saudi Arabia, in particular, and Gulf countries in general. It is also worth considering that local and regional consumers prefer live sheep especially in religious festivals.

The budget of the entire system is constructed through a combination of individual budgets prepared (at private and social prices) for each relevant agent involved in producing the final product, starting from the farm level (breeder) until the exported point (parity point).

In order to compare the economic costs of production (inclusive of implicit compensation of domestic resources) to international price references, a number of hypotheses have been made on the value of parity prices for tradable outputs, on macro-economic aggregates (such as the exchange rate and the interest rate) and on prevailing distortions in domestic factors markets.

The profitability of both social and private was estimated by using "Policy Analysis Matrix" model (PAM). By using this method, a set of indicators of comparative advantages emerged. The results indicated that the Syrian Live sheep fattening is privately profitable. Accordingly producers have incentives to continue, or to expand production and live sheep meat. This production has a comparative advantage for the representative fattening system analyzed, both under the current policies and in the case of absence of government intervention. With reference to the DRC indicator, Syria enjoys a strong comparative advantage in the field of Awassi sheep production and fattening (DRC = 0.56). Moreover, the results indicate that the system displays negative transfers from this commodity system to the rest of the economy, which means, that this system is taxed (taxes are applied mainly on the export quantity and capital). Also this system displays positive divergences of domestic factors (from the commodity system to the rest of the economy) which are caused by distortion in capital and labor market. It has also been revealed that an annual surplus of about 2 million local sheep is extant and therefore potentially available for export with no effect on the market balance sheep meat.

By using the concept of elasticity, which is the ratio of the incremental percentage change in one variable with respect to the percentage change in another variable, it is possible to measure the sensitivity of the PAM indicators with respect to the variables. The sensitivity analysis was carried out using (@Risk Software). With this analysis, the rank correlation coefficient is calculated between the selected output variable (PAM indicators) and the samples for each of the input parameters (lambs, parity price of final output, barley subsidy, establishment costs, interest rate and exchange rate). The higher the correlation between the input and the output, the more significant the input is in determining the outputs value. The results show that the parameter that has a significant impact on DRC is the parity price of the final output. The elasticity is -0.686 meaning that the percentage change of 0.686 will decrease the DRC value by 1%

A simulation was carried out for the system through the last ten years, to evaluate the probability of having a DRC below unity, this was done by using the variation ranges for those parameters that are mentioned above. The results indicated that the sheep meat fattening system enjoys a comparative advantage with reference to all parameters (price and yield, establishment costs, etc). Conditions as recorded in the past ten years reveal that the probability of having comparative advantage for the Awassi live sheep meat is 100% .

Finally, although as mentioned, the fattening sheep commodity chain is subject to direct tax on the exporter, this agent still achieves a higher share of the profit compared to the real producer (breeder). Therefore, more attention should be placed at breeding level such as: developing breeding centers to improve local breeds and protecting natural pastures. by establishing Projects. One of these projects aims to replant of the depleted locations in Al-Badia with pasture plants and seeds, to improve the pastures, to provide fodder reserves in drought years, to stop sand's movement and to increase the productivity of sheep. The major components of the project are 67 protected pastures, 13 grazing nurseries, 8 centers for seed multiplication, 4 oases and 4 observing centers. for the development of the Syrian Al-Badia. The other project is Al-Badia Project for Digging, Renewing and Equipping of Wells. This project is concerned with the study of the locations in which no water sources available for the breeders of livestock, the digging of wells and their establishment and equipping the wells with the needed requirements (fuel, furniture, tools, regular maintenance etc).. Moreover, government policies aim at improving the animal production services especially veterinary and extension services and improving the availability of fodder supplies. Added to this more attention should be paid to the economic analysis of risk in reference to this system. Issues concerning risk in agriculture, private tools for risk management in agriculture, and policies for risk reduction and farmers' income stabilization such as livestock insurance and water-related risk should all be accounted for.

Terminology

A Ewe is the mature female with age range between 8-10 months, that has given birth to at least one lamb.

A Ram is the mature male with age range "between" 1-3 years, in some cases the productive age of the ram reaches to 10 years

Lambs are male and female newly borne with age range "between" 1 day -3 months

A Sheep is male or a female that has been separated from its mothers for 15 days at least

Culled sheep are those taken from the flock because they do not meet performance standards.

Lambing Rate is the proportion of newly born to the number the ewes

Adult Loss Rate is the proportion of dead mature lambs over the total number of lambs

Newly Born Loss Rate is the proportion of newly born lambs which die over the total number of newly borne lambs

Culling rate is the proportion of sheep removed from the flock over the total number of flock

Chapter 1 -Background and Justification

Introduction

In 2005, the agricultural sector contributed to 24% of total GDP at constant price with reference to the year 2000 price. The share of livestock production accounted for about 36 % of the agricultural production. Meat accounted for 52% of the value of animal production followed by milk and dairy products 37%, eggs 7 % and fish 4%.

The Government's strategic goals concerning livestock development during the period 2000-2010, aim at an annual increase of 5% in the production of red and white meat and 4% in milk.

Syria is famous for Awassi sheep rearing, which is mostly concentrated in Al-Badia (Syrian Steppe), Furthermore, the importance of Syrian sheep meat results from its position as the first source of red meat for human consumption with a share of 75% and as export-oriented commodity with a share of 16.1 % of the total agricultural exports value.

The number of sheep heads has significantly increased with an annual growth rate of 4.1% during the period 1995-2005. Furthermore, this sector provides employment opportunities of 20%. To this end, comparative advantage for sheep meat has been conducted.

1.1 Applied policies

This section presents the applied policy up until 2005. The Syrian government promotes private investments concerned with sheep rearing and fattening and the public investments as well and applies a series of procedures to balance supply and demand at affordable prices. These procedures reflect the Government's strategy which seeks to saturate local demand (self-sufficiency) and protect local markets from foreign competition by increasing livestock production and to attain surpluses. The Government's strategy aims at the following:

- Improving grazing potential and protecting natural pastures.
- Developing breeding centers to improve local breeds.
- Improving the animal production services especially veterinary and extension services.
- Improving the availability of fodder supplies.
- Providing credits.

The policy concerned with improvement of sheep breeding and fattening are:

- Adapting development projects in order to improve pastures, increase number of produced seedling and provide credits to small projects to enhance household income.
- Providing infrastructure and services to Al-Badia inhabitants,
- Applying water integrated management technology

- Providing water for sheep and the breeders in Al-Badia through increasing the number of digging wells.
- Using alternative energy source for protecting the pastures and vegetation cover
- Improving grazing crops, grazing seedling and seeds and implementing these activates
- Developing management of pastures, sheep, and water
- Providing the animal production services especially mobile veterinary for sheep and assistance of marketing the final output and fodder

In 1974, General Establishment for Fodder (GEF) was established in order to provide the concentrated feed needed for livestock production. The GEF gets the raw products from both the private and public sector and store it in a proper way. It sells a limited quantity from both stored and processed feed to sheep and cattle breeders at the beginning of the agricultural season with an affordable price especially during the toughest agricultural period (November up to the end of February for each year). Therefore the GEF plays a critical role in protecting sheep flock by supplying only part of the feed requirements. Furthermore, in order to help farmers overcome the effects of the drought, long-term loans are provided in cash to finance breeder in drought seasons. They are granted for 7 years free of interest rate. Furthermore, the GEF provides exceptional extra quantities of feed in drought seasons. So the GEF plays a role in providing feed for livestock production when the feed resources are insufficient it does not provide a substitute to pasture - the total amount given by the GEF generally remains constant and therefore accounts, in a good season for 40% of the total required, whereas in bad seasons it accounts for 25% (because concentrated feed should compensate the lack of pastures) Therefore, Government has allowed both public and private sectors to import in order to supply the requirements since 1987. Actually, the total amount given by the GEF generally remains constant and It provides 28.9% of the total requirements, whereas the private sector provides 47.6% and 23.5% from the pasture. The former shares fluctuate according to the whether condition.

Historically, trade policies related to exported lamb fattening to foreign markets started

in 1986, when a number of joint ventures between the public and private sectors were established under Decree No. 10 to export sheep to the Gulf. The trade was profitable so resulting in a substantial increase in the price of mutton on the local market. To prevent further escalation of the domestic price and to pursue food security, the following actions were taken.

The “Two for One” policy that government introduced it in 1993 required exporters to import live sheep equivalent to twice the volume of the proposed export shipment². In response to discussions of government bodies and the export community, arising from continued illegal export practices, a new policy was established. This policy allows cooperatives to export lambs without the stipulation that they must import double the volume of the export³. Because of the continuation of illegal export practices, the head of the cooperative and some traders, the Ministry of Trade issued In structure 3974/4/9 on 26th May 1999. This allowed the General Meat Organization to export, in graduation, 200,000 heads. This exportation carries the same stipulations as those mentioned above. The ministry of trade issued the decision number 1100 which allows the public/private joint ventures and cooperative sectors to export sheep with the stated the condition that their average weight should be between 35-55 kg. This decree has more recently been adjusted according to the decision of the Trade Ministry, responding to the official council 5449/1 August 9th 2003. This alteration allows General Storage Institution, General Peasants Union and the private and joint-sector to export lambs with no restriction on weight

² Decision (Ministry of Trade) No. 379 March 9th, 1993

³ Decision (MoT) No. 3221 September 4th, 1998

and volume⁴. With reference to all the above policies, the imposition of a law stating that all exports (therefore in foreign currency) of sheep meat must be exchanged into Syrian Pound (SP) at the Commercial Bank of Syria. This therefore serves as a form of taxation on the exporter.

During 2004, domestic prices for local meat witnessed significant increases as a result of the increased exports accompanied by low imports. Accordingly, to adjust the situation the following decisions were taken as following,

- An export tax was imposed of 100 SP/head on exported livestock to reduce export and limit the domestic price increase⁵.
- The government introduced the “Two for One” policy which required exporters to import live sheep equivalent to twice the volume of the proposed export shipment⁶.
- The Cabinet issued Decision for exporting male sheep and stated the condition that their weight should not be less than 38 Kg till 11/4/2005⁷.
- The government reintroduced the “Two for One” policy from 15/4 till 15/6/2006 and stated the same condition of the lamb weight which should not be less than 38 kg⁸.

Moreover, the government frequently stops the lamb export for a short period for both health and economic concerns (food security) . This policy has many impacts on each agent of the system as following:

- **Impacts on breeders and domestic markets**

Noticeably, that more than 80% of the sheep breeders are of Bedouins, who frequently move in Al-Badia looking for pastures, and whose income depends almost entirely on the sales of dairy products (milk, yogurt, ghee, etc) and live sheep (males produced by the sheep raised by the breeders, and fattened until May to be sold in the sheep marketplaces). In May and June, the prices of male sheep go down. Exports play an important role in preventing the prices sheep from drastic decrease allowing the breeders earning reasonable revenues that assist in covering the high costs. In the absence of export, prices might go down to the extent that cause losses, obliging the breeders to sell sheep males and females and to reduce flock sizes. Some poor breeders might go out of business. However, consumers become better-off as prices decrease.

- **Impacts on foreign markets**

Saudi Arabia, which produces Awasi sheep and imports sheep from all producing countries, is the main destination of Syrian sheep exports absorbing about 90% of the whole sheep exports of Syria. Therefore, restricting sheep exports might cause Syria to lose one of its strategic exports as well as on of its main export markets.

Concerning livestock import, current Syrian quarantine regulations require that livestock should reach Syria within 45 days and 60 days for other animal products of issuance of the pre-shipment certificate of health in the country of origin⁹.

1.2 Importance of Syrian sheep sector

In 2005, the livestock sector contributed to 16.1 % of the value of all agricultural exports. Moreover, it provides about 20% of employment opportunities and it is considered as main sources of income for thousands of rural families, especially breeders in Al-Badia.

⁴ Decision (MoT) No. 1100, 15th July, 2003

⁵ Legislative Decree No. 18 of February 14, 2004

⁶ DecisionNo.396 of June, 13/2004

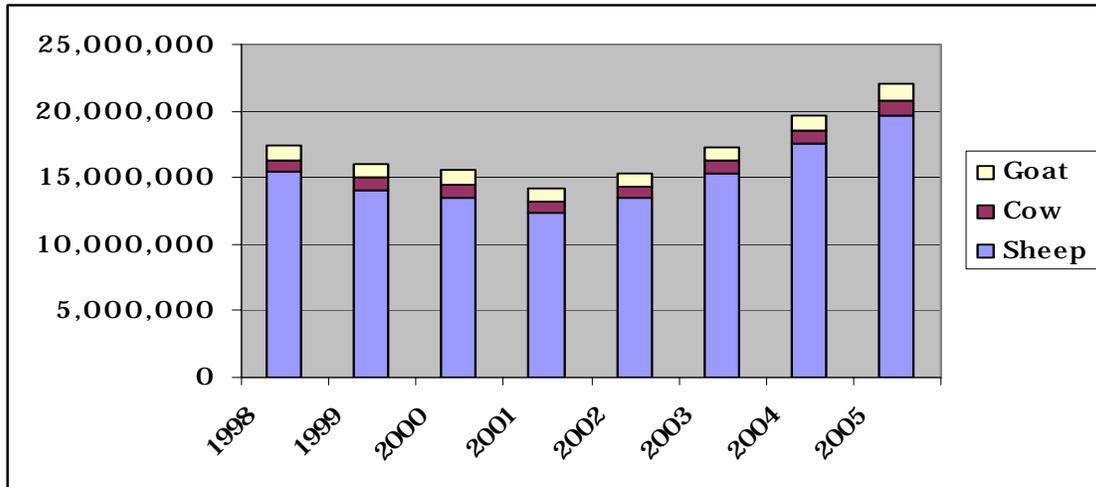
⁷ Decision No. 20of July, 2004

⁸ Decision No. 866 14 of April 2005

⁹ legislation decree no.60/T 1988, decree no.357/2000 and decree no.1618/2001

The Syrian main livestock is represented by 98% Sheep, 6% goats, and 5% cattle. These shares fluctuate according to rainfall. Figure 1.1 illustrates that the livestock population, especially the populations of sheep decreased in the period 1998-2001 due to the droughts in the years 1999 and 2000. Since then and until 2005 the sheep population has increased.

Figure 1.1. Number of animals by sectors, 1998-2005 (head)



Source: NAPC database.

Awassi Strain

Awassi is the most important strain of sheep in the Syrian market, as it represents 90% of the total number of sheep heads in Syria. Awassi is considered to be the best sheep strain with reference to its hardiness (its ability to cope with tough weather conditions). Awassi can bear drought conditions and limited food resources and also is capable of walking long distances.

A newly-born Awassi lamb weighs 3-4Kg and the Rams on average weigh 65Kg and Ewes an average of 50Kg. Each head of Awassi sheep produces 2.5-4Kg of raw wool per annum and each hair is between 20-25 cm. Awassi wool is considered as the best wool for carpet production. Awassi produces twins rarely, the average incidence of twinning in Awassi is only 7%. Awassi is renowned for its production of milk and the average production of each ewe for each season is 108Kg (this amount includes the weight for lamb weaning, which lasts 3 months)

The males' reach fertility between the ages of 5 and 7 months, females become fertile after 8 to 10 months. In this age the female can become pregnant if the weather conditions and food availability is suitable. The gestation period for Awassi is 5 months.

1.2.1 Annual domestic production and fattening

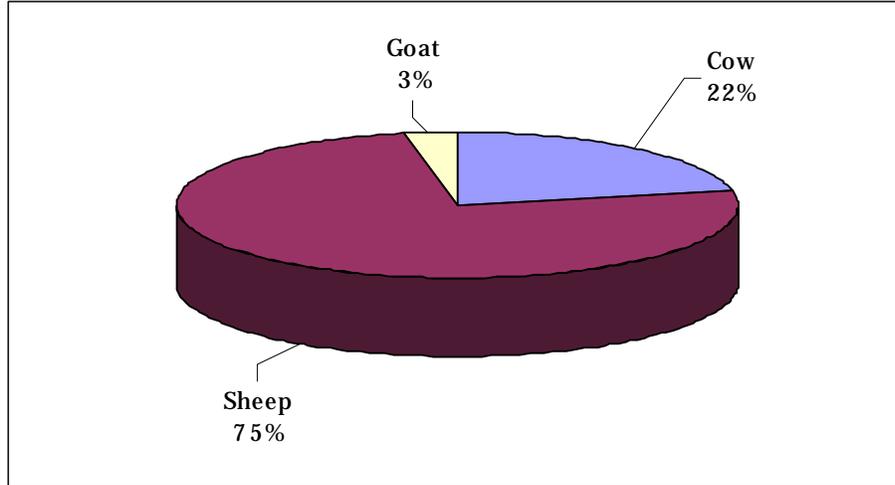
In 2005, Syrian sheep accounted for 19.6 million heads. In each year, the number of new lambs make up about 80% of the total sheep number (so it is about 15.6 million heads). Half of these lambs are males (about 7.8 million heads). The newly losses rate reaches 10% and accounting for 780 thousand heads of sheep males. This would result in 7 million heads of male sheep ready to be fattened and slaughtered. Female sheep not suitable for breeding account for about 20% of the total number of sheep accounting for 3.9 million heads. Therefore, the total number of sheep heads ready for fattening and slaughtering is about 11 million heads. In Syria, every year 8500 thousand sheep slaughtered; noticeably 500 thousand of the total are slaughtered on the occasion of religious festivity and during the tourist season. This means that there is a possibility of exporting about 2 million of sheep heads without affecting the domestic market keeping it in balance.

1.2.1.1 *Improvement of Sheep(meat & milk) production*

According to official statistics of the MAAR, sheep meat recorded the highest share of the total Syrian red meat production with a share of 75% , whereas, milk sheep occupied the second rank (after cow milk) of the total Syrian milk production with a share of 31%.

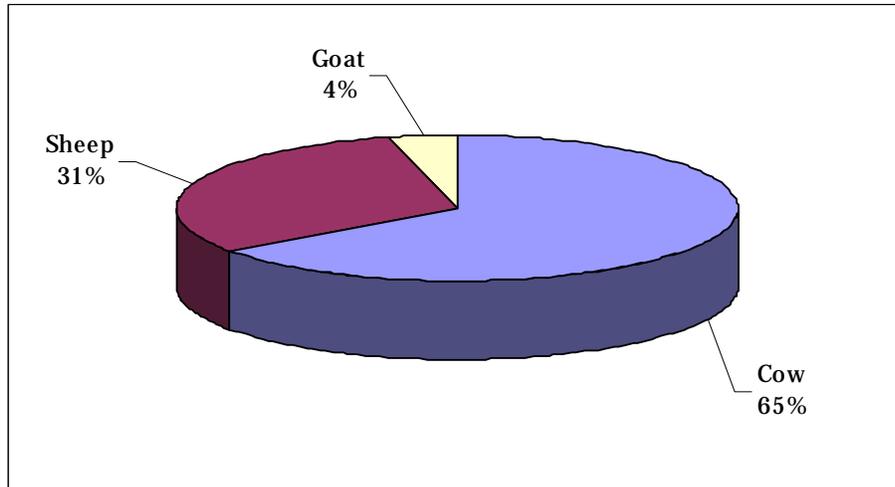
Figures (1.2) and (1.3), illustrate the contribution of sheep to milk and meat production in 2005.

Figure 1.2. Sheep meat production average 1996-2005 (%)



Source: MAAR, 2005.

Figure 1.3. Sheep milk production average 1996-2005 (%)



Source: MAAR, 2005.

Table 1.1 depicts the trends of Syrian sheep meat and milk production with reference to the cow and goat production. Sheep meat production increased during the period 1995-2005 with an annual growth rate of 3.2%. Sheep meat significantly increased in 2000, after that the negative trend prevailed until 2002 with a share of 14%. However, it started to increase during-2003 2004-2005. During the period 1995-2005, the annual growth rates of the number of sheep heads and milk production are 4.1% and 5.4% respectively.

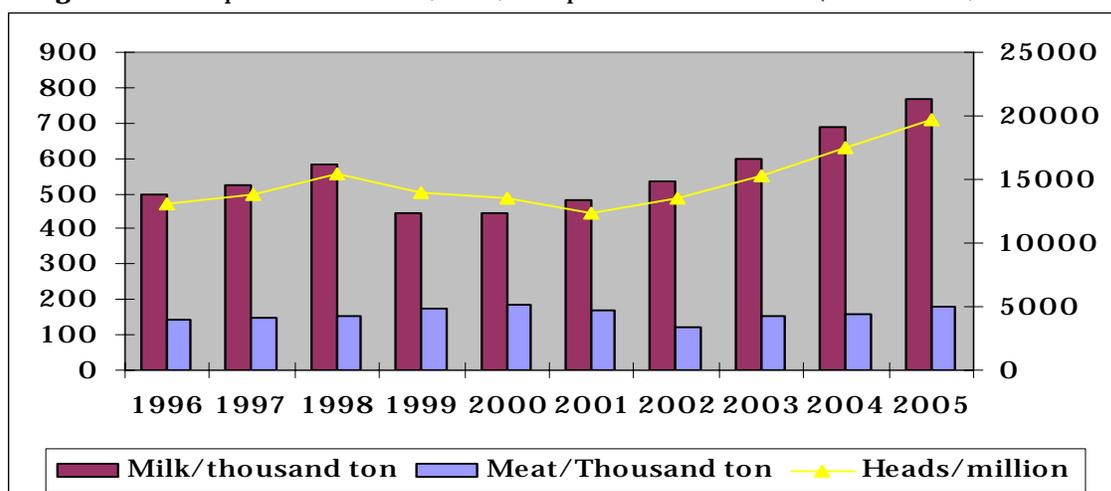
Table 1.1 Trends of meat and milk production 1995-2005 (thousand ton)

Year	Milk production				Meat production			
	Sheep	Cow	Goat	Total	Sheep	Cow	Goat	Total
1995	454	889	71	1414	131	34	6	171
1996	499	934	75	1508	143	40	7	190
1997	524	1009	77	1610	148	42	5	195
1998	582	1119	79	1780	154	43	6	203
1999	446	1144	66	1656	177	47	5	229
2000	446	1157	70	1673	184	47	5	236
2001	483	1033	62	1578	169	42	5	216
2002	536	1174	56	1766	120	47	5	172
2003	596	1207	71	1874	153	47	7	207
2004	690	1364	72	2126	161	48	7	216
2005	766	1364	81	2211	180	55	7	242

Source: MAAR, the agricultural statistical annual abstract.

Figure 4.1 clarifies the positive relationship between the numbers of sheep heads. However, the relationship between the sheep number and meat production is affected by weather conditions, (rainfall). Thus, in the drought period the marketable meat increase while the number of the sheep heads decrease (figure 1-4)

Figure 1.4. Sheep number of heads, meat, milk production 1996-2005 (Billion heads, thousand ton)



Source: NAPC database.

1.2.2 Syrian Live Sheep Trade

Sheep export is considered economically viable, since it is the most important single commodity in the Syrian trade system. A two-way trade traditionally characterizes Syrian live sheep trade. Syria exports Awassi sheep, highly valued in Saudi Arabia and other Gulf countries, and imports lower quality Romanian sheep. In 2005, sheep imports totaled US\$1.8 million (1108 tons). (1998-2005), exports sharply increased from US\$48.9 million to US\$195.4 million, and from 25.4 to 58.4 thousand tons, recording an increasing unit value for live sheep from US\$2538 per ton to US\$2944 per ton in 2005. The peak of the last five years (2000-05) in the level of exports was witnessed in 2002 with 109 thousand tons valued at US\$326.7 million. The following table 1.2 shows the development of Syrian sheep export.

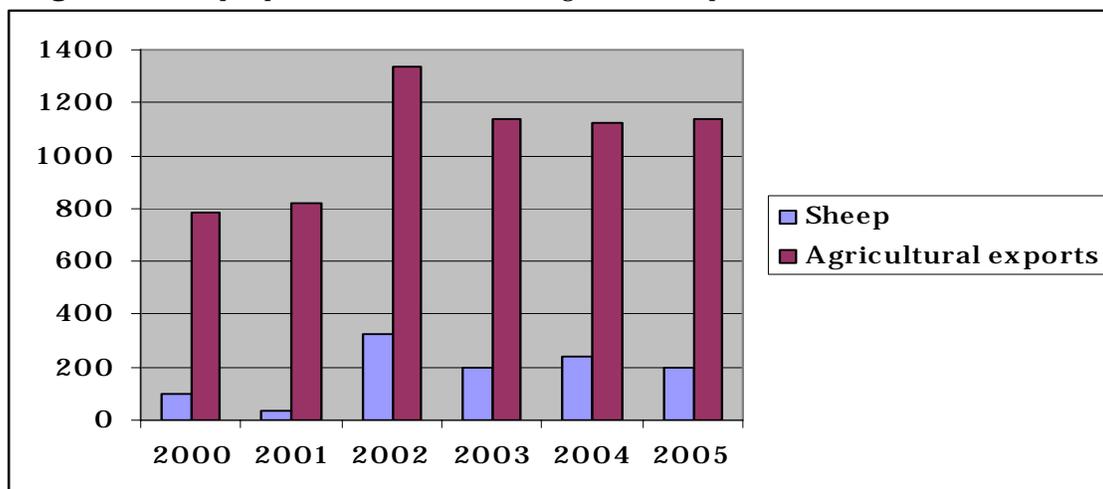
Table 1.2 Value of Syrian exports of sheep and its share of the total agricultural exports 1995-2004 (million\$)

Item	95-97	1998	1999	2000	2001	2002	2003	2004	2005
Sheep	58.4	48.9	45.5	99.6	34.9	326.6	201.1	238.2	195.4
%Agri. exports	6.5	5.3	6.9	12.7	4.2	24.5	17.7	21.1	16.1

Source: Custom department

The sheep exports expanded with an annual growth of rate 10% in quantity and 19% in value despite a significant decrease in 2001. Figure 1.5 illustrates the trends of Syrian sheep exports which are highly valued in the last three years comparing with other products

Figure 1.5. Sheep exports value from the total agricultural exports 2000-2005 (Thousand \$)



Source: MAAR, the agricultural statistical annual abstract.

The main destinations of Syrian sheep exports in 2005 were Saudi Arabia with 76% of total exports followed by Qatar 10%, Kuwait 9%, and Lebanon 3.3% (Table 1.3).

Table 1.3 Syrian Sheep Export and Destination Countries, 1995-2005

Years	Exports		Unit value US\$/Ton	Main Destination Countries (%)
	Ton	Million US\$		
Av 95-97	18201	58.4	3206.1	S. Arabia 43.0, Kuwait 30.0, Qatar 13.3, Turkey 12.4
Av 02-04	90419	255.3	2823.9	S. Arabia 73.5, Kuwait 9.1, Lebanon 8.4, Qatar 7.5
2000	42308	99.6	2354.9	S. Arabia 75.7, Qatar 14.6, Kuwait 9.3
2001	12489	34.9	2793.1	S. Arabia 73.9, Qatar 24.5, Kuwait 1.5
2002	109410	326.7	2985.6	S. Arabia 77.6, Kuwait 12.1, Qatar 7, Lebanon 1.7
2003	67998	201.1	2957.7	S. Arabia 67.4, Lebanon 18.1, Qatar 8, Kuwait 4.1, Jordan 1.4
2004	93850	238.2	2538.5	S. Arabia 72.9, Lebanon 9.3, Kuwait 9.1, Qatar 7.6
2005	195.4	58351	2944	S. Arabia 76, Qatar 10, Kuwait 9, Lebanon 3.3

Source: General Custom Department

1.2.3 Sheep Trade in the Arab Countries

In 2005, Syria occupied the second rank in terms of the number sheep heads among Arab countries. Syria accounted for 19660 heads. Sudan, with the highest number of heads in the region accounted for 48700 heads. In third rank Algeria with 18700, and then Morocco with

17026 heads. Furthermore, Syria also occupied the second place after Sudan, in terms of per capita to live sheep ratio with 1 head per capita

Table 1.4 Sheep geographical distribution among Arab region

Country	Thousand heads	Population/thousand
Sudan	48700	36233
Syria	19660	19043
Algeria	18700	33070
Morocco	17026	31478
Saudi Arabia	7000	24573
Tunisia	6700	10230
Yemen	6600	21700
Iraq	6200	28807
Egypt	5150	79420
Libya	4500	5853
Jordan	1672	5703
Kuwait	900	2687
Palestine	800	3702
Lebanon	340	3577
Qatar	200	813
Bahrain	40	727

Source: FAOSTAT

Considered in terms of export value Syria is considered as the first country in the Arab region in 2004. It shares 67% of the total, followed by Sudan with 26.4% followed by Jordan with 4.14%, Oman 1.11% and Saudi Arabia with 1%. These countries share 99.8% of the total Arab region export value.

Table 1.5. The main exporters in the Arab region in 2004 (\$thousand)

Year	Country	Export value	%
2004	Total Arab- countries	352173	100
	Syria	236.951	67%
	Sudan	93	26%
	Jordan	14.586	4%
	Oman	3.91	1%
	Saudi Arabia	2.998	0.85%

Source: FAOSTAT

With reference to imports the main importing countries in the Arab region for 2004 are Saudi Arabia (55%), Kuwait (14%), and Lebanon (7%) Emirates (6%) Jordan (5%),. The following table illustrates the main importer countries of sheep in the Arab region.

Table 1.6.The main importers of sheep in the Arab region in 2003 and 2004 (\$thousand)

Year	Country	Import value	%
2003	Arab countries	661,882	100
	Saudi Arabia	39,000	%59
	Kuwait	95,000	%14
	Lebanon	6,108	%9
	Jordan	24,744	%4
	Bahrain	19,744	%3
2004	Arab country	625,907	100
	Saudi Arabia	345,000	%55
	Kuwait	88,627	%14
	Lebanon	45,426	%7
	Emirates	38,000	%6
	Jordan	32,365	%5

Source: FAOSTAT

1.2.4 Global Live Sheep Meat Trade

The global total of sheep heads is 1079 million according 2005 statistics (FAO). The table 1.7 depicts the global geographical distribution. Globally Syria occupies the 15th rank in terms of sheep heads table (1.8).

Table 1.7 Sheep global geographical distribution 2005 (thousand heads)

Area	Asia	Africa	China	Europe	Australia	Russia	America
NO. heads	457,971	1,253,363	170,882	138,023	102,700	15,494	6,135

Source: FAOSTAT

Table 1.8 .The main producer of sheep in the world 2005 (million heads)

Country	Number	%
China	171	16
Australia	103	10
India	63	6
Iran	54	5
Sudan	48	4.4
New Zealand	40	3.7
UK	35	3.3
Turkey	25.2	2.33
Pakistan	24.9	2.3
Nigeria	23	2.13
Spain	23	2.1
Algeria	19	1.7
Morocco	17.02	1.6
Ethiopia	17	1.6
Syria	15.3	1.4

Source: FAOSTAT

Table 1.9 shows the first exporting countries of live sheep in 2003 and 2004. With reference to export in global terms Australia is considered as the primary exporter of sheep with a 30% share of total global exports, followed by Sudan (16.1%), Romania (10.9%), Hungary (5.9%) and then Syria with a share of 5.7%. These five exporting countries share 68.2% of the total global export value. In 2004 Syrian export increased considerably and shared 25.7% of total global exports, therefore it occupied the primary rank among the exporting countries in this year.

Table 1.9 The first exporting countries of live sheep meat 03-04 (thousand\$)

Year	Country	Export value	%
2003	world	752176	100
	Australia	222905	%30
	Sudan	120965	%16
	Romania	81928	%11
	Hungary	44432	%6
	Syria	43231	%6
2004	world	625907	100
	Syria	236951	%26
	Australia	168647	%18
	Romania	99197	%11
	Sudan	93000	%10
	Hungary	67573	%7

Source: FAOSTAT

1.2.5 The main markets of live sheep:

Saudi Arabia was the primary importer in 2004 with a total global share of imports accounted to 36%, followed by Italy (11%), Kuwait (9%), Greece (5.3%) and then Lebanon (4.7%). The share of these main five importers of the total global import value accounts for 66%. Table 1.10 illustrates the main importing countries of live sheep meat in 2003 and 2004.

Table 1.10 The main importing countries 03-04 (thousand\$)

Year	Country	Import value	%
2003	world	1003317	100
	Saudi-Arabia	39000	38.9
	Italy	101972	10.210
	Kuwait	95000	9.510
	Lebanon	61108	6.16
	Grece	38324	3.84
2004	world	962356	100
	Saudi-Arabia	345000	36
	Italy	107787	11
	Kuwait	88627	9
	Grece	51075	5.3
	Lebanon	45426	4.7

Source: FAOSTAT

The total sheep exports value of Arab region accounted for 24% and 65.9% with reference of sheep global exports value and sheep global import value respectively. Syrian Awassi sheep shared of global sheep trade with 5.7% of the exports global value and only 0.8% of the imports global value (2004)

1.3 objectives of the study

This study will cover the commodity chain of Awassi Sheep, since it is considered as an export oriented commodity. This study aims to assess the efficiency of this sector and to estimate effects of government intervention and market distortion. This study will be undertaken through the following measures:

- Description of the commodity system of Awassi Sheep, initiating with the breeder and finishing with the consumer. In order to identify the relationship between agents in this commodity chain.
- Description of the representative system with regard to sheep-fattening in order to determine the level of technology.
- Description of the agents in the commodity system and the calculation of the budgets involved in this system. This is done by breaking down the costs into tradable and domestic factors. This is done in order to calculate the policy analysis matrix (PAM).
- Evaluation of the production cost in order to determine the relevant importance of the cost of each item
- Conduction of sensitivity analysis of the PAM indicators in order to determine the relevant importance of the parameters that impact upon Asian performance in this sector.
- Identification of the export market according to trade agreements in order to determine foreign demand.
- Proposal of recommendations in order to improve this commodity system.

Chapter 2 - The Description of the Commodity System

2.1 Geographical distribution of sheep in Syria

According to 2005 official statistics, more than 70% of sheep are concentrated in Al-Badia. Their distribution is as follows: Der-ez-Zor 15.1%, Aleppo 14.6%, Homs 13.3%, Al-Rakka 13.2%, Al-Hassakeh 12.6%, Hama 12.2%, and Rural Damascus 9% (Table 1-2).

Table 1. 2. The geographical distribution of sheep in Syria (2005)

Governorate	Number of heads (thousands)	Governorate	Number of heads (thousands)
Rural Damascus	1776	Tartous	49
Al-Swida	447	Idleb	702
Dara'a	387	Aleppo	2874
Homs	2607	Al-Hassakeh	2476
Hama	2399	Al-Rakka	2585
Al-Ghab	141	Der-ez-Zor	2980
Lattakia	81	Al-Quneitra	147

Source: NAPC database

2.2 The state of sheep fattening in Syria

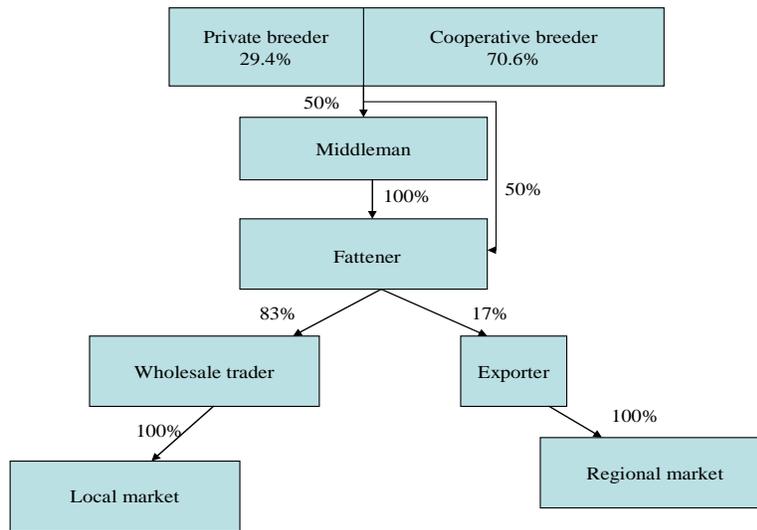
The number of fattened sheep is estimated to be about 10 million heads (from all sheep types: rams, lambs, ewes). In the past, the fattening operation was confined to a small number of traders in each governorate who used to buy young sheep at low prices and release them into the pastures of Al-Badia to graze for some time, then they used to sell them or fatten them in staples for a short period before selling them to live sheep retailers or butchers. Some fatteners used to leave the newly born lambs with mothers for six months (without milking). This allowed the fattened sheep to reach a suitable weight for slaughtering without the need for concentrated feed.

After establishing the fatteners' cooperatives in most governorates, which included most fatteners who used to operate individually, coupled with the presence of a network that connects the fatteners with sheep traders, the concentrated fattening was established, which is considered now the most common fattening method. It depends mainly on concentrated feed and on the availability of credit to cover the costs of feed, animal parks, and sufficient number of young lambs to enable the fatteners to exploit economies to scale.

2.3 The commodity chain of concentrated fattening of Awassi sheep

Figure 2.1 shows the commodity system of live sheep meat including the flow proportions among agents.

Figure 2.1. The commodity chain of live sheep meat in 2005



Source: NAPC

The breeder is the first agent in the marketing system of live sheep meat. He/she selects the healthy breeding rams to perform insemination. These rams are replaced once every three years, and the replacement is performed by using rams from inside the flock in order to avoid diseases and undesirable genetic properties. Breeders prefer rams between one and three years old to older ones. The breeder is also responsible of providing feed for the breeding ram according to its weight, for example, it is 1.5 – 2 kg of concentrated feed is required for a ram of 65– 85 kg. The composition of the feed should be also considered (protein, calcium, phosphor, carotene, and salt).

The breeder also takes care of pregnant ewes regarding feeding by ensuring that feed mixtures should be easily digestible. Ewes should take sufficient amount of solid items, proteins, minerals, vitamins, and water. The feeding requirements should be increased (in volume and quality) according to the age and the state of the ewe. An average ewe should take 2 kg of feed which is broken-down as follows: 1.25 kg solid items, 0.5 kg starch and 0.8 kg protein, while a pregnant ewe should take 2.250 kg/day allocated as follows: 1.5 solid items, 0.650 kg starch, and 0.10 kg protein. Lambs breastfeed for two months, during the first month it is totally dependent on breastfed milk while partly in the second month. In the third month, the lamb's feeding becomes completely dependent on fodder.

Two weeks after the birth, newly born fattening lambs are for ten weeks provided with a mix of concentrated feed coupled with a little straw in addition to breastfeeding. In this period, they grow by 170 grams and reach a weight of 20 kg. The feed mix should be 100 grams of starch equivalent plus 17.5 grams of digested protein. This feed mix increases gradually to become about 600 grams of starch equivalent, plus 105 grams of digested protein at the age of 11-20 weeks. And then sheep grow by 150 grams/day and reach a weight of 30-35 kg. At the end of raising period breeders sell lambs either directly to the fatteners (50%) or to the middlemen (50%) (those who transfer lambs from breeders to fatteners against the commission of SP50/head). There are two kinds of breeders, public with a share of 70.6% (who get benefit from supported feed) and private with a share of 29.4%.

The second agent in the chain is the fattener, who purchases the lambs from breeders at the age of 3-4 months. He/she increases the feed mix by 50 grams of starch plus 5 grams of digested protein so the feed amount becomes about 2 kg/day. At this stage, lambs might grow by about 170 grams/day. The fattener also provides water and sanitary care and raises the lambs for 2-3 months before selling them either to wholesalers (83%) for domestic consumption or to exporters (17%), given that most fatteners are exporters too.

The third agent in the chain is the exporter, who purchases the lambs (through middleman) at the traders farm (staple) gate at a price of about 130 SP/kg (as an index price) taking into that prices are vary according to season, weather, and policies related to sheep trade(stop export, open export) he paid to middleman 50SP/ head as a commission . also, he/she provides concentrated feed of 1-1.5 kg/day for each head, but he/she keeps the lambs for only one week at most. Then he should transfer sheep to veterinary health quarantine stations in duty free zone for two weeks during this period trader provides concentrated feed of 1-1.5 kg/day for each head, water and veterinary care (loses in weight) . After that he starts export procedure through transitar as following:

2.4 Procedure for sheep export

Export operation to be conducted as follows:

1. Firstly the exporter must complete a registration form provided by the customs department
2. This form then must be registered in the customs department before the exported goods can be checked.
3. The customs check-up then can be carried out, but this must be done in the daytime as it is forbidden to check the sheep at night.
4. The nature of the check-up:
 - a. The empty export vehicles are first weighed.
 - b. The sheep are then weighed (and those that do not meet the specified weight requirements or are found to be female are excluded).
 - c. The sheep are then counted.
 - d. The doors of the vehicles are then closed and sealed.
 - e. The vehicles are then accompanied by a customs official.
 - f. If the net weight of the vehicles corresponds to the addition of the vehicle weight and the total sheep weight then the export documents will be signed.
 - g. Once the appropriate export documents have been signed the vehicle is cleared to leave the customs area.
5. The process for dealing with sheep who fail to meet the specified requirements:
 - a. If the exporter attempts to export sheep less than 38Kg the exporter is required to pay to customs 40% of the total value of sheep that have failed to meet the weight requirements. These failures must be declared at the commercial bank (when the exporter exchanges the income gained through export).
 - c. If the discrepancy in the sheep weight is 5% (more or less) than the required weight the exporter is required to pay 500 SP for each sheep. This difference in weight must be mentioned in the form that the exporter takes to the commercial bank (when exchanging the income gained through export).
 - d. If these aberrations are noticed inside the customs area they are considered as above, if they are noted outside of the customs area then these aberrations are considered as

smuggling offences, and are punished with a fine equal to 3 times the value of the total falling outside the specifications.

6. The total difference in weight that has been incurred by the exporter is then multiplied by 2.5 (which is the price of 1Kg in dollars). This price is then converted to SP, then the 40% charge is applied to this total.

7. If the exporter attempts to export female sheep this is treated as a smuggling offence, and he is required to pay 3 times the value of each 'smuggled' sheep. These sheep are also impounded.

Chapter 3- Agents' Characteristics

3.1 Information sources

To obtain the necessary estimates of private and social profitability, breeder, fatter and exporter budgets data were needed. Both primary and secondary sources were used. The primary data were obtained from field surveys in three districts: Al-Badia, Aleppo, and Hama.. Data were collected through interviews and structured questionnaires. The respondents were 3 breeders, 16 fatteners, 8 exporters and 1 transiter, together with the official data of MAAR and trade ministry and the secondary data was used (such as the official production coefficient that declared by MAAR, policy related to the sector).

A representative system was developed, based on the common type of fatter in terms of scale and feed. Lamb fattening operation varies in size, from small-scale (with less than 100 heads) to large scale (with more than 100 heads). The study neglects the small scale because such holders have limited capital and the revenue of their livestock activities their main source of income and their production goes only to local markets or operates in partnership with a large scale producer. Furthermore, research focused on the fattened system that relies on the concentrated feed which is the most common and stable system. The targeted market of such holders is Saudi Arabia, in particular, and Gulf countries in general. It is also worth considering that local and regional consumers prefer live sheep especially in religious festivals.

The budget of the entire system is constructed through a combination of individual budgets prepared for each relevant agent involved in producing the final product, starting from the farm level (breeder) until the exporter point (parity point).

3.2 The fattening system

There are three methods of fattening. The first one is based on natural pastures, in which lambs stay with mothers in the pasture. This method depends on Al-Badia pastures and crop residues. This method is considered to be more economical than the other two methods since it does not require staples and stores. It also does not require additional feed. However, it is an unstable method because it depends on Al-Badia pastures, which are heavily affected by the climatic conditions and rainfalls. This method, in addition, is not suited for full fattening, but lambs are only half fattened or even less. The second method is the individual fattening and it is usually performed by crop farmers as a way to increase income and secure the animal protein requirements for his/her family. This method is also considered to be economical regarding costs since lambs are fattened on the crop and tree residues such as leaves and fruits as well as the house residues (animal-plant integration). The third method, which is the most common one, is the concentrated fattening which depends mainly on concentrated feed, and requires the availability of credit for the purchase of feed for a sufficient number of sheep, the construction of staples, and marketing. Thus, the representative system is Awassi concentrated sheep fattening large scale targeted regional market.

Technical coefficient

Table 3.1 Technical coefficient

Item	Technical coefficient (MAAR)	Technical coefficient (study)
Milking rate	65%	65%
Lambing rate	80%	89%
Newly Born Loss Rate	10%	5%
Adult Loss Rate	3%	5%
Lamb sale rate		85%

Source: MAAR& field visits

3.3 Breeder budget

Breeder budget constructed for the Awassi fattened live sheep system (lambs) consists of three categories: Fixed Cost, Direct Labor, and Intermediate Inputs.

3.1.1 Fixed costs

Fixed costs are defined as the costs that are paid regardless of production level. Fixed cost, in principle consists of the equipment's actual value, the equipment's life time, the equipment's salvage value, the capital depreciation (% used of this machine for main line), and the theoretical and actual capacity of the line. The valuation of fixed and capital equipments inputs requires information on life and salvage value of the equipment. Capital recovery factors are applied to determine the annual equivalent costs of the fixed inputs.

In this system, the breeders' fixed costs are calculated including water tank and animals as well as the costs incurred by the males and females that produce the lambs. The latter are a part of the fixed costs because they are part of the establishment costs, which are called the costs of investment. In order to perform the cost-benefit analysis, a herd projection matrix is constructed explaining the growth and evolution of the herd composition, taking into account the variations of sex and age. In addition, each increase in the herd size is considered to be a return, while each decrease is considered to be a cost that the breeder covers by purchasing new animals from outside the farm. It is also assumed that the economic age of one ewe is to be six years. The methodology pursued in the construction of the matrix depends on the principle that the stock at the beginning of each year is equal to the number of animals preserved from the previous years minus the dead animals and any sales.

3.1.2 Flock composition according to technical coefficient

$$MaleN0 = FemaleN * \frac{LR}{2} * (1 - LSR)$$

where:

MaleN0 = Males number in the basic year

FemaleN = total number of female less than age 6

LR = lambing rate

LSR = loses rate of newly born

$$FemaleN0 = FemaleN * \frac{LR}{2} * (1 - LSR)$$

where:

*Female**N*₀ = Female number in the basic year

*Female**N* = total number of female less than age 6

LR = lambing rate

LSR = loses rate of newly born

The representative system at breeding level is consisted of 150 heads the composition of the flock is : 80 ewes and 2 rams produce 34 lambs the final out put, however, the young female 27, milk, wool and manure are considered as return from the joint products

Establishments' costs are

80 ewes* SP6000=480000

2 rams*10000=20000

Total establishment costs are 480000+20000= 500000

Salvage value is sum value of culled ewes and culled rams (400000)

Revenue

Lambs produced are 34 and the price of one lamb is SP 117. (1)

Female lambs produced 27 heads with a price of SP3000/head (2)

Wool produced is 2kg per each head with a price of 35 (3)

Milk produced is 0.5 kg per each head (excluding milk for lactating newly borne lambs, and the season of milk production lasts in average 100 days/ year (4)

Manure produced during the whole year is 9m³ with a price of SP500/m³ (5)

Sum (1+2+3+4+5) = breeder revenue

3.1.3 Direct labor

Direct labor includes all the hired labor used to serve the flock. Family labor is valued at the market wage. Labor is often divided into two categories skilled labor (qualified QL) and unskilled labor (non qualified NQL). Taking this terminology into account it is considered all labor involved in sheep rearing are referred to as unqualified labor e.g. the shepherd, the feeder and the shearer are all classified as NQL. Labor involved in sheep rearing is not seasonal but involves work all year round.

3.1.4 Intermediate Input:

In the category of intermediate inputs the cost of concentrated feed, pasture, water, electricity veterinary care and transportation costs are all included. The intermediate input is therefore affected the age and sex composition of the flock.

Table 3.2 Clarifies the cost needed to produce 34 lambs (1020kg) ready to fatten. The total cost reached was in this case 242500 SP, while the revenue was 275000. The total profit was therefore, 32450 SP. This is equivalent to 32 Syria Pound per Kg of sheep. Labor productivity is 525 Kg/year. For each 4.7 Kg of feed 1 Kg of meat will be produced.

Table 3.2. The distribution of the cost in value and percentage to produce fattened lambs in 2006 (Syria Pound/1020kg)

Item	Unskilled labor	Skilled labor	Capital	Tradable	Total	%
Fixed costs	16,092	2,796	33,564	17,423	69,875	29
Direct labor	48,800	0	0	0	48,800	20
Intermediate input	25,536	5,750	47,541	45,048	123,876	51
Total	90,428	8,545	81,105	62,471	242,550	100
%	37	4	33	26	100	

Source: NAPC

The figure 3.1 illustrates the share for each category from the total cost at the breeder level. The highest share at the breeder level was intermediate inputs with a share of 51%. For the fixed cost 29% and for direct labor 20%. The 51% from intermediate inputs is broken down as follows – 62% concentrated feed, 24% pasture, 14% other expenses (water, electricity, veterinary care and transportation). The composition of the concentrated feed is 40% barely, 16% bran and 30% olive oil or cotton residue cake. Figure 3.1 illustrates the share for each category from the total cost at the breeder level.

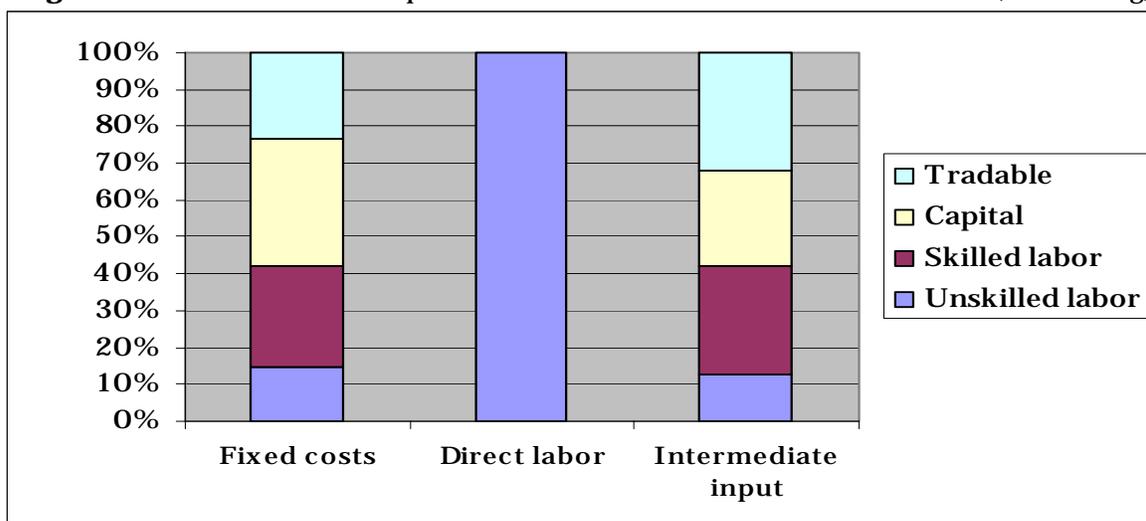
Figure 3.1 the share for each category from the total cost at the breeder level.



Source: NAPC

Figure 3.2 depicts the distribution of breeder cost according domestic factors and tradable inputs. It is clear that the sheep rearing project basically depends on NQL (37%) and capital investment (33%) and the share of tradable input (26%). Most of the labor is carried out by the family members (therefore not un-hired labor)

Figure 3.2 Share of tradable inputs & domestic factors at breeder level in 2006 (SP/1020 kg)



Source: NAPC

3.4 Fattener Budget:

The fattener budget is calculated from many sample stables. Each budget consists of the following data: number of fatten lambs, average weight of lambs before fattening, number of fattening cycles per annum, and the growth rate of weight during the fattening cycle. Technical coefficients are used for each sample in order to calculate the losses. Fattening costs are calculated according to three sets of data, direct labor, fixed costs and intermediate inputs. To calculate the annual cost and revenue for each Kg of fattened lamb by taking the average from each budget sample studied. The total cost is 30 SP/Kg and is distributed as follows: 93% to intermediate input, 3% to direct labor and 3% to fixed costs.

Table 3.3. The distribution of the cost in value and percentage to produce fattened lambs in 2006 (SP/kg) at fattener level

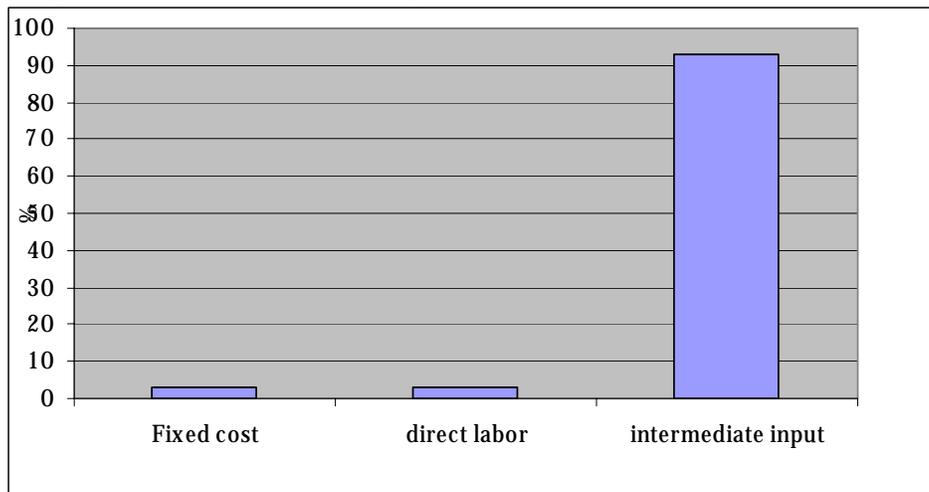
Item	Unskilled labor	Skilled labor	Capital	Tradable	Total	%
Fixed costs	0	0	1	0	1	3.3
Direct labor	1	0	0	0	1	3.3
Intermediate input	9	2	5	12	28	93
Total	10	2	6	12	30	100
%	33	7	20	40	100	

Source: NAPC

The figure 3.2 illustrates the share for each category from the total cost at the fattener level. The highest share at the fattener level was intermediate inputs with a share of 93%. For the fixed cost 3.3% and for direct labor 3.3%.

The 93% from intermediate inputs is broken down as follows – 62% concentrated feed, 24% pasture, 14% other expenses (water, electricity, veterinary care and transportation). The composition of the concentrated feed is 40% barely, 16% bran and 30% olive oil or cotton residue cake. Figure 3.1 illustrates the share for each category from the total cost at the breeder level.

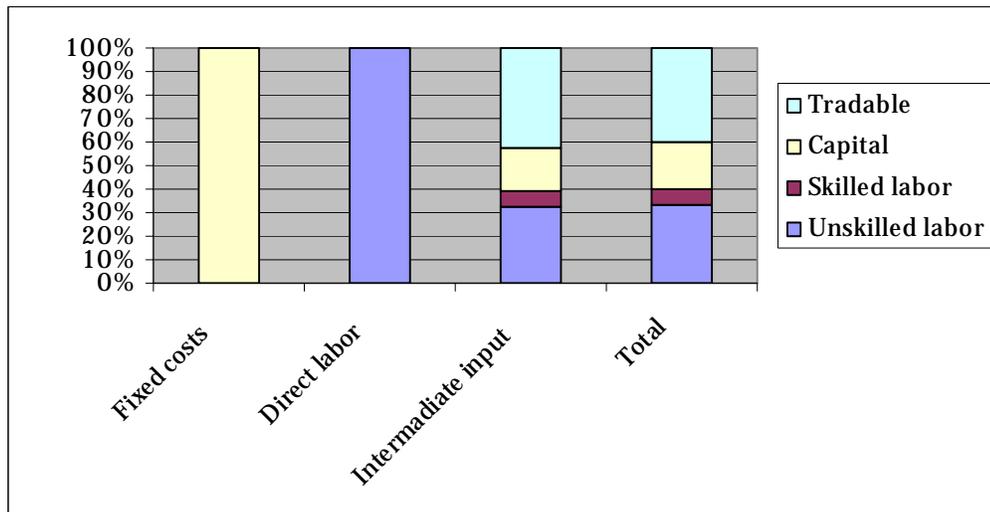
Figure 3.2 the share for each category from the total cost at the fattener level.



Source: NAPC

With reference to the composition of the cost of tradable and domestic factors figure 3.3 shows that the labor accounted for 40%, capital 20% and the tradable 40%, taking into account commodity in process shares 70% of the total cost which is 100 SP/Kg. The revenue is 130 SP/Kg, and therefore the profit is equal to 30 SP/Kg. Figure 3.3 illustrates the share for each category from the total cost at the fattener level

Figure 3.3 Share of tradable inputs & domestic factors at fattener level in 2006



Source: NAPC

3.5 Exporter Budget:

The exporter retains the flock, ready to export, for no more than one week. In special stables the exporter provides feed, water and veterinary care. Table 3.4 clarifies the total costs required to produce one Kg for export it is accounted to 16.2 SP/Kg

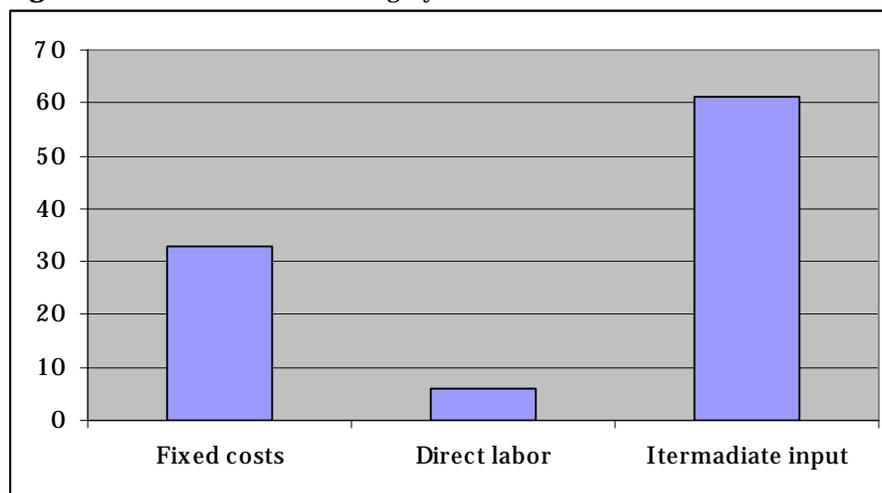
Table 3.4 The exporter budget (SP/kg) 2006

Item	Unskilled labor	Skilled labor	Capital	Tradable	Total
Fixed costs	0	0	5.4	0	5.4
Direct labor	1	0	0	0	1
Intermediate input	1.2	0.3	0.9	7.4	9.8
Total	2.2	0.3	6.3	7.4	16.2
%	14	2	39	46	100

Source: NAPC

The figure 3.4 describes the decomposition of exporter costs distributed as following: Fixed costs shares 33%, direct labor 6% and the intermediate input 61%. In terms of tradable and non tradable. The tradable shares 46%, capital 39% and labor 16%. This activity is capital intensive.

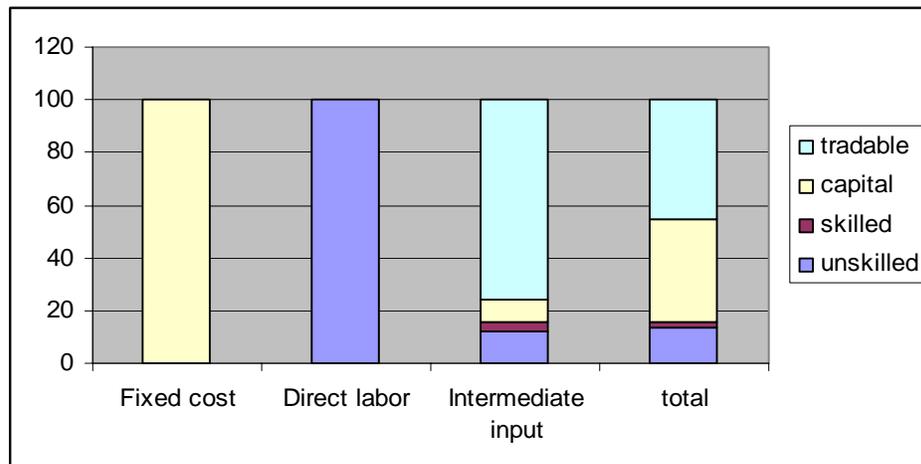
Figure 3.4 the share for each category from the total cost at the breeder level



Source: Author

In terms of tradable and domestic factors the tradable shares 46% and domestic factors shares 54% (figure 3.5)

Figure 3.5 Share of tradable input and domestic factor at exporter level (SP/Kg)



Source: Author

Chapter 4 Comparative Advantage of Awassi Sheep Meat

4.1 Policy Analysis Matrix

Comparative advantage is based on the best use of domestic resources in an open trade and competitive environment. A comparative advantage analysis aims to discern if a country has to produce a good with its own domestic resources (labor, capital, land) to supply the national market, and possibly to export, or to import the good and to reallocate saved domestic resources, to the production of another good enjoying comparative advantage.

The Policy Analysis Matrix (PAM) model developed by Eric A. Monke and Scott R. Petterson (1989) can be used, not only to measure the comparative advantage (social profitability) of an activity, but also to measure the effect of Government interventions, in this instance on sheep sector, and market imperfection. Table 4.1 shows the organization of the PAM .

Table 4.1 The Policy Analysis Matrix

	Revenue	Costs		Profits
		Tradable inputs	Domestic factors	
Private prices	A	B	C	D
Social prices	E	F	G	H
Divergences	I	J	K	L

The first row is based on private (financial) estimates. These financial estimates are made up of revenues and costs that use the actual market price obtained or paid by producers or others agent involved in the commodity chain of the representative system. Profits provide a measure of the competitiveness of the activity. These financial estimates are derived from the budget of the whole system.

The second row of the matrix consists of costs and return at social price; prices which prevail without any distortion caused by Government policy intervention or market failure. These estimates are based on import parity prices for tradable and opportunity costs for domestic resources. The profitability column provides a measure of the efficiency with which resources are used and shows whether a commodity has a comparative advantage in production.

In the third row, each column is the difference between figures computed using the market prices and figures based on economic (social) prices.

The most important results of the PAM analysis are the profitability of both social and private and net transfers. However, the matrix format makes it possible to break down the results into the various components including output transfers, tradable input transfers, and domestic

resource transfers. These can be presented in ratio forms such as the domestic resource cost (DRC), the profitability coefficient ratio (PCR) and the nominal protection coefficient (NPC).

4.2 Macro economic environment

Prices used in the PAM are estimated in Syrian pound. A distorted exchange rate can therefore affect the currency price of tradable input and output. Given the increasing integration of the former multiple exchange rate regime, the SP to USD exchange rate of private transaction is applied as the nominal exchange rate valued at SP51.5. Given the relative stability of this rate in the past year, it is eventually assumed to take the same rate as the real exchange rate.

The interest rate of capital is based on the current deposit rate offered for private saving by the Syrian banks, i.e 7 %; the opportunity cost of the capital at social price is estimated at 3 %, which is offered by International monetary fund (IMF) to fund the Asian industrialization projects.

For labor market, it is assumed that there is no distortion and that the current wages correspond to the real value of the unskilled labor. A correction factor of 22.5 is applied to the value of skilled labor to take into account the effect of pension and health insurance fee on the value of this domestic factor.

For major tradable such as agricultural inputs, the latest uniform duty is used to compute the social price after deduction of the taxes applied whenever imported. For energy a comparison between the current market price for fuel in Syria and the one prevailing on the international market result in difference of 40% to the benefit of the Syrian operators. It means that there is a transfer of 40% from the oil-producing sector to the other sectors of the economy corresponding to the losses of this sector incurred by not selling its products abroad. For concentrated feed a comparison between the current market price and subsidize price result in difference of 35% applied just to the subsidize volume of feed.

4.3 Parity prices

Export parity prices are used in the budget to reflect the social prices of the final output with reference of international prices. Parity price for tradable outputs is the price that equals to the international or border price at the parity point adjusted for domestic transportation, processing, and marketing costs. The resulting farm gate prices are called import parity prices or sometimes border price equivalents. They are computed through the following steps: the computation of export parity prices of live sheep using international market sources is conducted with the C.I.F (cost, insurance, freight) price at the border of the reference country (Saudi Arabia, deducting all transportation costs and fees up till the Syrian border (duty free zone) and the F.O.B price of live sheep meat reached 163 SP at private and 168 at social price(Table 4.2)

Table 4.2 Parity price of live sheep meat

	Unit	Source of infor.	Value at Market Price	Value at Social price
FOB to CIF				
CIF price at importing country	ryal/kg	Data	12	12
drinking animal	ryal/kg	Data	0.14	0.14
middleman	ryal/kg	Data	0.14	0.14
Transport cost	ryal/kg	Data	0.1	0.1
FOB Price	ryal/kg	Data or comp	12	12
Exchange rate		Data	14	14
FOB price in domestic currency unit	SP/kg	Computed	168	168
Fixed duties				
fee for financial	per kg	SP/kg	1	
fee for general meat organization	per kg	SP/kg	2	
fee for trade chamber	per kg	SP/kg	0.04	
fee for grantee of bank	per kg	SP/kg	0.04	
fee for rail way	per kg	SP/kg	1	
fee for loading	per kg	SP/kg	1	
Total duties	per kg	SP/kg	5	
Parity price at parity point	per kg	SP/kg	163	168

Source: Author

4.4 PAM of live sheep meat

Table 4.3 presents the summery budget at private prices to produce 1kg of live sheep meat. This table illustrate the total revenue (main final output and by- product), total costs of tradable inputs and domestic factors and profit created at the entire commodity system level.

Value added is calculated by subtracting tradable costs from the revenue. The created added value at breeder level is 33 SP, at fatterner level is 118 SP, and at trader level is 156 SP mentioning the importance of the agribusiness and commodity chain in creating value added

Table4.3 Summery budget 2005 (SP/kg)

	FARM budget	Fattener budget	Exporter budget	Post breeding	Repre. system	%
Total revenue	166	130	163	163	259	
Main final output	70	130	163	163	163	
By-products	96	0	0	0	96	
Total cost	143	100	146	116	189	
A. Commodity in process		70	130	70		
B. Tradable	37	12	7	20	56	0.30
C. Domestic Factors	106	18	9	26	132	0.70
Unskilled Labor	53	11	2	13	66	0.50
Skilled Labor	5	2	0	2	7	0.05
Capital	48	6	6	12	59	0.45
Profit	19	30	22	47	71	

Resource: Author

Table 4.4 presents the PAM Awassi sheep fattening concentrated feed system and shows that, at private prices, the profit accounts for 71 SP/kg, having with domestic factors being the major cost. Domestic factors remain the major cost also at social prices, but, in this case, profits are

22% higher. Profit divergences being negative, it can be concluded that there is a transfer (tax) from the system to the economy accounting for 19 SP/ kg l. This transfer induced by distorting polices that affect domestic factors (direct capital tax) and tariff tax on fodder and other tradable inputs.

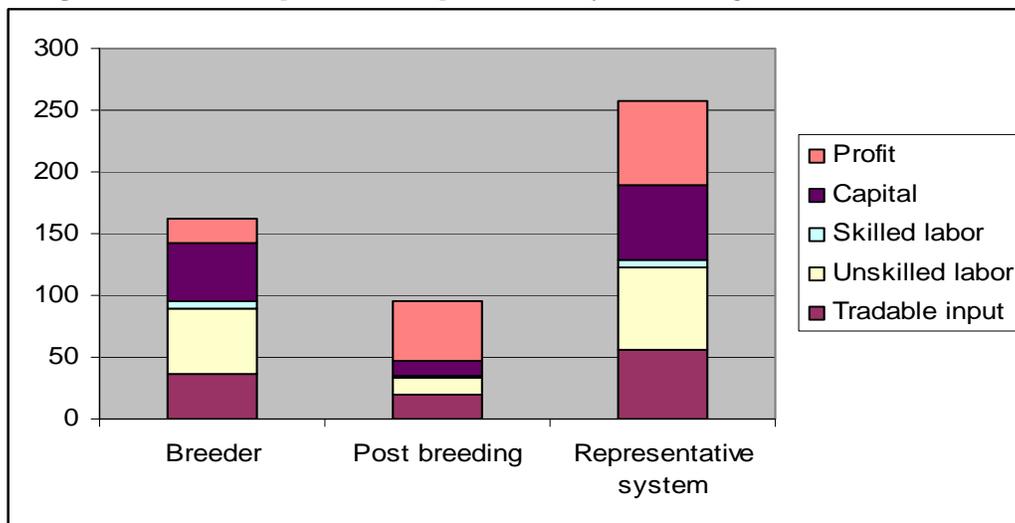
Table 4.4 PAM of Awassi sheep meat 2005 (SP/kg)

	Revenue		Costs			Profits		
			Tradable inputs		Domestic factors			
Private prices	A	259	B	56	C	132	D	71
Social prices	E	264	F	57	G	117	H	90
Divergences	I	-5	J	-1	K	15	L	-19

Source: Author

Figure 4.1 illustrates the costs for each agent decomposed into tradable and domestic factors. The total costs of the representative system accounted for 189 SP/kg distributed as 30% tradable and 70% domestic factors and the profit that achieved at the whole system is 113 SP/kg taking into account that the breeder profit is one third of the profit achieved by fatterner and exporter with reference to the total costs .

Figure 4.1 Costs and profit of the representative system (SP/Kg)



Source: NAPC

4.5 The main Indicators

Based on PAM ratio results, farmers have an incentive to engage in sheep fattening and it is an efficient use of domestic resources. This indicated by $DRC < 1$ meaning that to produce one unit of value added requires almost half unit of domestic resources.

Table 4.5 Indicators (2006)

Financial profitability	$[D = A - B - C]$	71
Financial cost benefit ratio	$[C / (A - B)]$	0.651
Social profitability	$[H = E - F - G]$	90
Domestic resource cost	$[G / (E - F)]$	0.566
Social cost benefit ratio	$[(F + G) / E]$	0.659
Transfers	$[L = I + J + K]$	-19
Nominal protection coefficient(including byproduct)	$[A / E]$	0.980
Nominal protection coefficient(main output)	$[A^* / E^*]$	0.970
Effective protection coefficient	$[(A - B) / (E - F)]$	0.978
Profitability coefficient	$[D / H]$	0.786
Producers subsidy ratio	$[L / E]$	-0.072
Equiv. producer subsidy	$[L / A]$	-0.074

Source: Author

- Live sheep fattening system is privately profitable indicating that producers have positive incentives to continue or to expand production and the achieved profit is 71/kg
- Negative divergences between private and social prices for tradable outputs and inputs are caused by policy distortion in the form of taxes imposed on the final output.
- DRC = 0.56 less than 1 meaning that this sector has a strong comparative advantage to produce and export fattened sheep meat and the cost per unit of final output is less than the created value added.
- Social cost benefit ratio (FCB) = 0.65 less than 1 meaning that the domestic factor cost to produce one unit of final output is less than the value added created. Furthermore, DRC less than FCB meaning that the value added at market price is less than the optimal one at social
- Nominal protection coefficient NPC= 0.98 implies that the live sheep meat system is taxed at a level of 2% of the social price, meaning that the price in the international market is higher than the local market by 2%.
- Effective protection coefficient EPC=0.97 being lower (although only slightly) than the NPC indicates that most of the distortion on tradable comes from the output market.
- The producer subsidy ratio of -0.072 indicates that the live sheep meat is taxed by the economy at a level of 0.072% of the social price value.

4.6 Break even point

The break even point is defined as the point at which the return equals the variable costs. It therefore indicates the minimum yield that the breeder should produce to cover the variable costs is 874 kg at market level and 522 kg at social level keeping other variables constant which represent 0.86 and 0.51 of the current yield at market and social price respectively. Concerning the price of the final output, the minimum price that the breeder should produce to cover the variable costs is sp 92 per kg at market price and sp78 per kg at social price which represent 45 %of the current market price and 37% of the current social price .

Table 4.6 The break even point

0	At Market	At Social
	(% of current value)	
Yield:	874 0.86	522 0.51
Final output price	92 0.45	78 0.37
Post harvest cost	70 1.52	169 4.57
Domestic factor costs	245 1.85	250 2.12

Source: Author

4.7 Sensitivity Analysis

The figures obtained to compose the PAM and calculate the related indicators depend on variables that, as presented above, have been assumed to take given values, under certain assumptions and/or given policy options which means that someone might disagree with the evaluation of this sector, and possibility to change the assessments and to have a better assessments when more information is available

Therefore, a sensitivity analysis is carried out in order to assess to what extent different values of the variables affect the values of the PAM indicators. By using @ risk software which is a device for presenting the quantified risk for a variable using Uniform and triangular distributions we first specify the input variables which are:

- Yield.
- Establishment costs
- Bran subsidy
- Barley subsidy
- Parity price.
- Interest rate at social
- Exchange rate

Second specify the (output) indicators whose sensitivity is better to be observed to argument on the comparative advantages of the commodity chain which are:

- Financial cost-benefit ratio (FCB);
- Domestic resource cost (DRC);
- Social cost-benefit ratio (SCB);
- Effective protection coefficient (EPC);
- Producers' subsidy ratio (PSR).

Third specify a range (0.2-0.5) (which reflect on past experience) of actual input variable values and distribution probabilities uses a mean and standard deviation. The mean defines the centered values and the standard deviation defines the range of the value around the mean

With this analysis, the rank correlation coefficient is calculated between the selected output variable (PAM indicators) and the samples for each of the input variables. The higher the correlation between the input and the output, the more significant the input is in determining

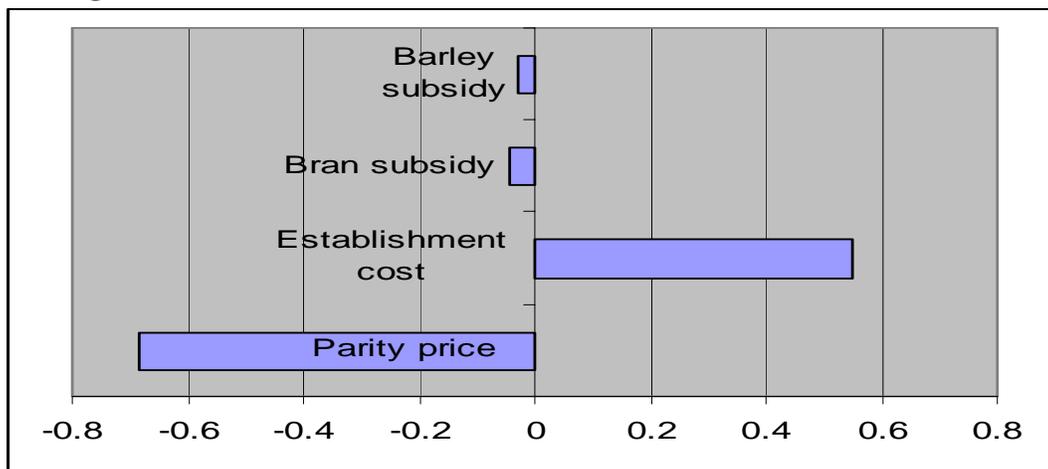
the outputs value. The results show that the parameter that has a significant impact on DRC is the parity price of the final output. The elasticity is -0.686 meaning that the percentage change of 0.686 will decrease the DRC value by 1% Table 4-7 the elasticity of the DRC to the main variables

Table 4.7 Elasticity of some variables

Variables	Elasticity	relationship
Parity price	0.686	negative
cost Establishment	0.55	Positive
Bran subsidy	0.044	negative
Barley subsidy	0.028	negative

Source: NAPC

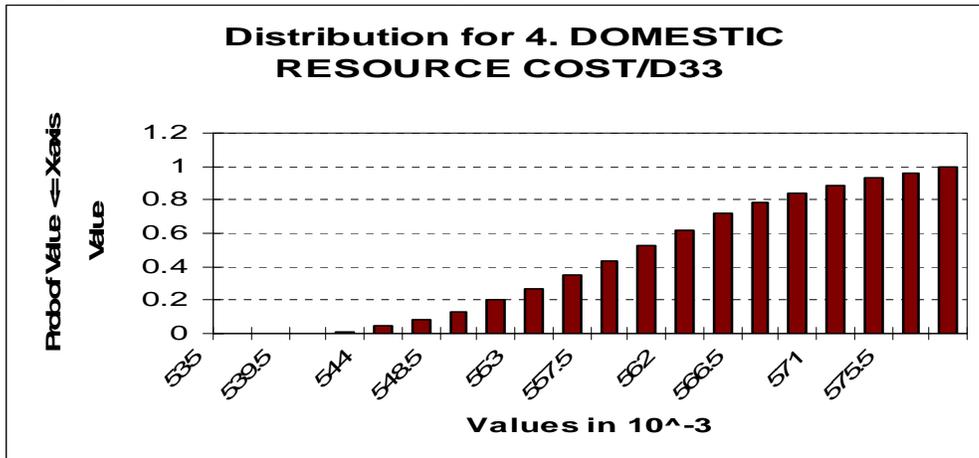
Figure 4.2 Correlation between DRC and variables



Source: NAPC

A simulation was carried out for the system through the last ten years, to evaluate the probability of having a DRC below unity; this was done by using the variation ranges for those parameters that are mentioned above. The simulation analysis identifies combinations of inputs which lead to output target values. The results indicated that the sheep meat fattening system enjoys a comparative advantage with reference to all parameters (price and yield, establishment costs, etc). Conditions as recorded in the past ten years reveal that the probability of having comparative advantage for the Awassi live sheep meat is 100%. Figure (4.3)

Figure 4.3 Simulation results in histogram and cumulative format



Source: NAPC

Chapter 5 - Outcomes and Recommendations

5.1 Outcome:

Syria enjoys a comparative advantage in the field of Awassi sheep production and fattening. A surplus of local sheep is available for export of about 2 million heads annually with no effect on the market balance.

5.2 Recommendations:

- Build a national reserve of feed sufficient for one year sufficient at least to respond to disasters and drought which cause a shortage of pastures then higher demand of concentrated feed
- Build a national reserve of medicines and vaccines.
- Provide treatment medicines for epidemic diseases and outbreaks free of charge at the Animal Health sections.
- Improve the quantity and quality control of veterinary vaccines locally produced.
- Increase the feed ration for sheep to a minimum of 100 kg/head of sheep.
- Protect the al-Badia and provide infrastructure services.
- Regulate grazing practices at the al-Badia.
- Prohibit the cultivation of the Badia.

5.3 Export Recommendations:

- Stop export for the four months starting at 15th of January up until 15th May each year until the sheep are big enough to reach the requested export weight. It also becomes easier to differentiate between the sheep males and females and therefore to control females smuggling.
- Divide the total number to be exported over the 8 months; a limitation to 250000 heads/month will avoid suffocation, and guard against fluctuation at the local market in terms of sheep and meat prices and to protect the producer and the consumer.
- Identify new trade market opportunities
- Study Issues concerning risk in agriculture, private tools for risk management in agriculture, and policies for risk reduction and farmers' income stabilization such as livestock insurance and water-related risk should all be accounted for

- Specify that the unit weight of the sheep to be exported be the same weight of the sheep to be slaughtered locally, i.e. not less than 40 kg./head, so there is a unified sheep price at the local market and not two prices (slaughter – export) which affect each other negatively.
- Currently export in the country is done through three customs directorates namely: Customs Directorate of Damascus - Customs Directorate of Aleppo - Customs Directorate of Homs. So it is very important to ensure that the number of sheep to be exported be agreed upon by each Customs directorate according to the size of sheep holding in that district based on the statistics of the Ministry of Agriculture and Agrarian Reform taking into consideration the following:
 - 1- Customs Directorate of Damascus gives export permission according to the holdings of rural Damascus-Qunaitera- Sweida- Deraa
 - 2- Customs Directorate of Homs gives export permission according to the holdings of Homs- Hama- Lattakia- Tartous
 - 3- Customs Directorate of Aleppo gives export permission according to the holdings of Aleppo- Idleb- AlHassaka- Deir Ezzor- AlRakka

Encouraging 75% of sheep traders from Aleppo governorate to export from outside of Aleppo, so export is not concentrated on one station. Controlling anything more than 10 thousand heads daily means that mistakes become inevitable.

- Unify standards and procedures at all branches of the Commercial Bank in the governorates for providing banking facilities to the sheep traders.
- Limit sheep export to the first class customs stations provided they are equipped with enough sheds (not less than 25) to receive and feed the sheep and make the necessary veterinary tests for them to define their race, sex, and weight. In order to evaluate the potentials of the stations in exporting process, a committee should be formed to study this matter and decide on which stations will be the best for export. The committee should have members from the following bodies:
 - 1- Ministry of Economy and Trade
 - 2- Ministry of Agriculture and Agrarian Reform
 - 3- General Directorate of Customs
 - 4- General Union of Peasants (this member should be a veterinary doctor).

The committee shall control the export process completely and precisely.

- Limit the checking committees of exported sheep at the customs area to the relevant bodies only which are:
 - 1- Customs, the responsible body for customs checking and other procedures.
 - 2- Animal Health body which is responsible for the technical issues and the veterinary health.
 - 3- Union of Peasants as a supervising and controlling body concerned in sheep breeding and its related activities.
- Commit to the regulations already in force, and so ensure that the checking of the sheep after sunset is prohibited and mistakes related to the identification of sheep sex and race are avoided.

- Commit to the agreement signed between the two Ministries of Agriculture, Syrian and Saudi which stipulates to keep the sheep at quarantine before being exported for at least 15 days and there to vaccinate them as has been agreed.
- Build very urgently veterinary health quarantine stations in the governorates which export sheep especially Aleppo to get rid of most technical and procedural problems that happen during the export process.

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Annex