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Comparative Advantages of Syrian Beef

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Foreword

The Syrian economy is gradually going through in-depth transformations for the last decade with an increasing exposure to international competition. The agro-industrial sector has a critical role in this transformation due to its contribution to GDP and employment as well as to its potential for diversifying sources of foreign currencies earning through exportations increase. However, this transformation poses a number of challenges for several agricultural products in particular animal products including beef concerning competing with other countries exporting similar products.

Accordingly, policy makers need a comprehensive assessment of the potential impact of possible policy changes on the economic viability of these commodities. This assessment will assist policy makers in formulating the most relevant and adapted policies required to facilitate the adjustment of the agro-industrial sector and to anticipate and control any potential drawbacks on rural population welfare.

To this end the National Agricultural Policy Centre, with the assistance of the project **GCP/SYR/006/ITA** which supported by Italian government and project of **TCP**, has carried out a systematic review of the comparative advantage of selected agricultural commodities (cotton, wheat, olive, tomato, orange and livestock) , the Comparative Advantage Study (CAS), in order to provide the necessary information base for decision making.

This report presents the results for beef, while the results for the other commodities have been published in separate similar commodity reports that are available from the NAPC. A synthesis has been produced putting in perspective the status of each commodity and where the methodology applied is presented in details.

The report was edited by helping from Samir Grad the chief of Agro-Food Division.

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Executive summary

The animal production sector contributes to 15% from agricultural export. In 2002 the value of animal production was 70353.4 million SP which equals to 15.4% from total of agricultural production.

Beef production in Syria has a major role since it is considered as a basic source of individual food consumption and energy requirements as well as of income. Furthermore, it represents the second major source of red meat after sheep.

In the second half of nineteenths, the number of calves increased and reached the highest levels at 1999 to 309,843 heads then it decreased suddenly in 2001 to 208,726 heads.

The government banned import cold meat for directly consumption from the world since 1989 with the exception of canned beef allocated for processing. From other side, the expectations of 2020 refer to increase the demand on meat by 49%.

Opening Syrian economy needs to give a high priority to the promotion of competitiveness to due the challenges of international trade. Therefore, the agriculture production system including animal and plant production has to depend on comparative advantage to use the domestic resources more efficiently. This implies an optimal utilization of natural resources.

Accordingly, this study aims to compute the comparative advantage of beef produced by Syrian farms relying on an easily computable model named the Policy Analysis Matrix (PAM) by calculating three columns and three rows including values estimated at private and social prices. Consequently, the following indicators are computed namely: Financial Cost-Benefit Ratio (FCB), Domestic Resource Cost (DRC), Social Cost-Benefit Ratio (SCB), Effective Protection Coefficient (EPC), and Producers Subsidy Ratio (PSR).

However, to calculate the aforementioned indicators, a survey was conducted to collect the data about the subject in the middle region (Homs and Hama) because it's famous for these activities. Then, budgets for all agents involved in the commodity chain were established including farmers, traders, slaughterhouses and butchers.

In the budget of live animal and meat, the one stage feeding system is used. In terms of feeding, fattener uses almost the same fodder quantity through the period of fattening.

The PAM is applied with reference to the parity price of imported calves from Romania. In addition to the data of import live animal which uses as a reference to calculate parity price to use it in the PAM and compare with one Kg of meat at the butcher shop taking into consideration the exchange rate of the US dollar at market price (51.5 SP/$) as a social price.

The value added at farm level was 48% from total revenue.

The main output of the mission is to build at least one PAM for each commodity system. As a result, depending on the PAMs indicators and budget summaries, Syria doesn't have comparative advantage in fattening local calves compared with importing fattening calves and cooled meat because of the high cost of buying calves and fodders.

I. Introduction

The Syrian economy has been moving from a state driven to a more liberalized economy, which forms a challenging task to the decision makers in Syria to make an adequate assessment of the development and effectiveness of the beef sector. Expected changes on this sector can be tracked through applying the comparative advantage framework. Before implementing this analysis tool, this section traces the evolution of the policies of relevance, the importance of beef production and the trends underlying this sector.

I.1. Policy issues

Several policies affect the meat products in Syria such as price policies, foreign trade regulating policies (import taxes or subsides, quantitative restriction on imports, export taxes), marketing policies, input and credit policies, and so forth. These policies can be considered as management tools to improve the commodity chain performance.

Syrian consumer prefers sheep meat rather than other red meat like beef, so consumers switch to the consumption of beef in case the price of sheep meat increases and increase the heath awareness.

I.1.1. Price policies

The Syrian Government does not interfere in the prices of livestock. Therefore, the price of local live calves depends on the imported quantities from Europe especially Romania and depends on the quantity of local production of calves.

I.1.2. Trade policies

There are many restrictions on domestic and foreign trade. The private sector had faced many obstacles to export and import, but in the last period there have been a lot of procedures to reduce the trade obstacles, before the Investment Law No. 10 was issued in 1991, which permitted to establish common agricultural companies between private and public sectors. Also, this Law included many facilities concerning reducing trade restrictions and allowing the private sector to activate.

The Government has banned importing frozen meat from Europe since 1989 for sanitary reasons especially mad-cow disease (BSE). Now the decision is still in place until the date of collecting data (2003) with the exception of canned beef allocated for processing. In December 2004, the Minster of Agriculture and Agrarian Reform issued the decree No. 403 that forbids the imports of calves from the United States due to sanitary reasons. Furthermore, the Government has authorized the private sector to import live animal and fodders. However, it imposes tariffs for importing cattle at 7%, meat at 20%, barley and bran at 7%, and minerals at 5%; export policies aim at making the trade balance with other countries positive and keeping the foreign currency reserves high.

Accordingly, it is very important to give the private sector many additional facilities in the fields of releasing trade, facilitating marketing activities, and removing restrictions on import and export; this implies removing all import and export restrictions.

I.1.3. Credit, inputs and investment policies

Regarding credit, there are two types of credit that the Agricultural Cooperative Bank (ACB) offers: in-kind and in- cash loans distributed for long, mid, and short terms. The interest rate of short term loans is equal to 4% and 5.5% for cooperative and private sectors respectively. It increases to reach 7.5% for loans which is more than 50 thousands SP. The period of repayment is one year for short-term loans (mainly offered to fattening activities), five years for mid term loans (offered to buy cows), and ten years for long-term loans (offered for the establishment of livestock farms).

The two types of credit fluctuate from year to year according to the Government policy, climatic conditions, and disease occurrence. Figure i.1 below illustrates the evolution of annual amount of in-cash and in-kind credits over the period 1987-2001.

Figure i.1. The evolution of in-cash and in-kind credits for cattle (1987-2001,)
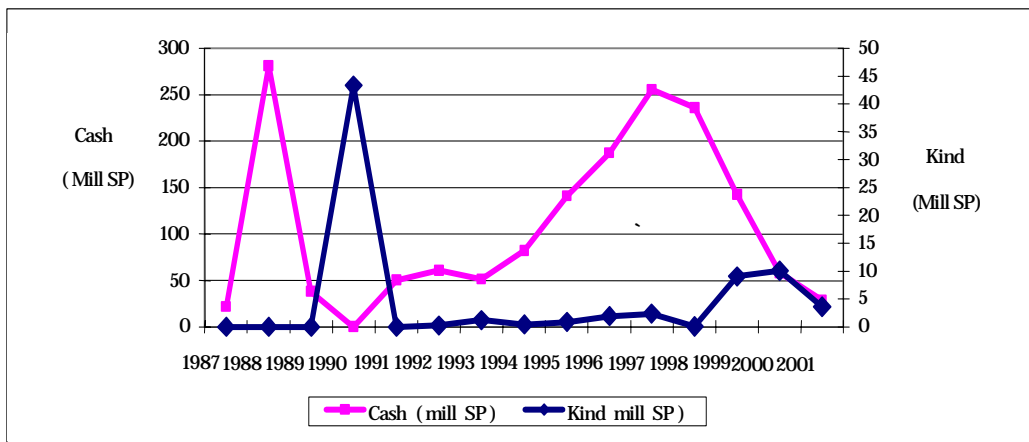
Source: NAPC - data base

I.2. The place of beef in agriculture

The agricultural sector including animal production in Syria is considered one of the most important sectors in the national economy. It creates work opportunities and plays an important role in poverty reduction. Thus, cattle fattening commodity systems play a crucial role in the on-going transformation of the Syrian agriculture to be more responsive to changes in food demand and new market opportunities.

The animal production sector contributes for about 15% of total agricultural exports. In 2002, the value of fresh milk and its productions was SP 46 millions and of livestock was SP 70 millions, accounting for 11.8% and 15.4% of the total agricultural production, respectively. Table i.1 shows the evolution of agriculture production and its composition in both values and shares during the period 1998-2002.

Table i. 1. Evolution of the value of agricultural production and its composition, 1998-2002 at current prices (mill SP)

Production	Year				
	1998	**1999**	**2000**	**2001**	**2002**
Plant production	246,328	201,959	215,383	249,078	257,914
Share from total %	**72.4**	**67.9**	**63.9**	**66.6**	**66.4**
Animal production	93,948	95,344	121,716	125,171	130,706
Share from total %	**27.6**	**32.1**	**36.1**	**33.4**	**33.6**
Milk & milk products	40,854	39,750	42,408	42,495	45,897
Share from animal production %	**43.5**	**41.7**	**34.8**	**33.9**	**35.1**
Livestock	43,544	44,603	67,329	70,365	70,353
Share from animal production %	**46.3**	**46.8**	**55.3**	**56.2**	**53.8**
Total value of Agricultural Production	340,275	297,303	337,098	374,249	388,619

Source: statistics central bureau

Cattle breeding is facing many challenges during the last decade because of three main reasons: first of all, the disappearance of pastoral lands of the village which was participating in reducing the feeding cost of livestock; secondly, the increase of the feeding cost resulting from the increase of the feed price (SP 8 per 1 kg); finally, low milk prices, because there is lack of dairy factories.

I.3. Trends

Beef production has fluctuated during the last decades. It increased during the eighties and then slightly decreased in the first half of the nineties due to climatic conditions and scarcity of fodder resources. In the second half it increased to reach its highest level in 1999 with 309,843 heads then decreased dramatically in 2001 to 208,726 heads.. Furthermore, in 2002, the number of calves increased to 254,602 heads.. Since 1995 the imports of beef has been banned until 1996 due to Bovine Spongiform Encephalopathy (BSE), therefore, most traders have shifted to importing live animal instead of meat(See Figure i.2).

Concerning calf meat, there is no data that refers specifically to its production since all data sources also include cow meat. Figure i.3 shows that the highest quantity of meat was produced through local improved cows. Thus, the productivity can be improved by focusing on genetic improvement, fatting systems, and health care.

Figure i.2. Evolution of number of calves in Syria, 1988-2001 (000 heads)
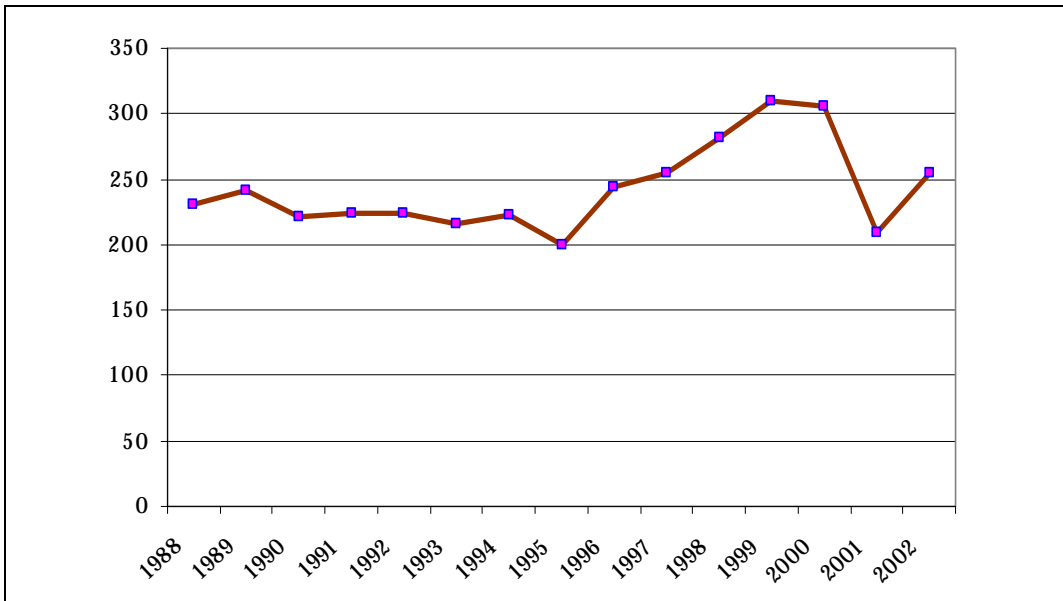
Source: NAPC - data base

Figure i.3. Evolution of meat production in Syria, 1988-2001 (000 ton)
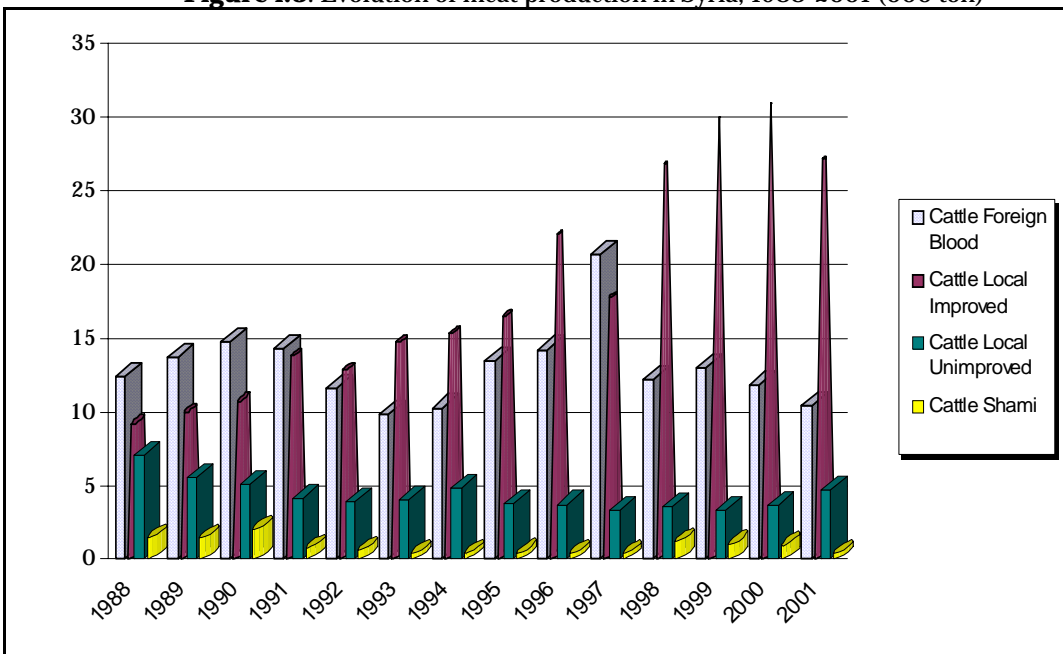
Source: NAPC - data base

Weather, technological advances, changes in price of inputs and the availability of alternative products affect the domestic supply of livestock products. Variations in seasonal rainfall affect 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 resulting in an increased supply of livestock products from the existing natural resources of

Syria. Similarly the changes in feed prices of livestock would have the same impact on the cost of production and the supply of livestock products (NAPC- Final Report on livestock sub sector)

I.4. Demand and supply projection

The population of Syria grew by more than three percent from 1998 to 1999, and this high rate of growth will slow some of the expected growth of the Syrian economy. Estimates for 2020 indicate that the demand for meat, milk and poultry will increase by 34, 14 and 49 percent respectively (table i.2).

Table i.2. Consumption of selected livestock products in 2010 and 2020 at different rates of GDP growth (thousand tones)

Item	Demand	Demand - GDP Annual Growth of					
		2%		3%		6.60%	
	1998	2010	2020	2010	2020	2010	2020
Red meat	198	220	241	223	265	281	352
Milk	1780	1754	1883	1832	2025	2122	2552
Egg	2153	2669	2970	2850	3301	3526	4528
Poultry meat	79	114	129	123	145	156	205

Source: final report on livestock sub sector

According to the 2002 data, the consumption per capita of beef is 2.7 kg/year taking into consideration that the share of beef is 27% of red meat, table i.3.

With reference to table i. 3, expectations suggest that there will be a surplus of beef in the future if it is assumed that beef consumption and the share of beef in red meat are constant. For example, in 2005 and 2010, the demand is expected to be 49.24 (000 ton) and 55.25 (000 ton) respectively, but the production is expected to be 73.71 (000 ton) and 90.45 (000 ton) respectively, Figure i.4**.**

Table i.3. Beef production and projected demand, 1995-2010

Year	Population projected Million	Beef [1]consumption 2002 Kg/year	Projected demand 000 Ton	Projected red meat 000 ton	Share of beef in red meat in 2002 %	Projected Production 000 ton
1995	14.2	2.7	38.34	182	27	49.14
2000	16	2.7	43.54	222	27	59.94
2005	18	2.7	49.24	273	27	73.71
2010	20	2.7	55.25	335	27	90.45

Source: MAAR data base- FAO Stat

Figure i.4. Beef production and projected demand, 1995-2010
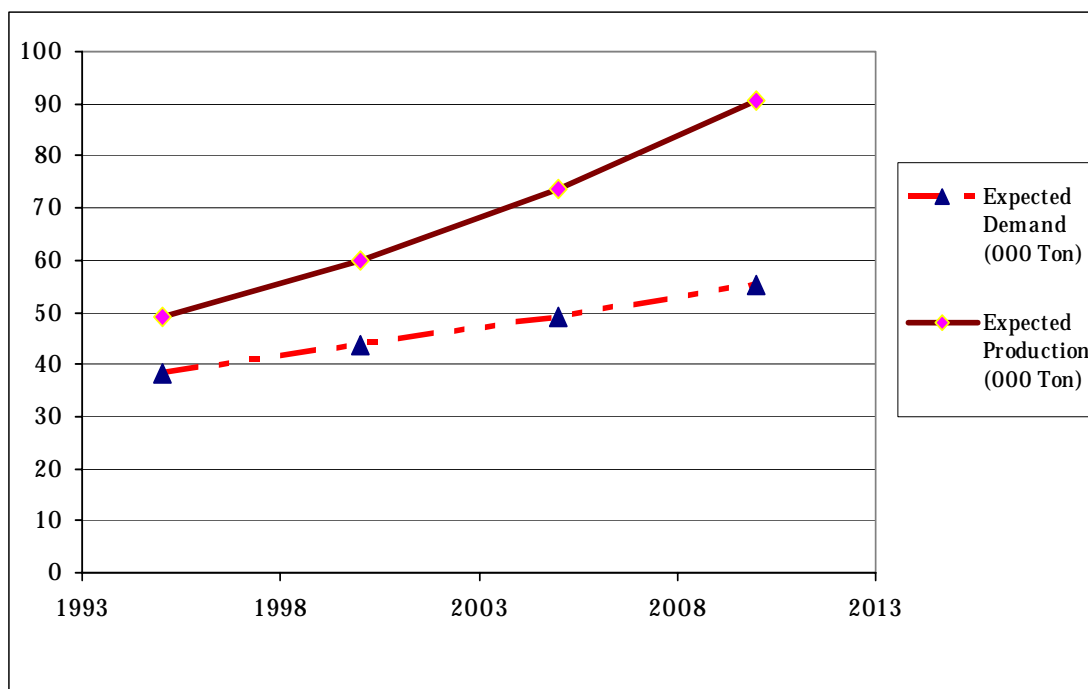
Source: MAAR database- FAO Stat

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[1] 2002 reference year (value is expected to be the same in other years).

Chapter 1- Description of the commodity system

1.1. The functional analysis of the beef commodity chain

Figure 1.1 illustrates the beef commodity system. Here, it can be distinguished between agents concerned with domestic market including milk producers, fatteners, middlemen, slaughterhouses, butchers and agents interested in both domestic and world market such as live animal and carcass importers.

Figure 1.1. The commodity system of beef
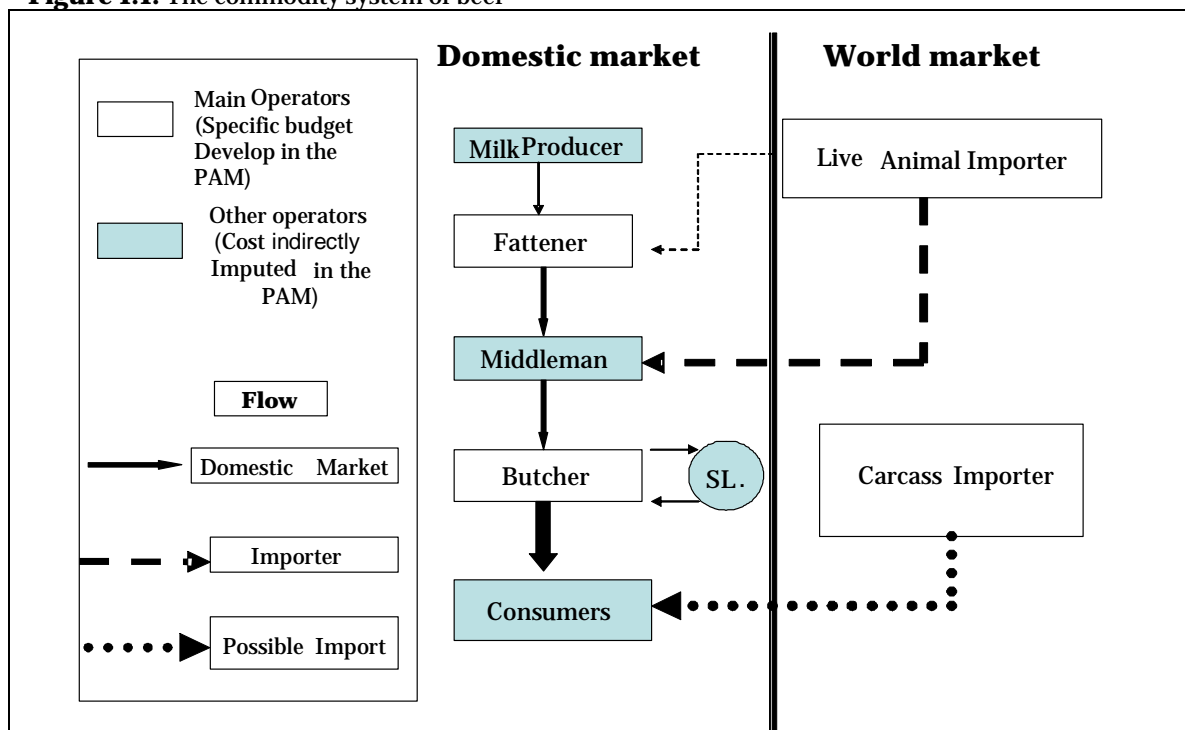
Source: collected and analyzed by the editor of this report

1.2. Description of the main fattening systems

Currently there are two sources of beef. First, the calves are produced and fattened by farmers who breed local strains or fattened by fatteners who buy them from farmers specialised in milk production. Most fatteners use local fodders, some imported cereals and the crops' residues to feed the calves. Second, foreign calves are imported by traders (usually from Romania) through sea shipment by lots of 1000 heads. There is about 10% loss in weight during transport and the mortality rate is estimated at 1%. By arrival of the shipment, the animals that weight less than 250 kg are sold to fatteners while the bigger ones (around 400 kg) are directly sold on the beef market to the middlemen or the butchers.

Local calves are mainly raised in small-scale farms, which produce cow milk. Farms producing animal products can be classified into three types as the following:

1) State farms, which produce about 1.3% of domestically produced calve and cow meat. These farms are concentrated in Homs, Hama, Tartous, and Dair-Ezzor. They sell their products to traders by local price depending on demand and supply at market prices, and few calves to private sectors.

2) Cooperative farms, which are affiliated administratively to the General Union of Farmers, produce about 58.9% of beef and are concentrated in the same governorates mentioned above. They sell their live animals from local, Shami, improved, and imported breeds to wholesalers.

Private farms produce about 39.8% of beef and sell animals to fatteners and traders. This meat is produced from local, improved, Shami, and imported breeds. (Rama Daniele etal. (2001). Supply Chain Coordination and Policy Implication: The Case of Dairy and Red Meat Products in Syria. National Agricultural Policy Centre, Damascus, Syria).

This paper focuses on private large farms. These farms are the most specialized farms and the estimation of costs and benefits is facilitated. Farmers purchase local calves for fattening from the central marketplaces in the governorates, middlemen importers. Most farmers declared their preference to local animals because they have experience in breeding them. However, there is a gradual shift to imported animals or locally produced hybrid breeds because their conversion rate is high. The farmers choose the type and number of calves for fattening according to the price of imported and local calves, their experience, exchange rate from dollar to Syrian pound, price of fodder, and size of their farms. The number of calves in the farms is between 15 and 60 heads. Also, the price of local live calves is 78-95 SP/kg and of imported breeds is 78-82 SP/kg ; table 1.1.

Table 1.1. Some differences between local and imported calves in weight, price, and conversion rate

Calves	Purchasing Weight Kg/head	Purchasing Price SP/Kg	Selling Weight Kg/head	Selling Price SP/Kg	Conversion Rate Kg/ day
Local	225-250	78-95	375-425	78-85	1
Imported	250-275	78-82	400-500	80-81	1.25

Source: collected and analyzed by the editor of this report

There are continuous changes in animal production systems, shifting from natural grazing towards concentrated fodder. In this context, there are different feeding techniques; most of the farmers use the same quantity of fodder during the whole fattening cycle, while a fewer number of farmers adjust the composition of the feed according to the different stages of animal growth.

Syrian Farmers are using local and imported strains for producing milk and meat. The small calves are raised in farms producing milk as well. When the calves reach a weight of 225-275 kg, they are sold to fatteners who, in turn, sell them to butchers at the weight of 400-500 Kg.

The feeding system of calves is somehow simple and depends on the calf weight. On average a calf eats 1 kg of mixed feed made from wheat and barley for each 50 kg of its weight. The feed is usually supplemented with a small amount of hay (usually 1 kg at most per day). Then the raiser starts weighing the calf every day till it stops gaining weight, so it becomes ready to be sold. The raisers usually buy the calves at the age of four months to feed them and sell them at the age of 10/12 months by a weight of 400 to 450 kg. In this regard, most farmers still use traditional fattening systems since they feed the calf with a big amount of fodder.

Most farmers depend on family labour for taking care of the calves and less likely on hired workers. Some of them have vehicles for their activities such the transporting of fodder and calves to market and farms.

On average, the cost of veterinary care for each calf per one rotation varies between 100 and 400 SP although the Government provides some vaccination for free. The mortality rate of young calves is about 2%.

1.3 Marketing and processing technology of beef

1.3.1. Middlemen

Middlemen have stalls in the cattle markets. The middlemen pay an annual fee to the market authorities on the basis of the occupied area. The intermediary services provided by the middlemen are either fully paid by the farmers (300 to 200 SP) or shared by farmers and butchers. The mission of middlemen is to arrange the transaction of selling and buying between two farmers. After that, the middleman only takes money from the buyer in Hama Market (300 SP/head), and from each seller and buyer in Homs Market (200 SP/head) in case the transaction is done.

1.3.2. Butchers

Butchers oversee the slaughter operation of live animals and sell meat to consumers. Each butcher has a shop in a retailing market equipped with refrigerators. A butcher purchases animals (local or imported strains) by himself or through a middleman. After that, he takes the animals directly to slaughterhouse and pays 100 SP/head as a transport cost, 100 SP/head for loading and unloading, 100 SP/head for slaughter, 140 SP/head as a fare of slaughterhouse, and 25 SP/head for weighing.

There are some differences between local and imported calves as presented table 1.2.

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Table 1.2. Difference between local and imported calves (2002)_

Calf	Live weight purchase price (SP/Kg)	Carcass weight Kg	Dressed meat price SP/kg	Skin SP/Kg	Value of the other parts (head, liver, fat...) SP
Local	78-95	250-270	220	30-40	1500-2000
Imported	78-82	235-260	215	30-40	1500-2000

Sources: collected and analyzed by the editor of this report

Technical slaughterhouses are located in Damascus and Aleppo, but in the other Governorates there are slaughterhouses subject to municipalities, which some of them are rented to private sector under the supervision of these municipalities. All these slaughterhouses are controlled by Supply, Health, and Local Administration Ministries.

The slaughterhouse is regulated in such a way that calves and cows are slaughtered in the morning while sheep are slaughtered in the evening or vies versa, but most of these places are old and need more maintenance and improvement. Before slaughtering, the veterinarian tests the animals to ensure the absence of diseases.

There is a new and modern slaughterhouse in Hama, but until now it does not operate (2004) due to some administrative problems. The total number of slaughtered calves in 2002 was 5465 calves. However, the number in Homs was 12567 calves in 2002. The Government forbids slaughtering small animals weighing less than 350 kg and 10 months old.

1.4. Selected representative systems

Two sources of meat are taken into account from both domestic market and world market. Fattener obtaining their calves either from domestic market or buying calves from milk producers. After fattening, they sell calves to butchers through middlemen. Then, the butchers take the calves to slaughterhouses for slaughtering. Then, they sell the meat and the other parts of the slaughtered animals in their shops to consumers (figure 1.1).   On the other hand, fattener obtaining their calves from foreign market buy live animal from importer and do the same steps mentioned before by the formers.

Chapter 2 - Agent characteristics

2.1. Sources of information

Six traders (three of them importers) were interviewed and the information provided is averaged. Furthermore, 16 farmers working in fattening activities were questioned. Information obtained shows that the most of them rely on traditional methods of fattening that usually imply overfeeding of calves resulting in cost increases. In all the fattening stages the feeding quantities are between 6 and 12 Kg/head.. The price of one kilo of green fodder is SP 2.5.

Three middlemen were also interviewed in Homs and Hama Governorates. Some middlemen work as fatteners as well, and some of them work as fatteners and butchers mainly depending on family labour.

Four butchers were interviewed in Damascus. It is noticeable that the most of them sell meat of local and imported live animal but the butcher achieves more profits in the case of selling the meat of imported calves because the price of imported live animal is lower than that of local animal and the conversion rate of imported calves more than the conversion rate of local calves per day (table 1-1). In addition, two slaughterhouses were visited in Homs and Hama.

2.2. Fattening budget

The fattening budget of calves consists of many steps as the flowing:

1) Determination of the number of calves per duration of fattening rotation, since small farmers use small number of calves and vice versa.

2) Calculation of the average weight of purchased calves and fattened calves, and average number of fattened dead calves before fattening and calves dead before selling.

3) Calculation of the average number of fattened calves being sold by subtracting number of dead heads per fattening rotation from calves after fattening.

4) Calculation the number of fattening rotations per year, total weight of fattened calves , and growth per day during fattening

5) Determination of fixed and variable costs per one kg of fattened calf sold.

6) Calculation of the profit per one kg of fattened calf.

The following can be noticed:

The share of total fixed input at the farm level forms 4.4% of the total cost which include

the cost of hangar and crushing machine.

- The share of total direct labour at the farm level forms 1.4% of the total cost (all labour at the farm is considered non-qualified).

- The share of total intermediate input at the farm level accounts for 94.3% due to the high price of live calf and fodder (especially barley).

- The share of total tradable inputs equals 66% of the total cost at farm level representing a high share because of importing some items especially calves.

- The share of capital from total cost at the farm level reaches 16% because farmers need capital to invest at the beginning of the project of fattening calves.

- The disaggregation of the main parts of the budget like fixed cost, direct labour, and intermediate inputs into domestic factors (non-qualified labour, qualified labour, and capital) and tradable inputs is also calculated.

Also, the total disaggregation of the cost to local and tradable for each item and the share from total is also calculated; table 2.1 and figure 2.1**.**

Table 2.1. Disaggregation of cost at farm level at market price (SP/ton from fattened life animal)

Disaggregation at market price	NQ labor	Q labor	K	TI	Total	Share %
Fixed input	202.50	69.17	977.60	193.18	1,442.44	4.41
Direct labor	433.33	0.00	0.00	0.00	433.33	1.40
Intermediate input	3,815.88	1,640.58	4,097.60	21,299.87	30,853.92	94.27
Total	4,451.71	1,709.75	5,075.20	21,493.04	32,729.70	100.00
Share %	13.60	5.22	15.51	65.67	100.00	

Source: collected and analyzed by the editor of this report

Figure 2.1. Cost at farm level (000 SP/ton from fattened live animal)
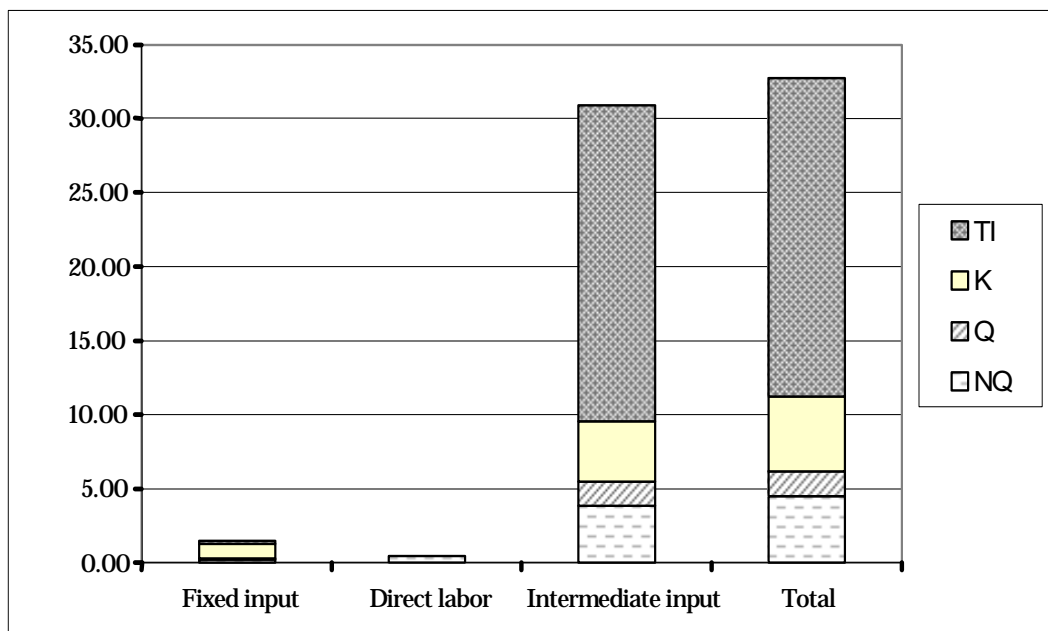
Source: collected and analyzed by the editor of this report

2.3. Data processing

The butcher achieves good profit because the share of cost relative to revenue is small. Calculating the profits is based on the following steps:

1) Determining the maximum storage capacity and maximum annual capacity of carcasses. Also, number of carcasses sold per day;

2) Writing down the weight and the prices of inputs;

3) Calculating the weight, the price, the value of output, and the part of animal sold ;

4) Calculating the quantity sold from carcase per kg/year and numbers of heads sold per year.

5) Determining the fixed and variable costs for one kg of carcase;

6) Subtracting the total costs from total revenue to get profit.

In the PAM of live animals it has been considered that there are some agents who provide services to fatteners, such as middlemen, and to butchers such as slaughterhouses. The calculation of the disaggregation for the slaughterhouse and middleman is as the following:

The cost of slaughterhouse and middleman was divided into fixed and variable costs. Then the coefficient of every item and the life time of buildings and machines were taken into consideration. The cost of slaughterhouse per ton of meat was accounted with a conversion rate of 200 kg of meat for 500 kg of live animal. The total nonqualified and qualified labour, capital, and tradable inputs have been calculated in table 2.2**.**

Table 2.2 . Distribution coefficients of all items

Total coefficient	Coefficient			
	L NQ	L Q	K	TI
Fee for the slaughterhouse	0.05	0.16	0.48	0.31
Fee for middleman	0.17	0.55	0.16	0.12

Source: collected and analyzed by the editor of this report

A middleman usually has a stable in the market of animals and a car, so he pays some variable costs for maintenance of stable and car, worker salary, and fees, so if the number of marketing days per week, the number of calves per day of marketing, the number of calves per year, and middleman fees per head are determined, the total cost can be subtracted from revenue to get the profit. Middleman achieves a lot of profits compared to their total cost

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Chapter 3 - Comparative advantages of representative systems

The concept of comparative advantage provides us by information about the efficient use of domestic resources, the effects of agricultural policies on using these resources efficiently and the economic profitability of agricultural and agro-industry systems.

There are many fluctuations in the prices of inputs and goods because of the shortage in agricultural policies, so comparative advantage analysis allows to estimate revenue independent of all market distortions. In other words, it permits the analyst to compare real or economic costs of production to international price references in order to determine what the activity's profitability would be in the absence of those policies which cause local prices to be different from international prices.

The comparative advantage is measured by what is called the Policy analysis Matrix. The Policy Analysis Matrix (PAM) relies on the data from the private and social budgets to facilitate the evaluation of policy effects and market failure on tradable inputs, domestic factors, resources, and outputs. The PAM structure is shown in annex 1,

The calculation of private profitability provides information about the competitiveness of commodity systems at actual market prices. Also, the same computations using social prices provide information on profitability when commodities and factors are priced at their social or opportunity costs.

The divergences between private and social evaluations provide insights into the extent of policy interventions in the form of taxes, subsidies, trade restrictions, and exchange rate distortion. Also, their comparison points out to imperfections in the functioning of commodity and factor markets.

3.1. Macro economic environment

Regarding the weight increase per day, the conversion ratio for imported calves is (1.5 Kg/day) which is more than that of local calves (1 Kg/day).

In the budget of fattener, the one stage feeding system is used. In terms of feeding, fattener uses almost the same fodder quantity through the period of fattening.

The PAM is applied with reference to the parity price of imported calves from Romania taking into consideration the exchange rate of the US dollar at market price (51.5 SP/$) as a social price and the interest rate 5.5%.

3.1.1 Determining the parity price of imported calf

Parity price is the price that equals the international or the border price at the farm gate adjusted for domestic transportation, processing, and marketing costs.

The computation of parity prices starts with finding the F.O.B (free on board) price at the border of the reference country, which is usually a major exporter of the commodity under study.

Insurance and freight are added to the F.O.B to obtain the C.I.F (cost, insurance, and freight) price to move it from the point of export to the harbour of the importing country. Then the C.I.F price is multiplied by an appropriate exchange rate at which to convert prices expressed in international currency to prices expressed in domestic currency. Finally, marketing cost, transportation, storage, and processing activities that link the border to the farm are taken into account.

In table 3.1 below, the calculation steps of the parity price of calf from Romania are presented because most of the traders import calves from this country.

Table 3.1. Import parity price of live calf from Romania

Live animal	Unit	Private	Social
F.O.B. Prices	USD/ton	950	950
Freight and insurance	USD/ton	125	125
C.I.F. Prices, foreign curr.	USD/ton	1075	1075
Exchange rate	SP/USD	51.5	51.5
C.I.F. Prices, domestic curr.	SP/ton	55363	55362.5
Custom, finance, insurance, and license	SP/ton	4850	
Transportation	SP/ton	150	150
Landed price	SP/ton	60363	55512.5
Correction factor for dead animal		0.99	0.99
Landed price after correction	SP/ton	59759	54957
Transport from import point (Latakia) to parity point (Home)	SP/ton	375	375
Parity price at Home	SP/ton	60134	55332
Factor of weight loss	(Kg/head)	0.925	0.925
Parity price after weight loss (SP/ton)	SP/ton	62487	57466
Quality correction factor		1.13	
Kg of meat obtained from a local calf		260	
Kg of meat obtained from an imported calf		230	

Source: collected and analyzed by the editor of this report

3.1.2. Determining the parity price of imported carcasses

Determining the parity price of carcass is very difficult because its imports have been banned since the end of 1989 when the General Establishment of Meat has ceased importing meat products due to sanitary problems. Because there is no data available, the data of imported live animals are used as reference to calculate the parity price to be used in the PAM and compared with one kg of meat at butcher shop as the following:

1) The price of one kilo of live calf in Romania is 60 SP and the average weight is 500 kilos.

2) Each 500 kg of live animal gives after slaughtering 252.5 kg carcass.

3) The price of the other parts of live animal like skin, head, and so forth is 4000 SP (as in Syria). As a result, the price of carcass is 26000 SP and the price of one ton of meat is 103000 SP.

It is assumed that the exchange rate of dollar to Syrian pounds equals 51.5, so the price of carcass is 2000 $/ton. Table 3.2 explains in more details and illustrates the parity price of meat.

Table 3.2. Import parity price of carcass

Carcass (boned meat)	Unit	Private	Social
F.O.B. Prices ($/ton)	USD/ton	2000	2000
Freight and insurance	USD/ton	200	200
C.I.F. Prices, foreign curr. ($/ton)	USD/ton	2200	2200
Exchange rate	SP/USD	51.5	51.5
C.I.F. Prices, domestic curr. (SP/ton)	SP/ton	113300	113300
Tariff		20%	
Domestic Price	SP/ton	135960	113300
Transportation and marketing	SP/ton	2000	2000
Import parity value for carcasses at the market	SP/ton	137960	115300
Butcher cost to prepare the carcass into meat	SP/ton	9200	9200
Import parity value for meat			124500

Source: collected and analyzed by the editor of this report

3.1.3. Determining the parity point of imported calves

There are big and small calves that have been imported from foreign countries. Both calf types have the same final point in the commodity chain at butcher's shop. The calculation of the parity price of imported big and small calves is useful to know which one is better in terms of achieving more profits. After importing carcasses, the trader sells them to butchers, which sell the meat to the consumers in their shops.

Coefficient for disaggregation

The commodity chain of meat needs to be studied with careful attention to inputs and outputs along the chain for all agents to know where the highest cost occurs in the chain. The disaggregation into domestic factors (non qualified labour, qualified labour, and capital) and tradable inputs of the parts of the budget in the PAM like fixed cost, direct labour, and intermediate input is also calculated.

3.1.4. Presentation of the hypothesis for selecting the macro prices and budgets

In the PAM, the parity price of imported calves from Romania is considered; the selected exchange rate of dollar at market price is (51.5 SP/$); the interest rate is set at 5.5%.

3.2. PAM of Beef and live animal

3.2.1. PAM of beef

3.2.1.1. Budget summary presentation

The budget summary of beef is presented in table 3.3.

Table 3.3. Budget summary beef SP/ton (2002)

Item	----Values at market price-----					
	Fattener	**Butcher**	**Budget 3**	**Budget 4**	**Post farm**	**System**
1.Total revenues	207500	245130	220000	220000	245130	245130
Main final output	207500	220000	220000	220000	220000	220000
By-products	0	25130	0	0	25130	25130
2. Total cost	163648.5	220644.3	220000	220000	220644.3	176792.8
a. Commodity in process		207500	220000	220000	207500	
(tax+,subsidy-)				0	0	0
b. Tradables	107465.2	1607.831	0	0	1607.831	109073
c. Domestic factors	56183.28	11536.51	0	0	11536.51	67719.79
Unskilled labor	22258.55	4681.46	0	0	4681.46	26940.01
Skilled labor	8548.739	346.286	0	0	346.286	8895.025
Capital	25375.99	6508.765	0	0	6508.765	31884.75
Profit before-taxes	43851.5	24485.66	0	0	24485.66	68337.16

Source: collected and analyzed by the editor of this report

The value added is calculated by subtracting the tradable inputs from revenues. It amounted at the farm level (fattener level), butcher level, and entire chain level to 48%, 96%, and 56% respectively figure 3.1.

**Figure 3.1.** The share of value added from total revenue for all agents (2002)
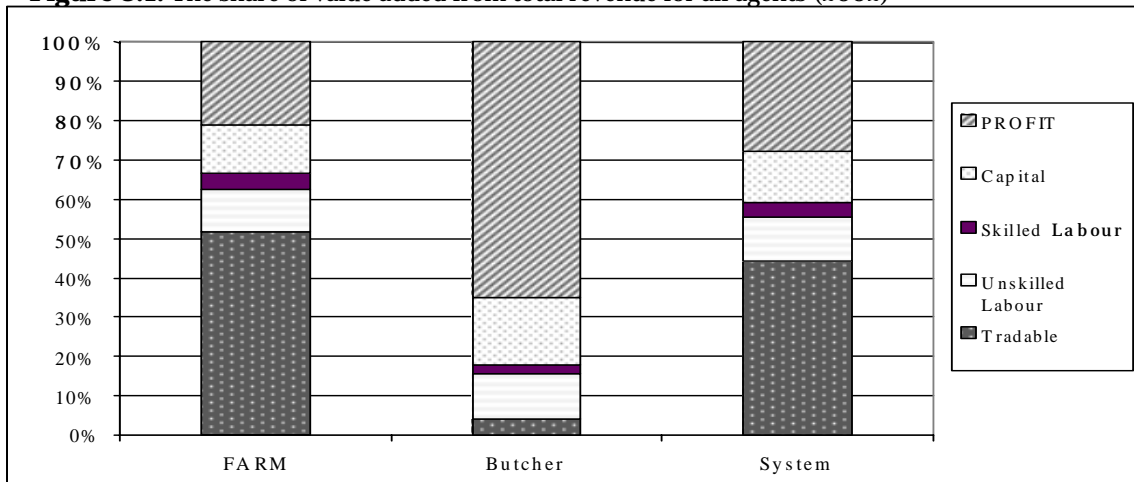
Source: collected and analyzed by the editor of this report

As illustrated in figure 3.2, the cost concentrates at farm level. In fact the farm faces high investment costs. The share of total cost at farm and butcher level in the total cost of the system

is 93% and 7% respectively; the share of profit from total at farm and butcher level is 64% and 36%, respectively; domestic factor cost (unskilled labour, skilled labour, and capital) at farm level is 83% and 7% at butcher level.

Figure 3.2. The distribution of tradable and non tradable for beef (2002)
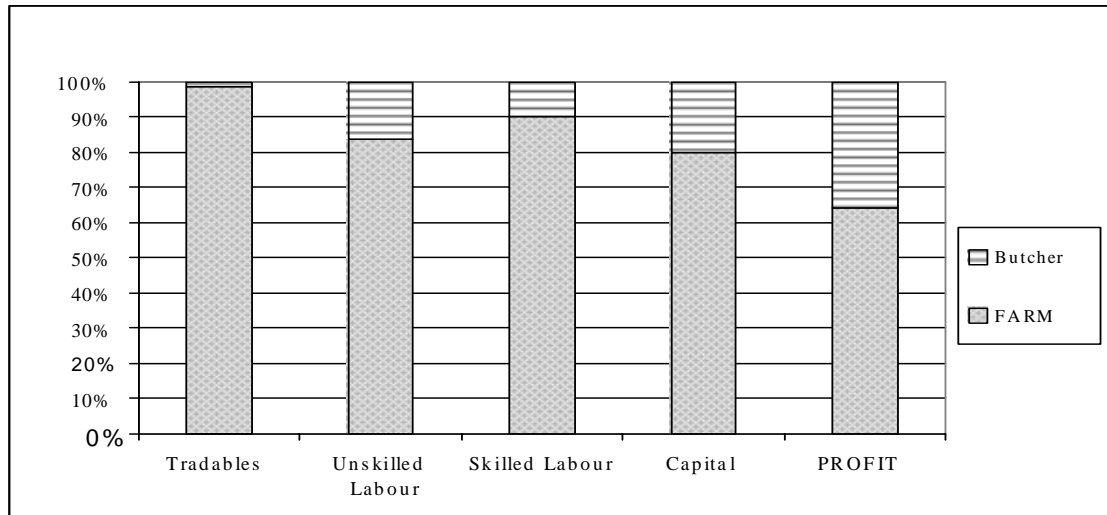
Source: collected and analyzed by the editor of this report

3.2.1.2. Presentation of the beef PAM

Table 3.4 presents the policy analysis matrix of animal fatteners and butchers (SP by ton of meat).

Table 3.4. The PAM of animal fatteners and butchers (SP/ton of meat)

Item	Revenues	Costs		Profits
		Tradable inputs	Domestic factors	
Private prices	A 245,130	B 109,073	C 67,720	D 68,337
Social prices	E 149,630	F 103,267	G 60,164	H - 13,800
Divergences	I 95,500	J 5,806	K 7,556	L 82,137

Source: collected and analyzed by the editor of this report

Accordingly, the calculation of private profitability provides information on the competitiveness of commodity systems at actual market prices taking into consideration the given current

technologies, the output values, the input costs, and the policy transfers. Private profits are the differenced between revenues (A) and costs (B+C).

As shown in table 3.4, the private profit is positive (D>0), so the system is competitive and these returns imply a future expansion of the system**.**

The calculation of social profits (H), outputs (E), and inputs (F+G) are priced at their social or opportunity costs. In the case of the outputs and inputs that are traded internationally, the appropriate social valuations are given by world prices – CIF import prices for goods or services that are imported or FOB prices for exportable. The social profit (H) is negative which means there is no comparative advantage, indicating that the economic resources are not used efficiently.

The third row computes the divergences between private and social values. Divergences refer to distortions created by under or over valued exchange rates and by direct taxes and subsidies. Because the social prices row has been obtained from the calculation of export and import parity prices, it is also possible that the divergences reflect the effects of non-traded goods and services such as transportation, marketing, and processing.

The revenue at private prices is more than revenue at social prices; consequently I is positive which means there is a subsidy transfer from the economy to the system. Also, J and K are positive meaning that there is a tax on the tradable inputs by J value and on the domestic factors by K value. The value of L is positive which means that the subsidy policy increases the final level of private profits, or that there are transfers from the economy (society) to the system.

On the other hand, to compare the profitability and efficiency of different crops especially when the production processes and outputs are very different, ratios are used to provide information on private and social profitability (table 3.5).

Table 3.5. Policy analysis indicators

1. Financial profitability	[D = A - B - C]	68,337
2. Financial cost-benefit ratio (FCB)	[C / (A - B)]	0.498
3. Social profitability	[H = E - F - G]	- 13,800
4. Domestic resource cost (DRC)	[G / (E - F)]	1.298
5. Social cost-benefit ratio	[(F + G) / E]	1.092
6. Transfers	[L = I - J - K]	82,137
7. Nominal protection coefficient (NPC) including by-product	[A / E]	1.638
7a. Nominal protection coefficient (main final output only)	[A* / E*]	1.767
8. Effective protection coefficient (EPC)	[(A - B) / (E - F)]	2.935
9. Profitability coefficient (PC)	[D / H]	-4.952
10. Producers subsidy ratio (PSR)	[L / E]	0.549
11. Equiv. producer subsidy (EPS)	[L / A]	0.335

Source: collected and analyzed by the editor of this report

The Financial Cost Benefit ratio (FCB) is positive (0.498) and less than one, so there is competitiveness in the system. The Domestic Resource Cost coefficient measures the efficiency or comparative advantage of the system. In the table above DRC is more than one, so the system does not have comparative advantage. Moreover, a transfer value of 82, 137 SP mean that there is a transfer from economy to the system by this value. In addition, the Nominal Protection Coefficient (NPC), and the Effective Protection Coefficient (EPC) are more than one; therefore, the system benefit from a protection or the Government subsidizes the final output. Thus, there is a subsidy to farmers for the value of (EPC). Also the Profitability Coefficient (PC) is more than one in **absolute value**, so the system benefits from a net transfer from the economy due to policy in place. Finally, the value of Producer Subsidy Ratio (PSR) is 0.55 which means there is subsidy by 55% of social revenue, and the value of Equiv. Producer Subsidy (PC) is 0.33 which means there is a subsidy to producers by this percentage.

3.2.2. PAM for live calf

3.2.2.1. Budget summary presentation

Table 3.6 depicts the components of the budget summary for live calf.

Table 3.6. Budget summary of live calf (SP/ton live animal)

| | ----Values at market price----- | | | | | |
	Farm	**Budget 2**	**Budget 3**	**Budget 4**	**Post farm**	**System**
1.Total revenues	83000	83000	83000	83000	83000	83000
Main final output	83000	83000	83000	83000	83000	83000
By-products	0	0	0	0	0	0
2. Total cost	65459	83000	83000	83000	83000	65459
A. Commodity in process		83000	83000	83000	83000	
(tax+,subsidy-)				0	0	0
B. Tradables	42986	0	0	0	0	42986
C. Domestic factors	22473	0	0	0	0	22473
Unskilled labor	8903	0	0	0	0	8903
Skilled labor	3419	0	0	0	0	3419
Capital	10150	0	0	0	0	10150
Profit before-taxes	17541	0	0	0	0	17541

Source: collected and analyzed by the editor of this report

The share of the value added from total revenues at the farm level (fattener level is 48% (figure 3.3).

Figure 3.3. Distribution of tradable and non - tradable for live animal
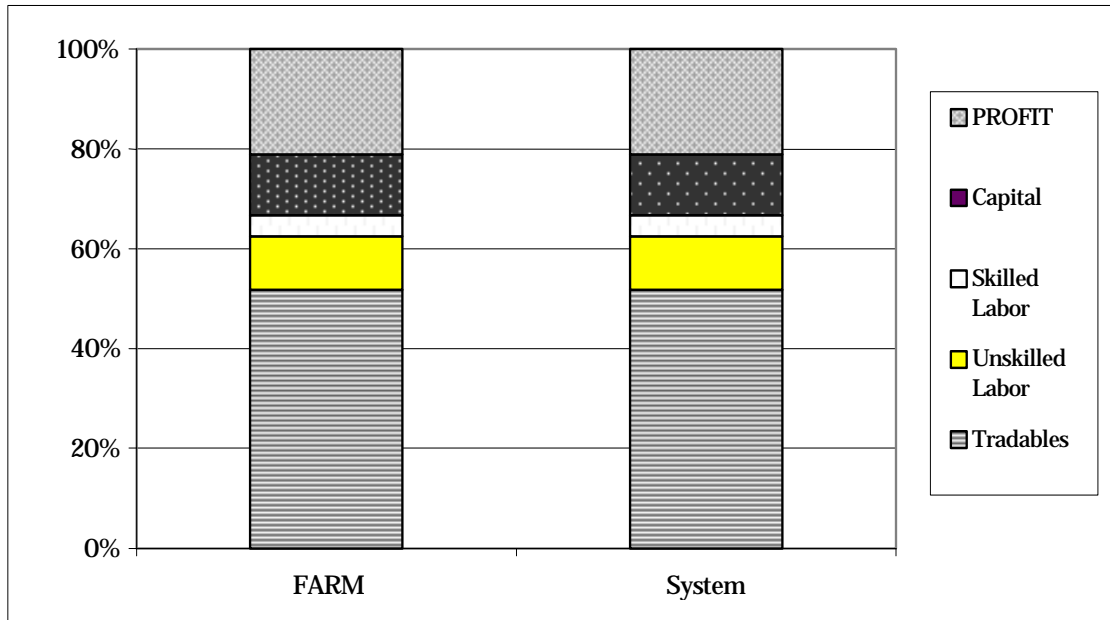
Source: collected and analyzed by the editor of this report

3.2.2.2. Presentation of live animal PAM

Table 3.7 shows the Policy Analysis Matrix of live animal.

Table 3.7. The PAM of live animal (SP/ton)

Item	Revenues	Costs		Profits
		Tradables inputs	Domestic factors	
Private prices	A 83,000	B 42,986	C 22,473	D 17,541
Social prices	E 57,466	F 40,638	G 19,660	H - 2,832
Divergences	I 25,534	J 2,348	K 2,813	L 20,3

Source: collected and analyzed by the editor of this report

In table 3.7 the social profits (H) are negative which means there is no comparative advantage, not using of economic resources efficiently, and not achieving high levels of outputs and income.

The third row computes policy and market divergences by subtracting the second line of the PAM from the first line. Divergences refer to distortions created by applied policies and market failures. .

Because the row of social prices estimates has been obtained from considering the export and import parity prices, it is also possible that the divergences reflect the effects of non-traded goods and services such as transportation, marketing, and processing.

The revenue at private prices is more than revenue at social prices; consequently (I) is positive which means there is a subsidy by (I) or the system benefits from system protection. In addition, (J)>0, so it can be said there is a tax on tradable inputs by this value. Also, if (K) is positive means there is a tax on domestic factors by (K) value.

As a result, the value of (L)>0 means that the subsidizing policy increases the final level of private profits, or there are transfers from all economy (society) to the system.

In table 3.8, the FCB at private prices is less than one, so there is competitiveness in the system; the DRC, which measures the efficiency or comparative advantage, is more than one, so the system does not have comparative advantage in producing the commodities. Also, the NPC is more than one, so the system is subsidized; the transfers value is (positive) 20.37 SP means that there is transfer from the economy to the system by this value; the EPC is more than one that's mean there is protection for the sector, or the Government subsidizes the final output in terms of its subsidy to producers. But the Profitability Coefficient (PC) is more than one in *absolute value*, so the system benefits from a net transfer from the economy due to policy in place. Finally, the value of Producer Subsidy Ratio (PSR) is 0.35, which means there is subsidy by 35% of social revenue, and the value of Equiv. Producer Subsidy (PC) is 0.24, which means there is subsidy to producer by this value.

Table 3.8. Value of indicators of live animal PAM

1. Financial profitability (FP)		[D = A - B - C]		17,541
2. Financial cost-benefit ratio (FCB)		[C / (A - B)]		0.562
3. Social profitability (SP)		[H = E - F - G]		-2,832
4. Domestic resource cost (DRC)		[G / (E - F)]		1.168
5. Social cost-benefit ratio (SCB)		[(F + G) / E]		1.049
6. Transfers		[L = I - J - K]		20,372
7. Nominal protection coefficient (NPC) (including by-product)		[A / E]		1.444
7a. Nominal protection coefficient (NPC) (main final output only)		[A* / E*]		1.444
8. Effective protection coefficient (EPC)		[(A - B) / (E - F)]		2.378
9. Profitability coefficient (PC)		[D / H]		-6.194
10. Producers subsidy ratio (PSR)		[L / E]		0.355
11. Equiv. producer subsidy (PC)		[L / A]		0.245

Source: collected and analyzed by the editor of this report

3.3. Sensitivity Analysis

The objective of sensitivity analysis is to determine the relation between the calculated indicators (DRC, SCB) and the changes of variables to see which has a larger impact on the PAM's results.

The PAM variables that can be taken as a reference in the sensitivity analysis are Financial Cost Benefit Ratio (FCB), Domestic Resources Cost Ratio (DRC), Effective Production Coefficient (EPC), and Producer Subsidy Ratio (PS). While the basic variables that by experience have a large effect on the output are calf's weight, parity price for the main output, conversion factor from the raw to main output at the processing level, and exchange rate.

Accordingly, an analysis of the complete cost structure of the system has to be carried out to identify cost items that represent an important share of the total cost (more than 5 %).

3.3.1. Meat

From figure 3.4, it is noticeable that the value of output variables changes when there is any modification in yield, so the elasticity is calculated to find the following results:

- If there is an increase in the meat yield by one unit there will be a decrease in the FCB by 0.65, the DRC by 0.86, and the EPC by 0.60. But there is an increase in the PSR by 0.10.

- On the other hand, when the yield reaches 0.56 then the DRC is equal to one and the profit is zero, so this point represents the break even point which means the cost of producing one kilo of meat is equal to the revenue of selling one kilo of it; annex 2 table 1.

Figure 3.4. Variation of FCB, DRC, EPC, and PSR due to cattle weight (ton)
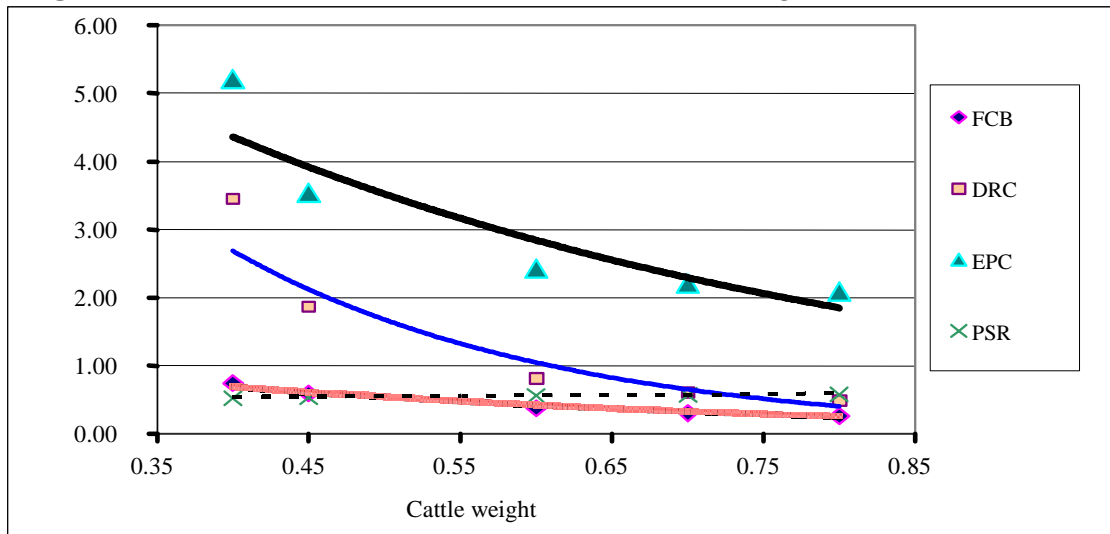
Source: collected and analyzed by the editor of this report

From figure 3.5, the variations in PAM variables, change nationally, when the world price changes by one unit; FCB doest not change; whereas, the DRC and EPC decrease by 0.94 and PSR by 1.06.

When the world price increases to 2280$, the DRC will equal one; annex 2 table 2.

Figure 3.5. Variation of FCB, DRC, EPC, and PSR due to FOB price ($) carcase
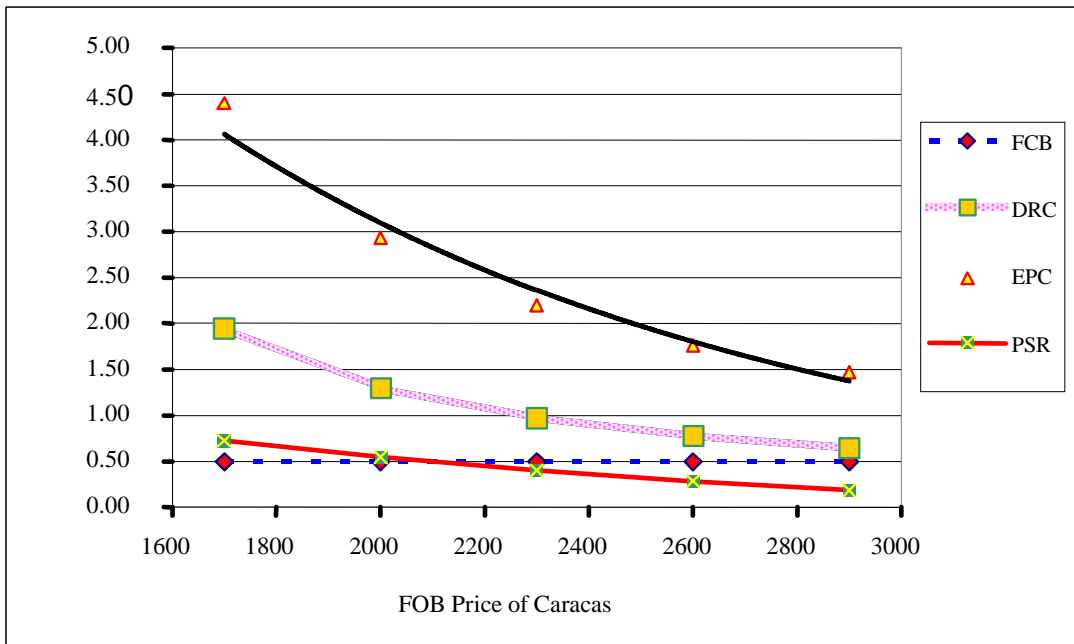
Source: collected and analyzed by the editor of this report

3.3.2. Calf

Figure 3.6 reports nationally, the variations in output variables to calf price change. When the price of calf changes by one unit, the FCB, DRC, and EPC will change by 0.99, 2.40, and 1.12 respectively. Whereas, the PSR will decrease by 0.09. When the price of calf decreases to 73.5 SP, the DRC is one and reaches the break even point and at this point there is no profit; annex 2 table 3**.**

Figure 3.6. Variation of FCB, DRC, EPC, and PSR due to FOB calf price variation (SP/kg)
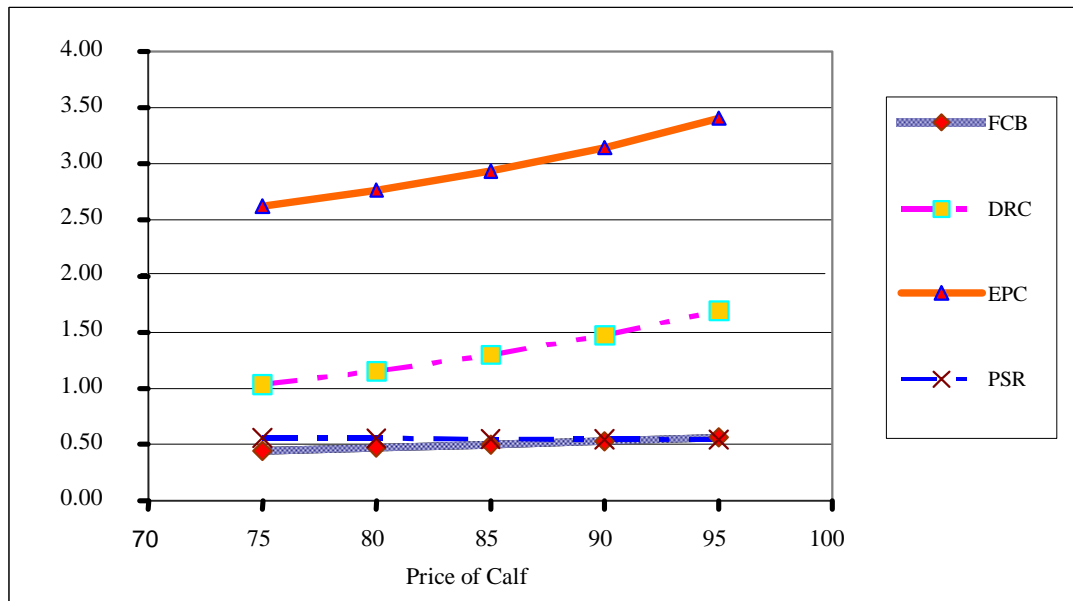
Source: collected and analyzed by the editor of this report

In addition, an analysis of the complete cost structure of the system can be made taking into consideration identifying the cost item that represents an important share of the total cost (more than 5%). The share of calf cost is 60% and barley 10% in total cost (collected and analyzed by the editor of this report).

3.3.3. Live animal weight

Figure 3.7 reports the variations in PAM variables due to live animal weight changes as the following:

- When the live animal weight changes by one unit, the FCB, DRC, and EPC will change by 1.87, 3.07, and 1.52 respectively. Whereas, PSR will increase by 0.26.

- When the live animal weight increases to 0.525 ton, the DRC is one reaching the break even point and at this point there is no profit because the cost equals to the revenue (annex 2 table 4).

- The share of calf and barley cost from total cost is 65% and 10.3%.

Figure 3.7. Variation of FCB, DRC, EPC, and PSR due to live animal weight (ton)

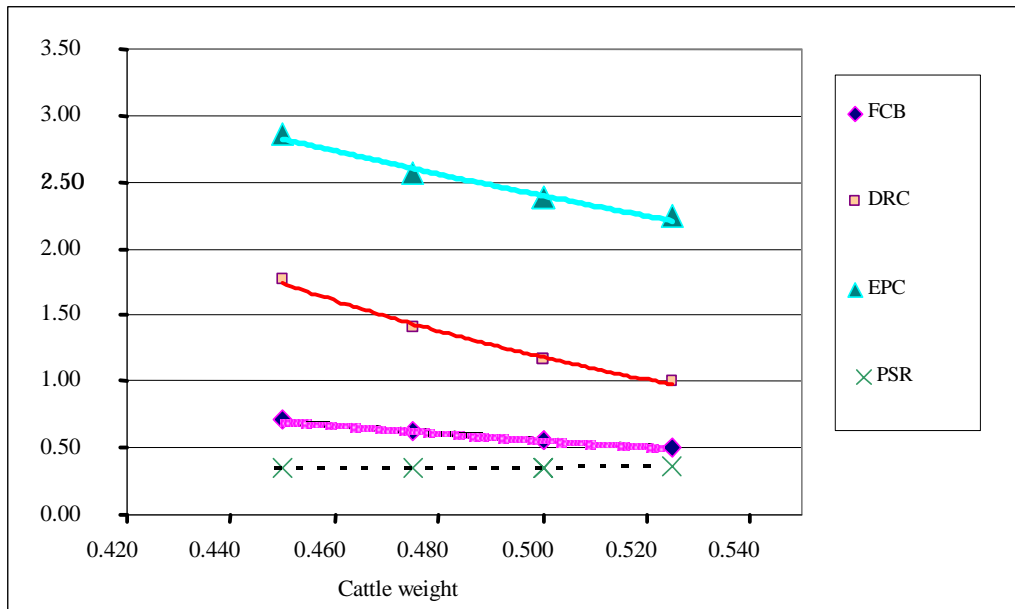Source: collected and analyzed by the editor of this report

Chapter 4 - Conclusion and recommendations

Depending on PAM indicators and budget summary, Syria does not have comparative advantages in fattening local calves compared to importing fattened calves, and cooled meat because of the high cost in buying calves and fodders. Noticeably, according to the sensitivity analysis of the comparative advantages indicators to the factors determining them, Syria has the break even point when the yield of meat reaches 0.55 ton/live animal (now 0.5 ton) because the DRC is equal to one. Also, when the parity price of carcase is equal to 2280$, the DRC equals to one and there is no profit, but above this world price Syria has comparative advantages in importing meat. Moreover, when the price of calf reaches 73.5 SP the DRC is one,, but less than this price Syria has comparative advantages.

All expectations refer to an increase in the demand for red meat -due to the expected increase in the population in 2020. Therefore, it is advisable to encourage the imports of foreign fattening calves and frozen meat due to the lack in the comparative advantage in fattening local calves because of the high cost of purchasing calves and fodders. At the same time, we can improve comparative advantage by increasing green fodders and facilitating of getting concentrated fodders.

Accordingly, we can recommend the followings:

- ➢ Encouraging and improving the agriculture of fodder crops to decrease the cost of feeding.
- ➢ Using cool transportation to keep the quality of distributing meat.
- ➢ Improve marketing information by establishing a suitable database.
- ➢ Improving veterinary services, improving fodder supply, and promoting the establishing of modern fodder firms.
- ➢ Establishing a follow up program to assess the effectiveness of credits and investments, and increasing long-term credits

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ANNEXES

Annex1 table 4. Budget of beef production

B1. FIXED INPUT	Life-Time	Used up Value	Initial Cost	Residual Value	Recovery rate	Market Price
Hangar	30	1	20000	0	0.068805	1376.108
crushing machine	10	1	500	0	0.132668	66.33388
TOTAL						1442.442
BUDGET #1 - FARM LEVEL					Revolving	TOTAL
B1. DIRECT LABOR		Unit	Freq	TOTAL	Fund	Price
Labor		month	130	433.3333	0.5	433.3333
TOTAL			0.108333			433.3333
BUDGET #1 - FARM LEVEL					Revolving	TOTAL
B1. INTERMEDIATE INPUT		Unit	Freq	TOTAL	Fund	Price
Calves		Day	1	21250	1	21250
Barley		Day	130	3359.77	0.5	3359.77
Cake		Day	130	383.8095	0.5	383.8095
Maize		Day	130	69.64286	0.5	70.33929
Bran		day	130	422.7902	0.5	422.7902
Straw		Day	130	1127.012	0.5	1127.012
Vitamin additives		Day	130	9.285714	0.5	9.285714
Mineral additives		Day	130	0	0.5	0
Wheat		Day	130	377.2321	0.5	381.0045
Soybean		Day	130	116.0714	0.5	116.0714
Lentils		Day	130	375.8135	0.5	375.8135
Jelbaneh (Rambling)		Day	130	1248.929	0.5	1248.929
Vet		head	1	250	0.5	250
Transport		head	1	100	0	100
Losses		head	0.01	830	0	830
Interest: on Revolving Fund		at market	0.666667	929.0996		929.0996
TOTAL			year			**30853.92**
BUDGET #1 - FARM LEVEL						TOTAL
B1. REVENUES	kg head	Unit		TOTAL		Market
fattened calves		ton		41500		41500
price per kg of fattened calve	83			0		0
TOTAL REVENUES						41500
TOTAL COST						32729.7
PROFIT (BEFORE TAXES)						8770.3
B1. DIRECT TAXES				0		0
TOTAL						0
PROFIT (AFTER TAXES)						8770.3

Source: collected and analyzed by the editor of this report

Annex 1: Brief presentation of the PAM

The Policy Analysis Matrix (PAM) provides an analytical framework to estimate the comparative advantage of a given productive system. It compares two accounting entities (Income = Input cost + Factors cost + Profit). One is computed for a level of price observed under the current economic conditions (called private prices), while the second entity uses the price (social price) that would prevails under perfect market conditions leading to an optimal allocation of resources within the economic system (a situation where the welfare of any economic agent cannot be improved without affecting the welfare of another one). The last line of the matrix is computed by subtracting private values from social values and represents the divergence between the current situation and the optimal situation. Those divergences are due to distortions attributed either to policy affecting the level of prices (taxes, subsidy) or to market failure (monopoly, externalities) that prevent markets to allocate resources efficiently. Prices prevailing on the world market are taken as the reference for building the accounting entities under social prices.

The Policy Analysis Matrix

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

For instance, if H>0, a commodity has a comparative advantage because it can be profitably produced in an open and competitive environment without generating any additional costs to the entire economy under the form of financial transfer through government policy or under the form of externalities caused by market failures.

The PAM provides straightforwardly a range of indicators for assessing the efficiency and the comparative advantages of a system.

Beyond commodity chains, the method can be easily adapted to assess the comparative advantages of a farming system, a region, a new technology and a development project. For each commodity, the CAS will build a PAM for the most representative commodity chains through which commodities are produced, marketed and processed.

PAM indicators

Indicators	Formula	Manning
1. Financial Profitability (FP)	[D = A - B - C]	Absolute value of the profit generated by the system at private price
2. Financial Cost-Benefit Ratio (FCB)	[C / (A - B)]	Indicator of the competitiveness of the system. If FCB<1, the system is competitive, if FCB>1 the system is not competitive, FP is negative
3. Social Profitability (SP)	[H = E - F - G]	Absolute value of the profit generated by the system at social price.
4. Domestic Resource Cost (DRC)	[G / (E - F)]	Indicator of the comparative advantage of the system. If DRC<1, the system have a comparative advantage, meaning that we use less value of Domestic Factors (labor, capital...) than the added generated (VA= E-F), if DRC>1 the system have no comparative advantage, SP is negative
5. Social Cost-Benefit Ratio (SCB)	[(F + G) / E]	Another indicator for measuring the comparative advantage of the system. It takes into account the full cost of production (F + G) instead of the Domestic factors only. It is a more appropriate ratio to rank the relative position of different systems when they have a different cost structure (i.e. tradable and non-tradable), because the DRC is biased in favour of system that have a high content in tradable.
6. Transfers	[L = I - J - K]	Absolute value of the transfer between the economy and the system
7. Nominal Protection Coefficient (NPC)	[A / E]	Indicate the level of protection for the main output, if NPC> 1, the system benefit from a protection, if NPC<1 the system is taxed.
8. Effective Protection Coefficient (EPC)	[(A - B) / (E - F)]	Indicate the total level of protection taking into account the effect of the policy on the private value of the tradable output and tradable input.
9. Profitability Coefficient (PC)	[D / H]	Measure the impact of the policy on the profitability of the system. If PC>1, the system benefit from a net transfer from the economy, if PC<1, the economy benefit from a net transfer from the system.
10. Producers Subsidy Ratio (PSR)	[L / E]	Indicator of the impact of the policy/market distortion on the increase (+) or reduction (-) of the total revenue of the system at social price. i.e. magnitude of the divergence from the reference situation at social price to the current situation at market price
11. Equiv. Producer Subsidy (EPS)	[L / A]	Indicator of the impact of the policy/market distortion on the increase (+) or reduction (-) of the total revenue of the system at market price. Equivalent to the Producer Equivalent Subsidy (PSE) as defined by OECD for trade negotiation. If + it is producer subsidy, if − its consumer subsidy.

Annex 2: Tables of sensitivity analysis

Table 1 - Variation of FCB, DRC, EPC, and PSR to Cattle weight (ton)

	weight of calf	FCB	DRC	EPC	PSR
	0.5	0.50	1.30	2.93	0.55
	0.4	0.75	3.45	5.21	0.53
	0.45	0.60	1.87	3.54	0.54
	0.55	0.43	1.00	2.62	0.56
	0.7	0.31	0.61	2.21	0.57
	0.8	0.26	0.50	2.09	0.58
(Xn/X1)-1	**1**				
	Y	-0.65	-0.86	-0.60	0.10
	X	1.00	1.00	1.00	1.00
Elasticity	**Y/X**	-0.65	-0.86	-0.60	0.10

Source: collected and analyzed by the editor of this report

Table 2 - Variation of FCB, DRC, EPC, and PSR to FOB price variation ($)

	Parity price	FCB	DRC	EPC	PSR
	2000	0.50	1.30	2.93	0.55
	1700	0.50	1.95	4.40	0.73
	2000	0.50	1.30	2.93	0.55
	2300	0.50	0.97	2.20	0.40
	2600	0.50	0.78	1.76	0.28
	2900	0.50	0.65	1.47	0.18
(Xn/X1)-1	**0.71**				
	Y	0.00	-0.67	-0.67	-0.75
	X	0.71	0.71	0.71	0.71
Elasticity	**Y/X**	0	-0.94	-0.94	-1.06

Source: collected and analyzed by the editor of this report

Table 3 -Variation of FCB, DRC, EPC, and PSR to Calf's price variation (SP)

	Price of Calf	FCB	DRC	EPC	PSR
	85	0.50	1.30	2.93	0.55
1	**75**	0.44	1.03	2.62	0.56
	80	0.47	1.15	2.76	0.55
	85	0.50	1.30	2.93	0.55
	90	0.53	1.47	3.14	0.55
	95	0.56	1.70	3.41	0.54
(Xn/X1)-1	**0.27**				
	Y	0.26	0.64	0.30	-0.02
	X	0.27	0.27	0.27	0.27
Elasticity	**Y/X**	0.99	2.40	1.12	-0.09

Source: collected and analyzed by the editor of this report

Table 4- Variation of FCB, DRC, EPC, and PSR to live animal weight (ton)

	Live animal weight	FCB	DRC	EPC	PSR
	0.5	0.56	1.17	2.38	0.35
	0.450	0.71	1.77	2.86	0.34
	0.475	0.63	1.41	2.57	0.35
	0.500	0.56	1.17	2.38	0.35
	0.525	0.51	1.00	2.24	0.36
	0.530	0.50	0.97	2.22	0.36
(Xn/X1)-1	**0.111**				
	Y	-0.21	-0.34	-0.17	0.03
	X	0.11	0.11	0.11	0.11
Elasticity	**Y/X**	-1.87	-3.07	-1.52	0.26

Source: collected and analyzed by the editor of this report