# Comparative Advantages of Selected Commodities

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# Foreword

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 benefits and limit 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 meet the challenges of increased population and sustainability of natural resources. More attention is also being placed on trade liberalization aiming at increasing export orientation. Concurrently, the gradual liberalization of the Syrian economy materialized in the GAFTA membership, the Association Agreement with EU and the application for WTO membership. In this context, the concept of comparative advantages of agricultural products has emerged as relevant in Syrian agricultural policy.

The assessment of the comparative advantages of a given productive system, or a sub sector, producing given goods or services, encompasses a broad range of conceptual works emanating from cost-benefit analysis and the theory of international trade. The concept of comparative advantages dictates that if a country has lower production cost of a good than that of the rest of the world, it should produce a good without getting any benefit from transfers from other sector. That means, the country should produce this good with its own domestic recourses (labor, capital, land and water) to supply its population, and possibly to export. If this is not the case then it is more economically efficient to import this good and to reallocate domestic recourses to other goods that have comparative advantages. The aim of applying the concept of comparative advantages is to diversify domestic resources in efficient ways under free market conditions.

The National Agricultural Policy Centre (NAPC), with the assistance of FAO Project GCP/SYR/006/ITA and the Government of Italy, has carried out; a systematic review of the comparative advantage of selected agricultural commodities (Sheep meat, Pistachio, and Potato) in order to provide the necessary information base for decision making. These commodities and their final output have been selected due to the existing of these commodities in local and regional markets and their importance in achieving food security. The study provides the main indicators of economic efficiency in producing these goods and assessing the capacity of the Syrian agriculture to remain competitive in a new policy environment to supply local and regional markets and get benefit from new market opportunities created by trade liberalization, and thus, durably increase its contribution to country's economic growth.

The results presented in this report aim at assisting policy analysts in assessing policy options and substantiate priorities on a commodity basis with respect to the whole range of functions devoted to the agricultural sector, balancing between economic efficiency and social equity. Following the introductory Section 1, Section 2 presents the method applied to measure the comparative advantages, the sources of information used and the process through which they were collected and analyzed. Section 3 presents the results obtained, while Section 4 addresses more specifically the policy makers need a comprehensive assessment of the potential impact of possible policy changes on the economic viability of these commodities.

This study is assembling the results of the three working papers of the selected crops that mentioned above.

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# 1. Introduction

## 1.1. Background

The scarcity of natural resources and the ongoing opening of Syrian economy to the world markets outline the urgent need for Syria to reallocate its domestic resources and tradable inputs within the agricultural sector and by governorates towards the objective of increasing specialization based on comparative advantages and to move further ahead towards a competitive advantages. Therefore Syria is currently seeking to identify commodities in which their governorates has a comparative advantage.

Assessing the capacity of agricultural sector under the new economic environment call for an urgent need to study comparative advantages of the following commodities:

- Pistachio;
- Potato;
- Sheep meat.

### Pistachio

Pistachio is considered as one of the most important fruit trees and has the potential for the generation of both social profit and hard currency. Pistachio produced in Syria is exported to Arab and European countries owing to its quality and preferred taste. Figure 1.1 illustrates the evolution of the balance sheet of pistachio during 1996-2006.

**Figure 1.1.** Evolution of produced, exported and imported pistachio quantities, 1996-2005 (thousand ton)
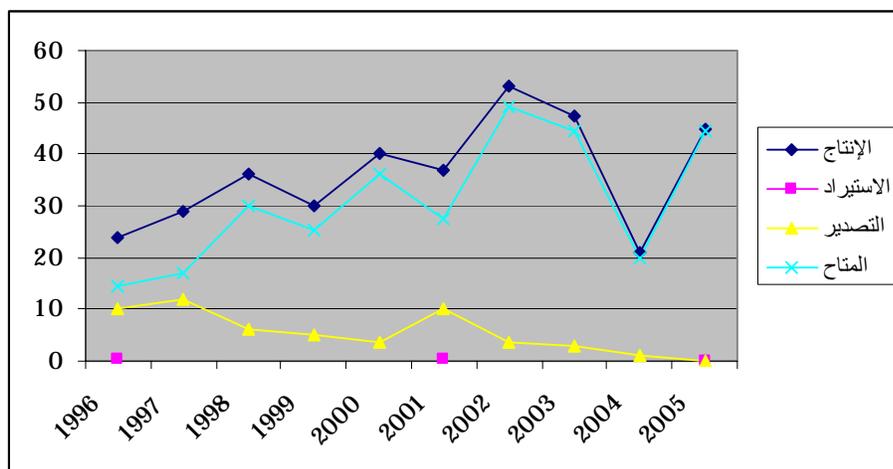


**Source**: Elaborated from NAPC Database

### Potatoes

Potato plays a substantial role in food security strategy, income generation, job creation and provides employment opportunity. Moreover, potato has recently shown an increase in export volume. Figure 1.2 illustrates the evolution of potato balance sheet over the period 1996-2005.

**Figure 1.2**. Evolution of potato balance sheet (production, import, export, available) 1996-2005 (thousand ton)
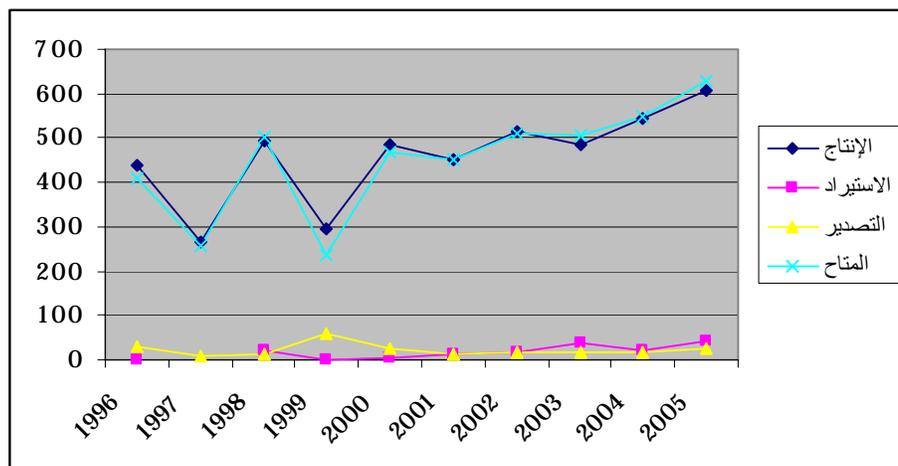


Source: NAPC Database- 2005

**Sheep meat**

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. Figure 1.3 shows the evolution of sheep meat balance sheet during period 1996-2005.

**Figure 1.3**. Evolution of sheep meat balance sheet (production, import, export, available)
 1996-2005 (thousand ton)



Source: NAPC Database- 2005

Table 1.1 clarifies the balance sheet of the selected commodities

**Table1.1** production, import, export of the selected commodities/ton

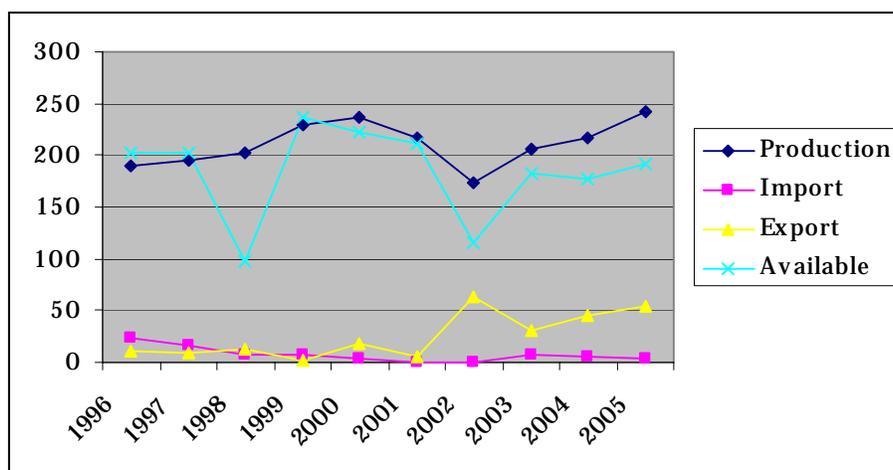| Product | Production | Import | Export |
|---------|-----------|--------|--------|
| Pistachio | 4500 | 2145 | 1096 |
| Potato | 542000 | 22000 | 16900 |
| Sheep meat | 197900 | 800 | 54500 |

Source: NAPC database

Therefore, it is crucial to assess to which range these commodities have comparative advantage considering both the needs of local market and the opportunity of entering new international markets ( Middle-East and the EU) in order to increase and diversify sources of foreign currency.

## 1.2. Main policies related to the selected commodities

*1.2.1. Macroeconomic environment*

### Exchange rate and monetary policies

According to the current policy reforms, taxes on export revenue have been removed and the exchange rate unified to 51 SP per 1 US dollar.

For the capital market of agricultural sector, the Agricultural Cooprative Bank(ACB) is perhaps the most important institutional instrument of the government to promote agricultural production and productivity and raising the standard of living of the rural population; cash and "in-kind" loans are provided short-term, medium-term and long-term loans. They are granted for periods not exceeding 300 days. Interest rates vary according to the volume of the loan and are different for cooperative members and individuals. They are 5% for cooperatives and pubic sectors for all kinds' loans, 7% for cooperative members for medium and short term loans, 8% for long terms loans. Concerning private and joint sectors the interest rate is 8% and 9% for short & medium term loans and long term loans respectively. [1]

### Trade Policies

The Syrian trade polices have been gradually going through extensive transformations through economic reform operation. Syrian government has removed all the taxes related to agricultural production and the tax on export profit[2]. It has also removed most of the inputs subsides. Moreover the Government allows private sector to export and import the commodities which were traded just through public sector.

The entire pistachio trade is in the hands of the private sector. Prices therefore are largely determined by market forces. There are government interventions in some areas of pistachio trade, such as a ban on the import of in-shell pistachios and custom duty on importing shelled pistachios (10% for the bags of 25 kg and more and 30% for the bags less than 25 kg); but no custom duty is applied on exporting pistachios.

Potato as well as all vegetables and fruits are marketed freely in the local or central wholesale markets. Farmers deliver their productions to traders directly or ask traders to sell their outputs for a commission of 5% of the total value. The price of potato varies form season to season

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[1] Official Journal
[2] Decree no. 15 dated 3/7/ 2001.

according to supply, demand, export and import. The price of one kg of potato reached 17 SP in 2004 while it was 14 SP in 2003.

The Syrian government promotes private and public investments in sheep raising and fattening and applies a series of measures to balance supply and demand at affordable prices. These measures reflect the Government's strategy which seeks to saturate local demand (self-sufficiency) and protect local markets. This is achieved through the following measures:

In 1993, the government introduced the "Two for One" policy which required exporters to import live sheep equivalent to twice the volume of the proposed export shipment. Since illegal export practices continued in spite of the "Two for One" policy, the ministry of trade issued decision number 1100 lifting restrictions on weight and volume. Also it is regulated that all exports value (foreign currency) of sheep meat must be exchanged into Syrian Pound (SP) at the Commercial Bank of Syria.

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 measures were taken,

- An export tax was imposed of 100 SP/head on exported livestock to reduce export and limit the domestic price increase[3].

- The government reintroduced the "Two for One" policy[4].

- The Cabinet issued Decision for exporting male sheep and stated the condition that their weight should not be less than 38 Kg till 11/4/2005[5].

- The government reintroduced the "Two for One" policy from 15/4 till 15/6/2006 and stated that lamb weight should not be less than 38 kg[6].

**Input policies**

The government continues to encourage pistachio production by selling seedling at controlled prices (low prices), alongside the private nurseries. The recent establishment of the Pistachio Bureau in Hama Governorate (2006) should help to develop this product throughout by assisting improvements in quality, by providing assistance to the farmers, by collecting data, by determining diseases and controlling them, and by holding the first Syrian pistachio fair in 2006.

Regarding potato seeds, the General Establishment for Seed Multiplication (GESM) determines the seed requirements of the farmers according the agricultural plan and the specifications as well A and E class of Elet Seeds through two committee, the first one is composed by the General Commission of Agricultural Research (GCAR), the Plant Protection and production department, and the General Establishment for Seed Multiplication (GESM) and takes care of technical and health condition of potato. The second committee is specialized in determining the seed requirements which consists of Plant Protection and production departments besides the National Peasant Bureau.

Regarding the technical feature of the imported seeds, Syria is considered as having strict procedures to guarantee high quality of imported potato seeds. Moreover, based on the production plan, the GESM determines the imported seed requirements and the specifications as well.

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[3] Legislative Decree No. 18 of February 14, 2004
[4] DecisionNo.396 of June, 13/2004
[5] Decision No. 20of July, 2004
[6] Decision No. 866 14 of April 2005

In 1974, the General Establishment for Fodder (GEF) was established in order to provide the concentrated feed needs for livestock production. The GEF gets the raw products from both the private and public sector and stores 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 at an affordable price especially during the toughest agricultural period (from November up to the end of February). Therefore the GEF plays a critical role in protecting sheep flock by supplying 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 breeders 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 but it does not substitute the pasture. Noticeably, Government has allowed both public and private sectors to import feed in order to meet 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 the share of pasture. is 23.5%.

## 2. Methodology and Data sources

### 2.1 The policy analysis Matrix

The Policy Analysis Matrix (PAM) model can be used to measure the comparative advantage (social profitability) of an activity, and to measure the effect of Government interventions and market imperfections of the entire system starting from the farm level  until final consumption (the exporter point).

The PAM, a three-lines by four-column table, is build on the bases of these accounting identities and provides all the different accounting values needed (noted from A to L) to compute the ratios required for the analysis of the comparative advantages (table 2.1)[7].

Considering that the total output sale is the revenue of the system, the accounting identity can be noted as:

### Profit= Revenue- costs

To construct the matrix costs are distinguished between tradable goods and domestic resources (labor and capital). By definition, tradable goods are goods and services that can be traded internationally and include the goods produced by the system (the output) and all intermediate inputs, whereas domestic factors are those that cannot be traded internationally, such as labor, land and capital. Even though, labor and capital cannot be any more considered as "pure" domestic factors in a globalized world where international migrations are frequent and where financial markets are increasingly integrated. However it is considered that the price or the value of domestic factors is mainly determined by local factor markets conditions, especially for labor. This concept of "domestic factor" is central to the theory of the comparative advantages as they correspond to the resources available from which goods can be produced within the national economy. Since there is a limited quantity of domestic factors available, their optimal allocation and combination are crucial to ensure the maximum level of efficiency.

Revenue and the two categories of costs are evaluated at both private and social prices. The private price, the actual market price, is the price that is influenced by the existing polices. The social price, on the other hand, is the price that would prevail in the absence of policies or market induced distortions and reflects the scarcity of any resource within the studied system. The divergence between the social values and the private values indicates the magnitude of the

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[7] Lancon, Frederic. Comparative advantage technical note. NAPC, 2004

transfers induced by the current policy and market environment between the prevailing situation at private price and the optimal one at social price

**Table 2.1** Policy analysis matrixes

| Item | Revenues | Costs of tradable inputs | Costs of domestic factors | Profit |
|---|---|---|---|---|
| Private price | A | B | C | D |
| Social prices | E | F | G | H |
| Divergence | I | J | K | L |

Source: author

The Policy analysis matrix (PAM) is a tool that assists policy makers to determine what specific part of the agricultural sector has the best advantage in relation to international competitors and assesses the comparative advantage potential. Comparative advantage analysis is the framework, which allows determining the economic profitability of an activity. It allows the estimation of revenue and cost independent of all market distortions, either subsidization or taxation. This tool can be applied at farm level as well as through the entire commodity chain (producers, processors, traders) in a coherent manner to determine the level of profitability. It allows also making an interesting comparison among a number of commodities or production systems to determine which one has the strongest comparative advantage (CA) and more profit. CA refers to changes in three categories of economic parameters namely: the world price of tradable outputs and inputs, opportunity costs of domestic factors of production (labor, capital, land), and production technologies used in farming and marketing. These three parameters together determine the social profitability and comparative advantage.

In an open economy, the parity prices of tradable goods (both final output and tradable inputs) express their opportunity cost. Therefore, the parity prices are used to calculate the returns at social prices with reference to the export destination and world price.

There is no world prices for domestic resources simply because they are non traded goods, therefore their economic prices are calculated based on the opportunity costs (shadow prices), the output of the second best alternative use of domestic resources is estimated at world prices either (CIF) or (FOB). The opportunity costs of the domestic resources are calculated as following:

- Identify the second best alternative use
- Asses the return produced by this alternative
- Calculate the parity price of alternative production
- Estimate the conversion rate which is the ratio of the production value of the alternative at world price and the actual production value at market prices

The PAM provides straightforwardly a range of indicators for assessing the comparative advantages of a productive system. If D is positive the system generates profit under the current policy and market conditions and is said to be competitive or profitable.

Similarly, if H is positive the system is able to generate profit without benefiting from any transfer from the rest of the economic systems, or conversely transferring resources to the rest of the economy; in this case the system is said to be economically efficient or to have a comparative advantages.

The computation of a PAM for one specific system provides only a limited set of information for policy formulation that requires choosing between different alternatives. It is, therefore, much more relevant to build a PAM for different technical combinations of inputs and domestics factors or for different category of outputs or for different period of reference to analyze changes across time. The comparison of PAMs, developed for different technologies or different products, relies on the computation of ratios that are scale, product and time independent in order to derive meaningful comparison. Different types of ratio have been developed that provide indication on the different dimension of the comparative advantages. The meaningful indicators that can be calculated through PAM are presented in table2.2.

**Table 2.2** PAM Indicators

| Indicators | Formula | Meaning |
|---|---|---|
| 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+B) /A] | 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 has comparative advantage, meaning that less value of domestic factors (labor, capital...) is used than the added value generated (VA= E-F), if DRC>1 the system has 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 different cost structures (i.e. tradable and non-tradable), because the DRC is biased in favour of the system that has a high share of 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] | Indicates the level of protection for the main output, if NPC> 1, the system benefits from a protection, if NPC<1 the system is taxed. |
| 8. Effective Protection Coefficient (EPC) | [(A - B) / (E - F)] | Indicates 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] | Measures the impact of the policy on the profitability of the system. If PC>1, the system benefits from a net transfer from the economy, if PC<1, the economy benefits 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 negotiations. If + it is producer subsidy, if – its consumer subsidy. |

Source: CA working paper NAPC, 2004

## 2.2 Characterization of Representative Systems

The representative systems of Pistachio and Potatoes have been broken down based on the following criteria:

- The type of the main output produced (packed or unpacked potato, shelled or unshelled pistachio).
- The market destination (Arab, Gulf and European markets).
- Farm level irrigation technology

Moreover, only the harvesting season of potato has been taken into account.

A representative system of sheep meat was developed based on the common type of fattener in terms of scale, feed and destination.

Table 2.3 presents the list of representative systems that have been identified and the different characteristics of each system. The last column indicates the policy issues that are relevant for each system.

**Table 2.3:** Combination of criteria for representative systems characterization.

| Number | commodity | Final output | Farm level technology | Processing | Targeted market | Main policy objective |
|--------|-----------|--------------|----------------------|------------|-----------------|----------------------|
| 1 | Awassi sheep meat | Live sheep meat | | Concentrated fodder | Gulf market | currency earning food security |
| 2 | Pistachio | in-shell pistachio | rainfed | Manual pilling | Gulf market EU market | currency earning food security |
| 3 | Pistachio | in-shell pistachio | Sprinkle well irrigation | Manual pilling | Gulf market Eu market | currency earning food security |
| 4 | Pistachio | in-shell pistachio | Drip well irrigation | Manual pilling | Gulf market EU market | currency earning food security |
| 5 | Pistachio | in-shell pistachio | Flood well irrigation | Manual pilling | Gulf market EU market | currency earning food security |
| 6 | Pistachio | Shelled Pistachio | rainfed | Manual packaging | Gulf market EU market | currency earning food security |
| 7 | Potatoes | Packed Potato | Well Irrigation | Manual packaging | Gulf market EU market | currency earning food security |
| 8 | Potatoes | unpacked Potato | Well Irrigation | Manual packaging | Iraq market | Political Issue |

**Source**: Elaborated by author

## 2.3 Data Sources and Analysis for Budget Development.

The information relating to the productive system was collected from the governorates, where production activities concentrate. Both primary and secondary sources were used. The primary data were obtained from field surveys through interviews and structured questionnaires. The official data of MAAR and trade ministry (secondary data) was used (such as the official production coefficient that declared by MAAR). The collection of farm data in the governorates relied on the investigation of the agricultural directorates and their sub-directorates, extension units and the leaders of local communities. Thus, the budget of the entire system is built through a combination of individual budgets prepared for each relevant agent involved in producing the final product, starting from the farm level until the exporter point (parity point).

## 2.4 Budgets at market price

These budgets present revenues, costs and profits. Costs are disaggregated into three main groups: fixed costs, intermediate input, and direct labor. Also, budgets distinguish, within each cost category, between tradable goods and domestic resources (labor and capital).

*2.4.1 Decomposition of Cost Items into Tradable and Domestic Factor Component*

The distinction between tradable input/output and domestic factors is at the core of the PAM concept. Once the budget has been established each cost item is decomposed across these categories. Revenue earned from the output sale is straightforwardly classified into the tradable output category. Whereas, labor directly provided or paid by any agents involved in the sub sector is considered as a domestic factor. Family labor at the farm level was inputted into the budget using the corresponding wage rate for each agricultural operation.  In order to assess the potential of labor regulations on the performances of the systems analyzed, two categories of labor are distinguished.

- Qualified labor, which is subject to formal employment contract associated with employer's contribution to social insurance retirement schemes. Drivers, technician and engineers attending to processing equipments, clerks, manager were included into this category

- Non-qualified labor, or so called casual labor, such as farm workers, packers and so forth that are often paid on a daily or short term basis without any formal contract.

The decomposition becomes more complex for intermediaries inputs. For physical goods directly purchased by an agent, 5% of the purchase value was arbitrarily inputted as qualified labor, 5% as non-qualified labor and 10% as capital cost. The remaining 80% was considered as tradable input.

Complementary investigation and computations were made for complex intermediary input, such as energy purchase, maintenance services, transport, that incorporate a more balanced share of labor, capital and tradable.  Specific budgets were developed on the basis of data already collected by NAPC or additional data collected by the Farming system study FFS  are used to estimate more precisely the labor, capital and tradable content of mechanized farm operation, while for other cost items the allocation was made on the basis of educated guess or coefficient applied in other study made in similar environment.  When a selected sub-sector uses as input an output produced by another sub sectors, and this output is not international traded, the decomposition coefficient where taken from the corresponding PAM.

**Table 2.4(a)**: Coefficients applied to decompose intermediate inputs into tradable and non tradable components.

| Item | Non-qualified labor | Qualified labor | Capital | Tradable inputs | Sources or reason |
|---|---|---|---|---|---|
| Manure | 0,07 | 0,05 | 0,17 | 0,72 | Beef production PAM budget |
| Seeds | 0,05 | 0,05 | 0,10 | 0,80 | |
| Fertilizer and chemical input | 0,05 | 0,05 | 0,10 | 0,80 | |
| Mechanized labor | 0,33 | 0,05 | 0,17 | 0,45 | Budget from FSS data |
| Barley | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Cake | 0,46 | 0,03 | 0,14 | 0,37 | Cotton sub sector PAM |
| Maize | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Bran | 0,26 | 0,06 | 0,15 | 0,54 | Wheat PAM |
| Straw | 0,27 | 0,05 | 0,14 | 0,55 | Wheat PAM farm budget |
| Vitamin | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Mineral | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Soybean | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Veterinary services | 0,00 | 0,40 | 0,10 | 0,50 | Educated guess |
| Purchased conc. Mix. | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |

**Table 2.4(b)**: Coefficients applied to decompose fixed costs into tradable and non tradable components.

| Item | Non-qualified labor | Qualified labor | Capital | Tradable inputs | Sources or reason |
|---|---|---|---|---|---|
| Building | 0,30 | 0,10 | 0,30 | 0,30 | Educated guess |
| Generator | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Vehicle for handling | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| pipe | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Refrigerator | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Agricultural machinery | 0,05 | 0,05 | 0,10 | 0,80 | Physical good |
| Well | 0,12 | 0,00 | 0,48 | 0,40 | Budget from NAPC water study |

**Table 2.4(c)**: Coefficients applied to decompose other costs into tradable and non tradable components.

| Item | Non-qualified labor | Qualified labor | Capital | Tradable inputs | Sources or reason |
|---|---|---|---|---|---|
| Maintenance (with spare parts) | 0,10 | 0,10 | 0,20 | 0,60 | educated guess |
| Spare parts alone | 0,05 | 0,05 | 0,10 | 0,80 | educated guess |
| Transport | 0,33 | 0,05 | 0,17 | 0,45 | Mechanized labor use as a proxy |
| Electricity | 0,01 | 0,03 | 0,04 | 0,92 | Collected |
| Fuel | 0,05 | 0,10 | 0,10 | 0,75 | educated guess |
| Water | 0,10 | 0,10 | 0,40 | 0,40 | educated guess |
| Telecommunication | 0,05 | 0,10 | 0,40 | 0,45 | educated guess |
| Other | 0,30 | 0,20 | 0,20 | 0,30 | educated guess |
| Packing | 0,05 | 0,05 | 0,10 | 0,80 | educated guess |
| Network Irrigation cost | 0,22 | 0,05 | 0,09 | 0,64 | NAPC water study |
| Pump Irrigation cost | 0,10 | 0,00 | 0,05 | 0,85 | NAPC water study |
| Maintenance of the drip | 0,10 | 0,10 | 0,20 | 0,60 | Educated guess |

Source: CA working paper NAPC, 2004.

## 2.5 Budget Development at Social Price

Budgets at social price present revenues, costs and profits. Social prices are prices that prevailing in perfect competition where is no-one could be made better-off without making someone else worse off (Pareto optimal, or Pareto efficient)[8]. Thus the opportunity costs of resources to produce one additional unit of a good equal the scarcity value of a good that a consumer would be willing to pay. In other words, the social prices reflect the opportunity costs. The determination of the value at social price for each cost and income items is done by correcting the prevailing market price on the basis of the price distortions that have been identified. The technique that applied to compute the social prices consists in computing the 3rd row and subtracted form the first one.

**Figure 2.1** Computation the 3rd row of the PAM
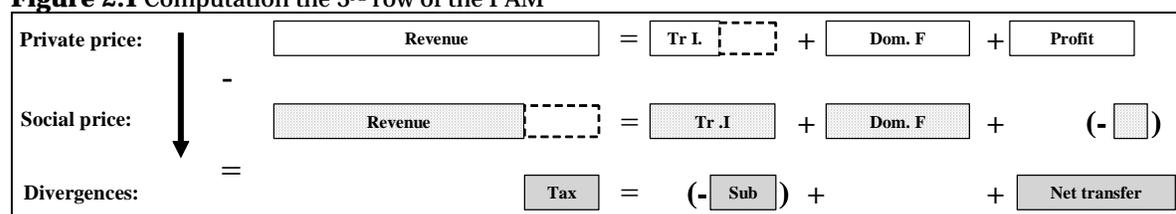


### 2.5.1 Output parity prices

Parity price for tradable outputs is the price that equals the international or border price at the parity point which is the point where local supply of the main output competes with the imported one or its substitute. This point is allocated at farm gate or at processing factory gate. The resulting farm gate prices are called import parity prices or sometimes border price equivalents.

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[8] Andreu Mas-Colell   Michael D. Whinston, Microeconomic theory 1995

Parity prices of imported goods are assessed by calculating the import parity price (CIF) at the border, adding all costs (except the custom duty) until the product reaches the local market; this price is then compared with that of the local good. Parity prices of exported goods, however, are calculated by subtracting all due costs including transportation and fright from the price of the import destination until the product reaches the Syrian borders.

Since social prices are calculated with domestic currency while the tradable items are treated with the US dollar, the exchange rate of the domestic currency against the US dollar has a great impact. No significant distortion was accounted for between the current exchange rate and the social exchange rate. Therefore, an average rate of 51.05 SP to 1 USD has been applied.

The reference used to compute the parity prices are listed in table 2.5.

**Table 2.5**: References for the computation of main final output parity prices.

| Final output | Reference price | source |
|---|---|---|
| Sheep meat | Imported unite value in Saudi Arabia market | Interview |
| Potato | Imported unite value in GAFTA and EU markets | Interview |
| Pistachio | Imported unite value at Greek borders | FAOSTAT |

Source: author

### 2.5. 2 Tradable input social price.

Tradable input values at social prices are determined by deducting from the corresponding value at private price the value of the custom duties, and by adding the value of any subsidies. A specific attention was given to the adjustment of the cost of energy, a major input for the agricultural sub sectors. Since the current market price in Syria (7 SP/liter) is lower than the prevailing world fuel price (estimated at 12.22 SP/liter), fuels users benefit from an implicit subsidy that amount to 40% meaning that there is a transfer from fuel sector to the rest of economy (Table 2.6).

**Table 2.6** Computation of the subsidy content in Diesel price

| Product form and market reference | Price | | |
|---|---|---|---|
| | **Value** | **Currency** | **Unit** |
| **Crude oil world price** | 30.00 | USD | Per barrel |
| | 0.19 | USD | Per liter |
| **Conversion ratio from crude oil to diesel** | 1.25 | | |
| **Diesel world price** | 0.24 | USD | per liter |
| **USD to SP exchange rate** | 51.50 | SP | |
| **Diesel parity price** | 12.22 | SP | per liter |
| **Market price in Syria** | 7.00 | SP | per liter |
| **Subsidy content from parity price** | 43% | | |

Source: CA study 2004

The reduced value of the fee paid by farmers benefiting from gravitational network irrigation is a significant public subsidy noted on the input side. Based on data collected by NAPC earlier, the total cost for gravitational cost has been estimated at 8700 SP per hectare and per year while farmers pay only 3500 SP. Similarly, subsidy provided to the sheep sector is calculated at 30% due to the difference between the market price of feed and the supported price of the provided quantity by GEF.

For physical goods directly purchased by selected sub sectors' agents, the duty enforced since the last revision of the tariff was directly applied. For complex intermediate inputs, combining a more balanced share of tradable and non tradable factors, a level of duty was adjusted according to the share of each tradable used in the services provided.

**Table 2.7:** List of the coefficients applied for deriving tradable input social price from observed prices.

| Item | Duty/implicit subsidy | Reference (HS code) |
|---|---|---|
| **Fixed costs** | | |
| Building | 30% | educated guess |
| Generator | 1,7% | 8704 |
| Vehicle for handling | 10% | 8427 |
| Truck 5-20 ton | 14,5% | 8704 |
| Van | 50,5% | 8704 |
| Tube pipe | 47,0% | 3917 |
| Refrigerator | 7,0% | 8418 |
| Agricultural machinery | 1,7% | 8433 |
| Well Irrigation cost | 30,0% | computed |
| **Agricultural *input*** | | |
| Seeds | 1,7% | 3102 |
| Fertilizer and chemical input | 1,7% | 3102 |
| Mechanized labor | -18,0% | educated guess |
| Barley | 1,7% | 2305 |
| Maize | 1,7% | 2307 |
| Bran | 7,0% | 2302 |
| Vitamin | 1,7% | 2307 |
| Mineral | 5,0% | 2512 |
| Soybean | 1,7% | 2307 |
| Veterinary | 1,7% | 2307 |
| Purchased concentrate .mix | 1,7% | 2307 |
| Vet, drugs, feet trimming | 1,7% | educated guess |
| **Other costs** | | |
| Maintenance (with spare parts) | 20,0% | 8708 |
| Spare parts alone | 20,0% | 8708 |
| Transport | -18,0% | computed |
| Electricity | -13,0% | computed |
| Fuel | -40,0% | computed |
| telecommunication | 10,0% | educated guess |
| Packing | 23,5% | 3923 |
| Network Irrigation cost | -6,0% | computed |
| Pump Irrigation cost | -35,0% | computed |
| Maintenance of the drip | -35,0% | computed |

Source: CA study 2004

## 2.5.3 Labor and capital market

The estimation of the social value of the domestic factors is less straightforward as it cannot be backstopped by the value of similar input on the world market. A first adjustment is made to take into account the impact of particular official regulation on factors costs. For the capital

market, the interest rate for the deposits in the Commercial Bank of Syria (CBS) reached 7% per annum. This rate is used to calculate the opportunity cost for the capital used in production at private prices. However, to calculate the opportunity costs for capital at social prices, the weighted interest rate (3%) that is calculated by the IMF for the Asian modern industrialized economies was applied.

For the labor market, it is assumed that there are no distortions present and that the current wages reflect the true opportunity costs of labor. Nevertheless, a distinction is made between temporary and permanent labor. This distinction is made to calculate the levied tax on permanent labor. This tax is composed of 3% as health insurance by the state, 14% is paid by the employer, and 7% is paid by the laborer. It is equal to the laborer's wages divided by the correction factor (26%).

# 3. Results

3.1 Performance the Representative Systems

Values and indicators for performance of the representative systems are presented in table 3.1. The two left hand columns provide the value of profit at private and social prices for one ton of main output. The next four columns provide the indicators also with reference to one ton of the main output (or 1kg meat of animal),

**Table 3.1** Indicators and profitability private and socials (sp/ton)

| System | Financial profit | Social profit | FCB | DRC | NPC | EPC | ESP |
|---|---|---|---|---|---|---|---|
| rain-fed in shell pistachio, exported to Europe | 89,635 | 77,769 | 0.668 | 0.551 | 1.31 | 1.376 | 0.044 |
| rain-fed shelled pistachio, exported Europe | 1,479 | 8,572 | 0.997 | 0.97 | 1.40 | 1.52 | -0.014 |
| drip irrigated in-shell pistachio, exported to Europe | 104,439 | 76,270 | 0.543 | 0.534 | 1.298 | 1.396 | 0.105 |
| sprinkler irrigated in-shell pistachio, exported to Europe | 91,133 | 63,769 | 0.588 | 0.586 | 1.298 | 1.436 | 0.102 |
| packed potato exported to Dubai | 3496 | 14885 | .593 | 230. | 550. | -0.46 | -0.84 |
| Sheep meat exported to Gulf | 71 | 90 | .566 | .786 | 0.98 | .072 | .074 |

Source: author

*3.1.1 Financial Profitability*

Financial profitability is estimated by Financial Cost Benefit ratio (FCB), is the value of the domestic factors above the value added (which is the output value minus the value of tradable inputs used in the production process) created at market price [FBC= C/ (A-B)]. If this ratio is above one, it means that the systems utilize more value of Domestic factors than it the wealth created or the Value added, then the system is not profitable. If the FCB<1, the system is profitable; therefore the system that are the most profitable are the one that have the FCB closest to zero. Table 3.1 indicates that for 2005, taken as a reference year by the study, all the

systems were profitable. The most profitable systems are, in decreasing order, drip irrigated in-shell pistachio exported to Europe (0.543), followed by sprinkler irrigated in-shell pistachio exported to Europe (0.588), packed potato exported to Dubai (0.59), Sheep meat exported to Gulf (0.651), rain-fed shelled pistachio exported to Europe (0.99).

In an absolute value the highest profit at market prices is obtained from producing one ton of; pistachio (89 thousand SP), followed by producing one ton of Awassi sheep meat (7 thousand SP), then packed spring potatoes (2500 SP) and finally rain fed shelled pistachio (1500 SP).

### 3.1.2 Economic profitability Economic efficiency

Economic efficiency is estimated by Domestic Cost Resources ratio (DRC) which is a ratio similar to the FCB but computed at social prices. It measures the level of comparative advantages achieved by the selected systems [DRC=G/(E-F)] . If the DRC is above one, the system has no comparative advantages, meaning that the production of one unit of output will mobilize more domestic resources than value added created. If the DRC is below one the system has a comparative advantages, and the system is said to be economically efficient. Results indicate that the return to Domestic Factors invested at social price, for packed potato exported to Dubai have a DRC ratio of 0.23, rain-fed in shell pistachio with supplementary drip irrigation exported to Europe have a DRC of 0.55, Sheep meat exported to Gulf a DRC of 0.56, rain-fed shelled pistachio exported to Europe a DRC close to a unity 0.97 so this system has weak comparative advantage.

Looking at the profit obtained at social price the highest profit is achieved by producing one ton of; Awassi sheep meat (90 thousand SP), then by pistachio in shell (89 thousand SP), Potatoes (15 thousand SP and finally shelled pistachio (8600 SP).

### 3.1.3Transfer of Resources

There are 4 indicators measure the level of protection, distortion and transfers from /to the representative systems

**The Nominal Protection Coefficient** (NPC) measure the level of protection for the tradable output by looking at the ratio of the revenue at private price above the revenue at social price (NPC= A/E). A NPC above one indicates that the system benefit from a protection since he gets a higher revenue at private prices than he would get at social price; conversely, a NPC below one indicates that the main output is undervalued at private price resulting in a transfer of wealth from the productive system to the rest of the economy.
The Nominal protection coefficient for both spring potato exported to Dubai and live sheep meat exported to Gulf are less than one ( NPC=0.72 & 0.98 respectively ) imply that the  spring potato live sheep meat systems are taxed at a level of 28% and 2%( respectively) of the social price, meaning that the price in the international market is higher than the local market by the same former ratios, whereas pistachio system has NPC more than unity (NPC=1.3) indicating that this system is protected and the price of pistachio at domestic markets is 31% higher than its social price.
**The Effective Protection Coefficient ratio** (EPC) compares the added value at private price to added value at social price [EPC= (A-B) / (E-F)] which give a combined index of the level of trade distortion on both tradable inputs and outputs; it provides a more accurate measure of the level of protection than the NCP. A EPC above 1 means that the selected systems is protected while an EPC below one means that the system generates less added value at market price than he would have at social prices or, in other words, that it is explicitly or implicitly taxed.

EPC is 1.38, which is slightly higher NPC, indicating the presence of significant distortion in the domestic resources (capital interest rate). EPC is 1.37, slightly above the NPC, meaning that

most of the distortions are related to the tradable materials because of the distortion of the final output.

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 Equivalent Producer Subsidy (EPS)** is a ratio of the total net transfer (L) above revenue at private price [EPS= L/A]. It indicates the share of income gained (or lost) for the system due to distortions induced by the current policy or market distortions. This ratio has been widely used as an instrument to measure and monitor the aggregated level of protection to a sub sector during trade negotiations

**The Subsidy Ratio to Producer (SRP)** compares the net transfer to the revenue at social price (L/E) and provides another measure of the magnitude of the transfer induced between the selected systems and the rest of the economy. In case of positive aggregated transfer (L>0), it indicates the magnitude of the world price increase that would be required for the selected system to have a comparative advantages.

*3.1.4 Comparison between the selected commodities chains*

Table 4.6 summarize all indicators related to the selected commodities chains pointing that all systems create profit at private and social prices at both current policies and without government intervention.

**Financial and social Profitability**

The financial cost-benefit ratios (FCB) computed for each system are below 1, indicating that for 2005, taken as a reference year by the study, all the systems were profitable. The most profitable systems are, in decreasing order, drip irrigated in-shell pistachio exported to Europe (0.543), followed by sprinkler irrigated in-shell pistachio exported to Europe (0.588), packed potato exported to Dubai (0.59), Sheep meat exported to Gulf (0.651), rain-fed shelled pistachio exported to Europe (0.99). In an absolute value the highest profit at market prices is obtained from producing one ton of; pistachio (89 thousand SP), followed by producing one ton of Awassi sheep meat (7 thousand SP), then packed spring potatoes (2500 SP) and finally rain fed shelled pistachio (1500 SP). Looking at the profit obtained at social price the highest profit is achieved by producing one ton of; Awassi sheep meat (90 thousand SP), then by pistachio in shell (89 thousand SP), Potatoes (15 thousand SP and finally shelled pistachio (8600 SP).

**Economic Efficiency**

In terms of return to Domestic Factors invested at social price, packed potato exported to Dubai have a DRC ratio of 0.23, rain-fed in shell pistachio with supplementary drip irrigation exported to Europe have a DRC of 0.55, Sheep meat exported to Gulf a DRC of 0.56, rain-fed shelled pistachio exported to Europe a DRC close to a unity 0.97 and therefore a weak comparative advantage.

**Transfer of Resources**

The lower FCB ratios obtained compared to the DRC indicate that rain-fed in shell pistachio is more profitable at private price than at social price. And has an Effective Protection Coefficient above the unit, and accordingly, benefit on aggregate from a positive transfer of resources from the rest of the economy (seedling subsidy and fuel subsidy), whereas packed potato exported to Dubai and Sheep meat exported to Gulf systems are more profitable at social prices, meaning that there is transfers from these sectors to the rest of the economy and there is no subsidy and the effective protection coefficient less than unit.

Looking now, at the respective share of the divergences on tradable outputs, inputs and domestic factors in the transfers of resources reported by the 3rd row of the PAM, on average, the largest share of the transfer are due to price distortions on tradable output due to the high quality and consumer preference of sheep meat and Potato in Gulf region.

*3.1.5 Comparison of the pistachio systems*

**Financial profitability**

The aforementioned results in table 3.1 confirm that all representative system of pistachio create profit at market prices, meaning that pistachio is a profitable crop under current policies, with the highest profit achieved by in shell drip pistachio exported to Europe. We should though take into account that this system can not be considered as pure irrigated system, rather a rainfed system with supplementary irrigation. The highest financial profit achieved in the pistachio systems for 1 ton is of the drip irrigated in-shell pistachio exported to Europe (104 thousand SP), followed by sprinkler irrigated in-shell pistachio exported to Europe with (91 thousand SP), and rainfed pistachio exported to Europe (90 thousand SP), and finally rain-fed shelled pistachio exported Europe (1500 SP).

**Social profitability**

In terms of social profit, the highest financial profit is achieved by in shell rain-fed pistachio exported to Europe (78 thousand SP), followed by drip system (76 thousand SP), sprinkle system (64 thousand SP) and rain-fed shelled pistachio (1500 SP).

**Economic Efficiency**

Domestic resource coefficients (DRC), which represent the value added unit cost, are less than unity for the all pistachio representative systems, meaning that with reference to year 2005, pistachio systems have a comparative advantage. From the most to the lowest efficient DRcs are the following: drip irrigated in-shell pistachio exported to Europe (0.534), sprinkler irrigated in-shell pistachio exported to Europe (0.5510, and rain-fed in shell pistachio exported to Europe (0.688). The above allows us to conclude that rain-fed in shell pistachio production has a strong comparative advantage taking into consideration that this crop requires supplementary irrigation. Moreover, it also results that drip irrigation technique is more efficient than sprinkle one. Whereas, there is no comparative advantage for shelled pistachio systems due to quality and inefficient post harvest operations.

**Transfer of Resources**

The lower FCB ratios obtained compared to the DRC indicate that rain-fed in shell pistachio is more profitable at private price than at social price. It also has an Effective Protection Coefficient above the unit, and accordingly, it benefits on aggregate from a positive transfer of resources from the rest of the economy (seedling subsidy and fuel subsidy). Concerning EPS which represents the share of revenue gained for the system due to transfer from other sectors, rain-fed shelled pistachio system records the highest share for, with a transfer share of 50%, while for other pistachio system the share is 40%.

# 4. Sensitivity analysis

## 4.1 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 producer should produce to cover the variable costs. It was estimated for the final output for each system. Table 3.2 depicts the sensitivity of the systems in response to the change of the final output prices both at market and social prices;

the higher the ratio the better the system is likely to maintain comparative advantage when the output prices decrease.

Table 3-2 clarifies that the sheep meat system has comparative advantage till the productivity of breeder decreases to 874 kg at market level and 617 kg at social level, keeping other variables constant, which represent 0.86 and 0.60 of the current yield at market and social price, respectively. Concerning the price of the final output, the lowest price that maintains a comparative advantage is 92 sp/kg and 78 sp/kg at market and social prices respectively, which represent 0.57 and 0.46 of the current prices at market and social price respectively.

The same interpretation has been developed for potatoes. Concerning yield, the lowest is 29 ton/hec at market level and 13 ton/hec at social level, keeping other variables constant, which represent 0.93 and 0.42 of the current yield at market and social price respectively. Concerning the final output price of potato, the lowest price is 12022 sp/ton and 10250 sp/ton at market and social prices respectively which represent 0.89 and 0.46 of the current prices at market and social price respectively.

Table 4.1 clarifies the break even point for pistachio system in terms of yield and final output.

**Table 4.1** The break even point

|  | At Market | At Social |
|---|---|---|
|  | (% of current value) | |
| Sheep Yield | 874 | 617 |
|  | 0.86 | 0.60 |
| Sheep Final output price | 92 | 78 |
|  | 0.57 | 0.46 |
| Potato Yield | 29.31 | 13.12 |
|  | 0.93 | 0.42 |
| Potato Final output price | 12022.06 | 10250.1 |
|  | *0.89* | 0.46 |
| Pistachio Yield | 1.17 | 1.20 |
|  | 0.62 | 0.61 |
| Pistachio Final output price. | 165561 | 129813 |
|  | 0.61 | 0.63 |

Source: Author

## 4.2 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 the basic elements that we have to identify :

- Yield.
- Establishment costs
- Parity price.
- Interest rate at social

- Exchange rate

Second we 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 we specify a range (0.2-0.5) on the base of past experience of actual input variable. The basic approach to quantitative "Risk Analysis" is to derive a probability distribution that describes the possible outcomes of an uncertain situation and generate valid results 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. This approach is called simulation. The approach relies on the ability of the computer to do a great deal of work very quickly solving the model repeatedly using a large number of possible combination of input variable values and the @ Risk analysis results are presented in the form of probability distributions. A simulation was carried out for all systems 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 of combinations of inputs which lead to output target values. The results indicated that the sheep meat fattening system and packed potatoes enjoy 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 those systems is 100% (Figures 4.1& 4.2)

**Figure4.1** The probability of DRC of the live sheep meat system
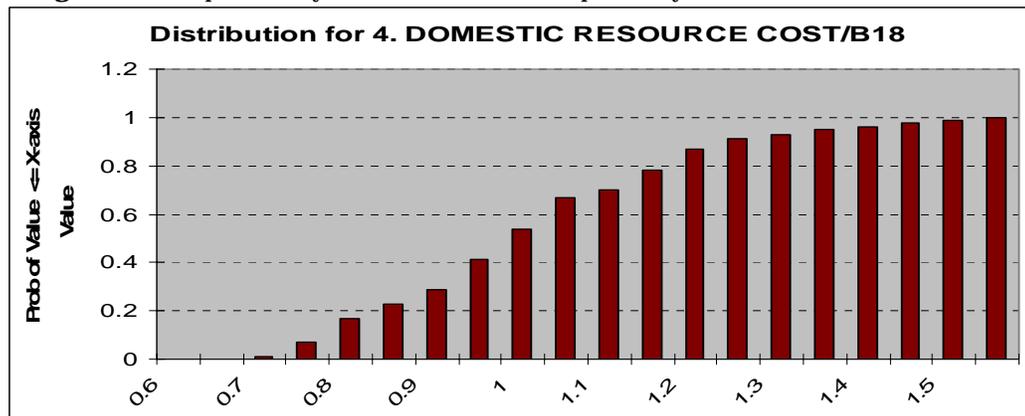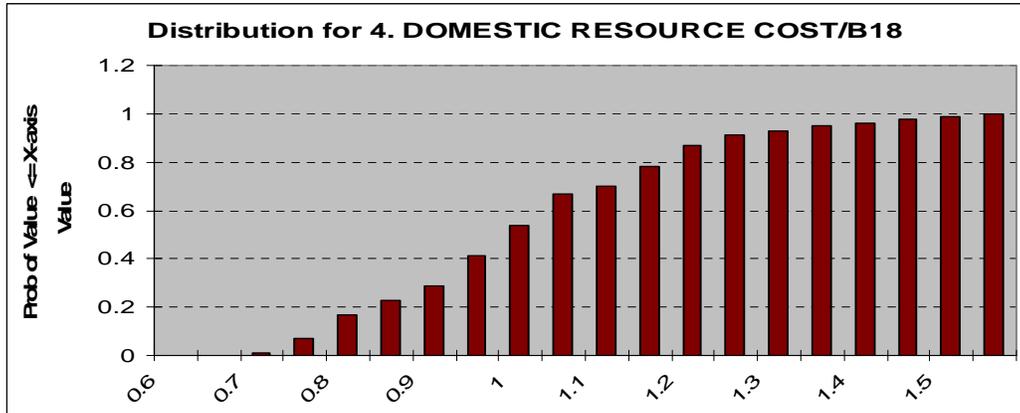


Source: Author

**Figure 4.2** The probability of DRC of the packed potato system
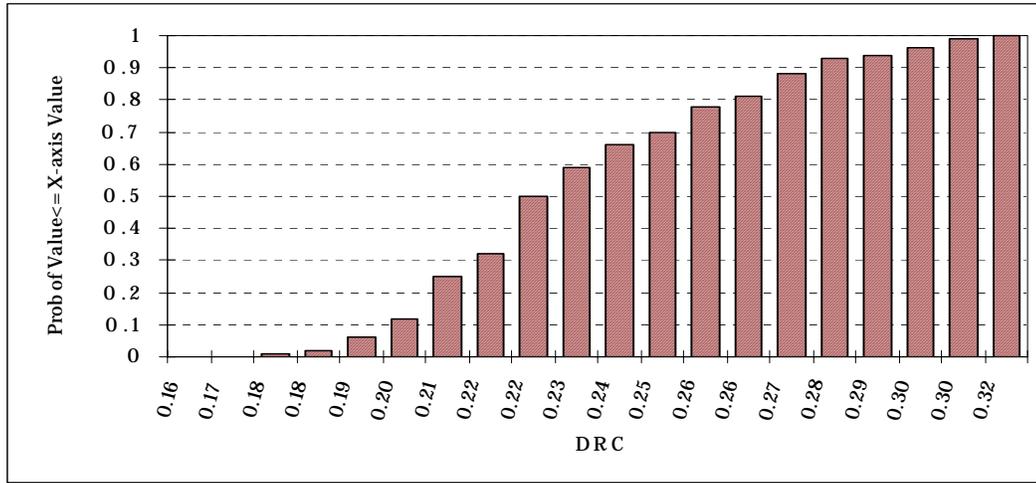


Source: Author

While the gross value of the DRC through simulation analysis for rainfed pistachio is clarified in Figure 4.3 where the maximum value is 1.56 and the minimum value is 0.69, while the mean is 1.01. It is noticeable that 55% of the DRC distribution is less than one, meaning that if data change with an interval of +/- 20%, it is probably by 55% that this system has a comparative advantage.

**Figure 4.3**The probability values of the DRC for the imported rain-fed shelled pistachio
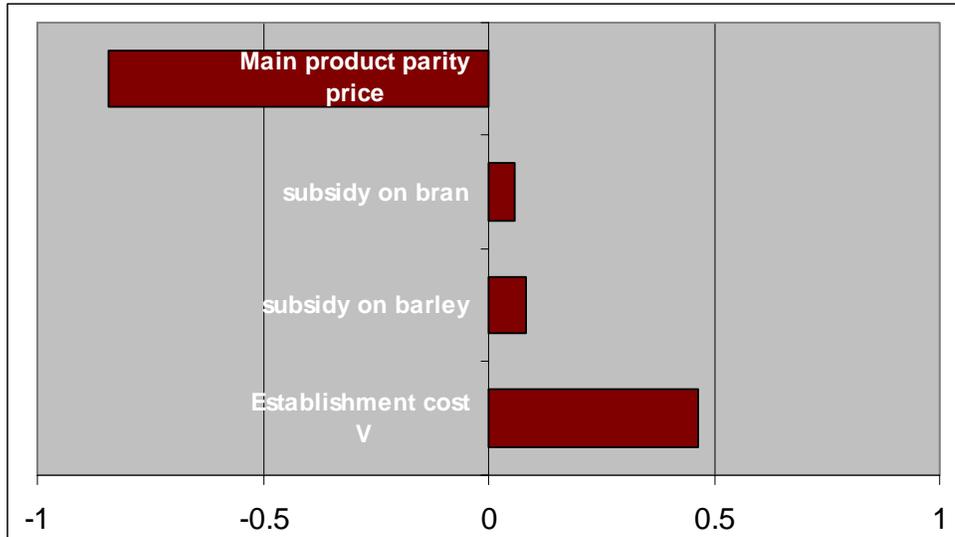


Source: Author

During a simulation analysis it is important to account for correlation between input variables. 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. Concerning sheep meat system; the sensitivity analysis (Figure 4.4) clarifies the presence of a strong inverse relationship between the DRC from one side and the social parity price, establishment costs. However, the DRC is less sensitive to the subsidy on barley and bran, but the relationship is proportional. For example, increasing the value of the current parity price by 1% is resulting in a reduction in the DRC by 0.686%, leading

to an increase in the comparative advantage of this system. While increasing the establishment costs by 1% in resulting in an increase in the DRC value by 0.55%.
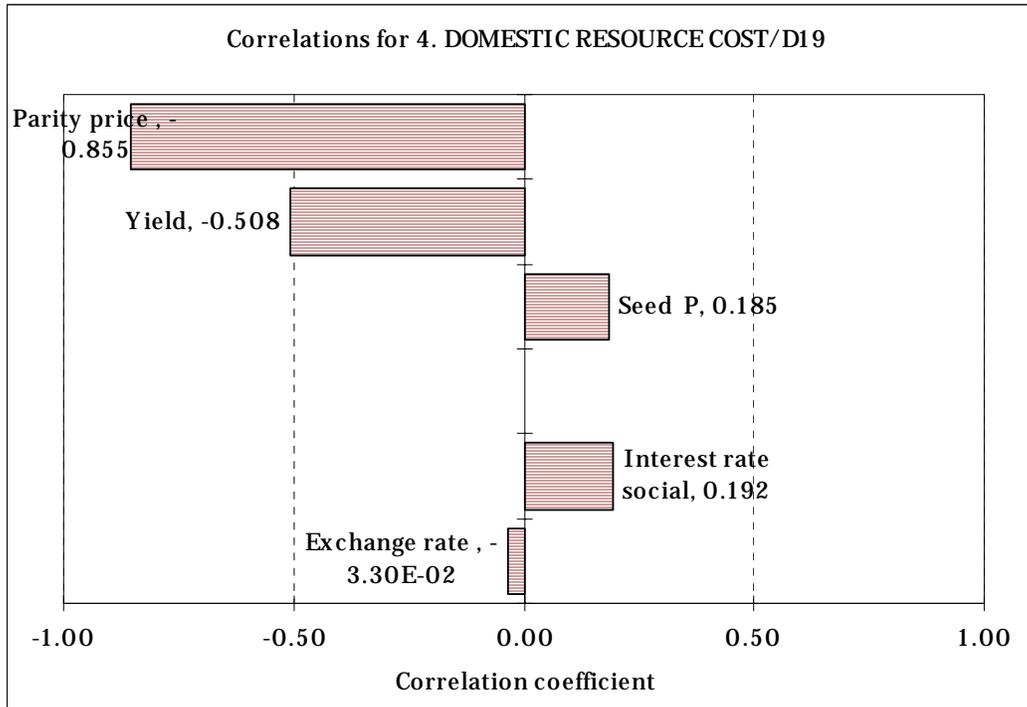
**Figure4.4.** The main variable effected DRC of live sheep system



Source: Author

Figure 4.5 illustrates the sensitivity analysis between DRC and the main input variables of spring potato exported to Dubai. Accordingly, there is an inverse relationship between the DRC and the parity price, yield and, exchange rate. A proportional relationship is present, however, between the DRC and the seeds' price, and social interest rate. For example, doubling the parity price will lead to a reduction of the DRC by 0.85% resulting in an increase of the comparative advantage of the system, whereas the DRC is less sensitive to seeds' price with a direct relationship of 0.18.

**Figure 4.5** The main variables effected DRC of spring packed potatoes



Correlations for 4. DOMESTIC RESOURCE COST/D19

Parity price , -0.855

Yield, -0.508

Seed P, 0.185

Interest rate social, 0.192

Exchange rate , -3.30E-02

Correlation coefficient

Source: Author

Concerning rainfed shelled pistachio; the sensitivity analysis (Figure 4.6) clarifies the presence of a strong inverse relationship between the DRC from one side and the social parity price, exchange rate, yield, and the conversion rate from the other side. However, the DRC is less sensitive to the social interest rate, but the relationship is proportional. For example, increasing the value of the current parity price by 1% is resulting in a reduction in the DRC by 0.567%, leading to an increase in the comparative advantage of this system.

**Figure 4.6** The main variables affected DRC of spring packed potatoes
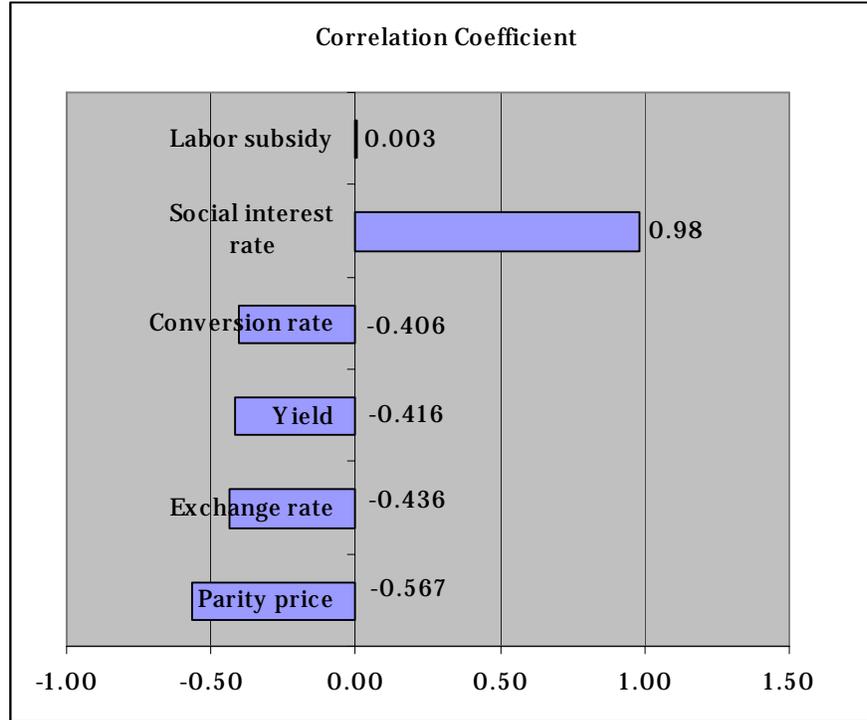


Source: Author

# 5. Conclusion

All representative systems achieve positive profits at social and market prices and enjoy comparative advantages meaning that the unit cost of domestic resources to produce a unit of the final output is less than the value added generated by this unit. However rainfed shelled pistachio has weak comparative advantage close to unity (DRC=0.97) due to the strong competition with the Iranian pistachio. The domestically produced shelled pistachio is preferred by the domestic traders and processors who are willing to pay 15-20% more than they pay for the imported one. Whereas the negative divergence in intermediate input market and final output market for both live sheep meat and packed potato induced by distorted prices as a result of government intervention such as taxes polices and the high quality and consumer preferences in Gulf countries. Whereas other subsidized systems receive transfers from other sectors.

# 6-Recommendation

**Pistachio systems**

- Seek new varieties that have higher conversion rates and yields in rain-fed areas, more resistant to the alternate bearing phenomenon, and suitable for mechanized peeling. This will increase both outcome and income and reduce production cost. Hereby the GCASR and extension service play a crucial role especially by improving the plantation techniques and design of pistachios.

- Introduce new technologies for peeling mechanically through providing credits, boosting private investments and supporting the processors to obtain this technology. This process will improve the quality of pistachios and reduce the cost of post harvest operations.
- Cooperate with Arab and international institution and partners to enhance the productivity and profitability of pistachios.
- Develop marketing brands by regions to diversify the pistachio products, to enter the world market, and to enhance competitiveness and profitability.
- Establish a marketing information system concerned with pistachio especially agent based data to enhance flexibility, efficiency and international competitiveness.

## Potato

- Improve the quality of the produced potato to comply with the needs of both local and foreign consumers, processors and quality standards such as:
  - Unification of size and quality.
  - Production of disease free potato.
- Supply the improved seeds of potato both on time and at competitive prices.
- Produce at competitive prices, this necessitates procedures both to reduce production costs and to increase yields such as:
  - Introduction of improved technologies.
  - Enhancement of marketing efficiency.
  - Improvement of potato research.
- Enhance international trade cooperation to decrease duties and to boost the movement of potato products.

## Sheep meat

- Build a national reserve of feed sufficient for one year at least to respond to disasters and drought which cause a shortage of pastures and 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 ratio 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.

## Export Recommendations:

- Stop export for the months from 15th of January through 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 250,000 heads/month will avoid suffocation, and guard against fluctuation at the local market in terms of sheep and meat prices and 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, and 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 in 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, responsible for the technical issues and the veterinary health.

  3- Union of Peasants, supervising and controlling body concerned in sheep breeding and its related activities.

- Commit to the regulations already in force, and 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 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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