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Introduction

Under the auspices of the Minister of Agriculture and Agrarian Reform, the National Agricultural Policy Center (NAPC), supported by the FAO Project GCP/SYR/006/ITA - Phase II "Assistance for Capacity Building through Enhancing Operation of the National Agricultural Policy Center", organized the 3rd National Agricultural Policy Workshop at Cham Palace, Damascus, on 1 July 2004.

The Workshop was organized to discuss the results of two major studies conducted at the NAPC with the support of the FAO Project: "Farming Systems in the Syrian Arab Republic" and "Comparative Advantage of Selected Syrian Commodity Chains".

The first study analyses the geographical and socioeconomic differentiation of Syrian agriculture. It provides a characterization of the Syrian farming structures and the prevailing agricultural households in different areas of the country with the objective of providing a baseline for informed government interventions in the agricultural sector. The study includes an assessment of the ability of representative farmers to respond to changing environmental and market conditions that can be of special interest in defining new forms of public intervention able to foster agricultural development in the emerging economic environment.

The study on Comparative Advantage of Selected Syrian Commodity Chains assesses production efficiency and competitiveness on international markets of some key agricultural products. It lays the foundation for the formulation of agricultural and trade policies able to successfully integrate Syrian farmers in the international markets, in line with the Syrian Government endeavor to enhance his participation in the global economic system.

The Workshop also provided an occasion to promote the debate on the challenges and opportunities related to Syria's accession to WTO, with a view at promoting awareness of accession requirements and enhancing preparedness for successful negotiations on the base of the analytical work that is being conducted at the NAPC with the support of the FAO Project GCP/SYR/006/ITA - Phase II.

The Project, jointly implemented by the Food and Agriculture Organization of the United Nations and the Syrian Ministry of Agriculture and Agrarian Reform counting on generous financing from the Italian Government, contributed to the realization of the 3rd National Agricultural Policy Workshop as a stocktaking event in the move from the nursing to the consolidation phase of the NAPC. Indeed, the event marked the conclusive stage of the second phase of Project activities and the turning tuning point into its third phase, which is due to start in October 2004 to contribute to the "Sustainable Capacity Consolidation of the National Agricultural Policy Center". During the Workshop two books recently published as outcome of this successful undertaking in international cooperation were presented: "Syrian Agriculture at the Crossroads" and "Syrian Agricultural Trade 2003".

Attendance to the Workshop (see list of participants in Annex 1) included policy makers and public officers from all main departments of the Ministry of Agriculture and Agrarian Reform, other Ministries and various Public Establishments, Members of the Parliament, scholars from various Universities, stakeholders from the private sector, representatives of various professional and nongovernmental organizations, and representatives of International Organizations and Embassies.

Opening Ceremony

The Workshop was opened by welcoming statements of H.E. Mahmoud Mohamed Taher, FAO Representative in Syria, H.E. Francesco Cerulli, Ambassador of Italy, and H.E. Adel Safar, Minister of Agriculture and Agrarian Reform.

H.E. M. Mohamed Taher, FAO Representative in Syria, expressed his honor in participating in the inauguration of the 3rd National Agricultural Policy Workshop and underlined that the Workshop came within the FAO efforts to enhance capacity in the analysis, formulation, implementation, monitoring and evaluation of the national policy in the area of food, agriculture, and rural development. In this regard, he stressed that the technical assistance provided by FAO to consolidate NACP as an institution specialized in applied agricultural policy analysis, is framed within the FAO commitment to support the modernization and development process of Syrian agriculture through enhancing in a sustainable manner technical and institutional capacities.

Mr Taher praised the generous financial support of the Italian Government that provided the funding for the implementation of the past, current and next phases of the FAO Project GCP/SYR/006/ITA. He also took the chance to welcome H.E. Francesco Cerulli, the new Italian Ambassador in Syria, thanking him for the attention he is paying to this Project. In this respect, Mr Taher also expressed deep appreciation to the former Ambassador, H.E. Laura Mirachian, for the support she provided to the FAO activities in Syria, especially those related to agricultural policies.

He remarked that the organization by the NACP of the 3rd third National Agricultural Policy Workshop, after the two events organized by the FAO Project in 2000 and 2002, is a factual evidence of the progress made in establishing a national institution able to assume a central role in promoting public awareness and dialog on the challenges faced by Syrian agricultural development. Meanwhile, the studies presented in the Workshop show the growing potentials of NACP in the area of research and analysis based on the solid technical basis acquired with the technical support provided by FAO.

Mr Taher continued his intervention introducing the studies and the publications to be presented, inviting the participants to contribute in the discussion and addressing the Workshop as a floor to exchange views with the aim of enriching the studies' outcomes taking into account the visions of policy makers and other stakeholders. In this regard, he wished the Workshop to be a fruitful occasion to further enhance the common understanding of the main issues related to the Syrian agricultural development.

Mr Taher concluded by expressing his gratitude to H.E Adel Safar, Minister of Agriculture and Agrarian Reform, for the efforts he is making to support the agricultural development process and, specifically, the FAO Projects being implemented in Syria.

The Italian Ambassador, H.E. Francesco Cerulli, welcomed the participants remarking the efforts that the Syrian Government is making to favor Syrian involvement in international trade. He recalled that, in the process of an opening towards the world market and liberalizing trade, Syria became a member of the Great Arab Free Trade Agreement (GAFTA), it has applied for membership to the World Trade Organization (WTO) and is on the verge to sign an Association Agreement with the EU. In this regard, he remarked how much such efforts need to be accompanied by structural changes, while policies have to be shaped so that Syria can be ready to face international competition.

The establishment of the NAPC is part of the process enabling Syria to face the challenges of a free market environment. In this respect, H.E. the Ambassador of Italy reminded that the Government of Italy with pleasure responded to the request of assistance coming from the Syrian Government. Indeed, the Italian funded Project GCP/SYR/006/ITA, implemented by the Food and Agriculture Organization of the UN, is an example of the Italian Government support to Syrian undertaking in agricultural policy reform. The Italian support covers all areas of Syrian agriculture, from institutional building to the improvement of agricultural processing. Other areas of cooperation that represent important part of the Italian support to Syria are the improvement of the irrigation systems and the safeguard of the environment.

The Ambassador concluded his intervention mentioning that, in the framework of a new agreement between Italy and Syria for the financing of new projects, agriculture will remain a pillar of future cooperation.

H.E. Adel Safar, the Minister of Agriculture and Agrarian Reform, welcomed the audience to the Workshop, hinting at the value in the Syrian agricultural development of the three studies that were about to be discussed. He wished the findings of the Workshop to be helpful in drawing strategies for Syrian agriculture to make it play a better role in the comprehensive sustainable development of the country. He also praised the well-timed organization of the Workshop, in a period in which the Ministry of Agriculture and Agrarian Reform is focusing on defining agricultural policies mechanisms and reshaping its structure.

The Minister mentioned the changes occurring worldwide that turned the existence of economic blocks into a process towards globalization. In this regard, he remarked that this shift calls for quick actions to be especially taken by developing countries that need to adopt new policies in order to achieve food security and to focus on the production of crops in which they have a comparative advantage.

Furthermore, the Minister highlighted how the modernization of Macro and Micro policies in Syria is responding to the requests for a new global economic environment, mentioning that the government is gradually shifting to a more market oriented economy, without giving up its essential role in managing resource allocation. He stressed the importance of agricultural policies as an effective tool to achieve food security, recalling that Syria attained food security by targeting the Government intervention on strategic crops, favouring the exports of valuable agricultural commodities. He also referred to the importance of the development projects implemented to foster land reclamation, women empowerment and credit provision.

Furthermore, the Minister also referred to the numerous agreements between Syria and other countries, to the efforts made in order to finalize the Syrian European Association Agreement, and also to the Syrian request of WTO membership.

He concluded his intervention thanking the Italian Government for its financial support, and the FAO for its critical role in improving the food situation both in Syria and worldwide. He then acknowledged the role of the NAPC in the country as a promoter and coordinator of researches, communication, and debate on agricultural policies and expressed his wishes for the Workshop to contribute to Syrian agricultural development with the final objective of improving the living standards and welfare of people working in the sector.

Introductory Session

Following the opening ceremony, Mr Atieh El Hindi, Director of the NAPC, presented two recent publications: the book “Syrian Agriculture at the Crossroads” and the 2003 issue of the periodical publication on Syrian Agricultural Trade.

Syrian Agriculture at the Crossroads collects a set of studies conducted at the NAPC by high-level international experts with the support of the FAO Project GCP/SYR/006/ITA. This publication, published by the FAO under its Agricultural Policy & Economic Development series, provides key references to policy makers and practitioners for research and policy making related to Syrian agricultural development. The editors of the volume, Mr. Jacques Vercueil, Senior Project Adviser, and Mr. Ciro Fiorillo, Project Chief Technical Adviser, structured it in three parts. Part One illustrates the contribution of the agricultural sector in the national economy through papers on agriculture in the syrian macroeconomic context; trade and agriculture with special reference to the association agreement with the european union; private investment and agribusiness; food policies in syria; and agricultural policy and environmental issues with special reference to rangeland grazing and soil management. Part Two analyzes the economics of the main sub-sectors in agriculture and includes extensive summaries of studies carried out on the crops considered “strategic” under Government planning, i.e., cotton, wheat, lentil, chickpeas, barley, tobacco and sugar beat; olive and olive oil; citrus; livestock; processing and marketing issues are analyzed with particular reference to the dairy and horticulture sub sectors. Part Three examines the structural and institutional factors and inputs for agriculture production and includes papers on the structural and distributional features of agriculture producers: land tenure and labor relations; irrigation water policies; agricultural inputs and market liberalization; inputs and credit supply and distribution systems.

In addition to the above, Mr. El Hindi presented another recent publication, the *Syrian Agricultural Trade 2003*, prepared by NAPC researchers in cooperation with FAO international experts. The *Syrian Agricultural Trade 2003* intends to be a source of information and a tool for decision makers to consolidate Syria’s internal reform process, increase its outward orientation, build up a network of bilateral and multilateral agreements, promote trade liberalization and, thus, accelerate the country’s economic development. This report includes five chapters, the first two focuses on general and agricultural world trade and related policies, hinting at the experience of the EU and the USA. The third chapter analyzes Syrian agro-food trade trends. It also identifies the country’s new agricultural trade partners and traces a classification of the most suitable products for export. In addition, it provides variables and indicators allowing to asses the adaptation of Syrian products to world demand changes and to measure the degree of exports diversification. The fourth chapter reviews recent changes in institutions and policies as well as negotiation and implementation of preferential agreements of relevance for agricultural trade. The last chapter is devoted to the description of the rules governing the accession process to the WTO. This information is meant to provide technical background to Syria’s request of adhesion to the organization and to be functional to a further progression of the country’s integration into the global trading system.

Farming Systems in Syria

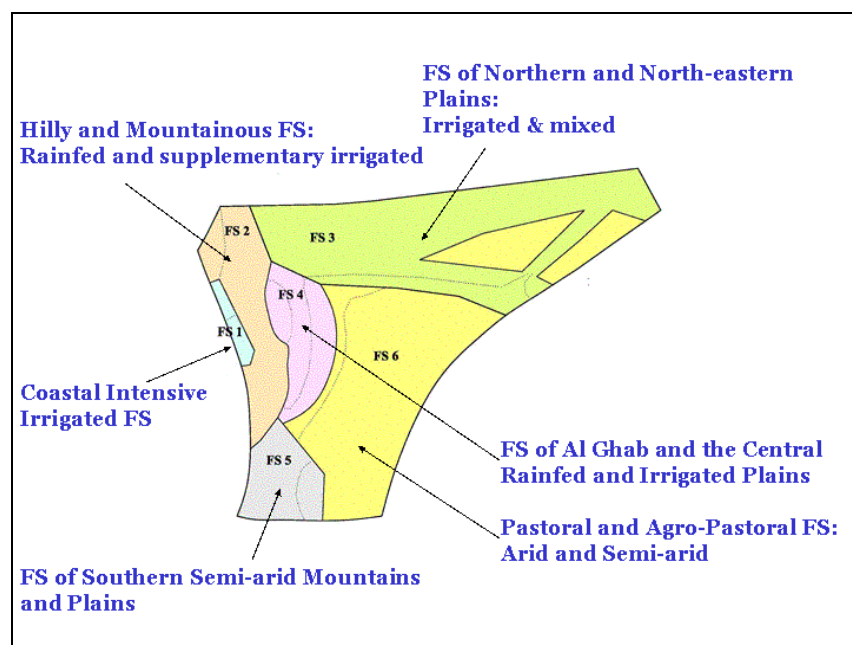
Mr J. Vercueil, Senior Project Adviser of the FAO Project GCP/SYR/006/ITA - Phase II, chaired the session on Farming Systems in Syria. He introduced the speakers, Ms S. Al-Zoughbi and Mr R. Hamzeh, NAPC researchers, and Mr H. Wattenbach, FAO consultant supervising the Farming Systems Study, stressing the validity of the research carried out at the NAPC and remarking that such a study was the first of this kind conducted in Syria.

The justification and purposes of the study were presented by Ms Al-Zoughbi, followed by an overview of the Syrian farming systems, given by Mr Hamzeh that then focused, as an example, on the characteristics of one specific farming system. Mr Wattenbach closed the presentation providing a comparative overview of the Syrian farming systems and highlighted some considerations on key policy issues.

The NAPC identified six major farming systems in Syria to provide policy makers with a better understanding of the geographic differentiation of the agricultural sector and of the socio-economic characteristics of rural households and their different exposure to policy changes. Ms Zoughbi addressed the participants on the distinctive characteristics of a farming system that result from a specific combination of natural and socio-economic factors, supplemented by the infrastructures provided by public intervention. Within a farming system, rural households locally adjust their income sources and livelihood opportunities to the possibilities given by their farm resources under consideration of their vulnerability to ecological and market risks. Each household type responds differently to policy changes. Therefore, the aggregation of responses by household type at regional level (Farming Systems) allows to link economic policies to household performances and strategies.

Ms Zoughbi continued her presentation by explaining the methodology applied in the Farming Systems Study. Major farming systems boundaries, as well as sub-systems and eventual niche systems were identified on the basis of secondary data, such as the agro-climatic zone, the type of irrigation and the socio-economic conditions (see figure 1). 29 field missions, for a total of 327 days in the field, were conducted to select representative Mantikas and villages, define household types, assess household characteristics and quantify farm economic aspects. At local level, households were classified according to their size, income sources, technology level and resource endowments.

Figure 1: Overview of Farming Systems



The characteristics of the farming system of the Northern and North-Eastern Plains were presented as an example of what in detail such a study can provide to policy makers. The household analysis by household type (poor, medium, better-off) at sub-system level was presented (share of household type, income sources, cropping pattern, changes over the last decade) and the strategies, as well as the vulnerability (to climate, price shocks, policy changes) of the different household types were displayed. In this regard, the speaker illustrated how much poor households dominate the system (about 50%) also noticing the relevant share in their income coming from off-farm sources. Indeed, it was clarified that the contribution of off-farm income to household livelihood decreases with the focus of the analysis shifting from poor households, to medium and better-off households. Mr Hamzeh stressed that the study also investigated the strategies preferred by each household type for their future development. The survey conducted by the Farming Systems Study team considered the following as strategies to be taken into account: intensification, diversification, expansion, off-farm work, and exit from the agricultural sector. Notably, with regard to the sub-systems of FS3 (Northern and North-eastern Plains) no household type (either poor, medium or better-off) considered off-farm work or exit from the agricultural sector as feasible strategies for the future. Furthermore, the speaker presented two tables (one per sub-system) illustrating the vulnerability to external factors (climate, price shocks, policy changes) comparing poor with better-off households at sub-system level (see figure 2).

Figure 2: Poor and Better-off households vulnerability (FS3, sub-systems level)

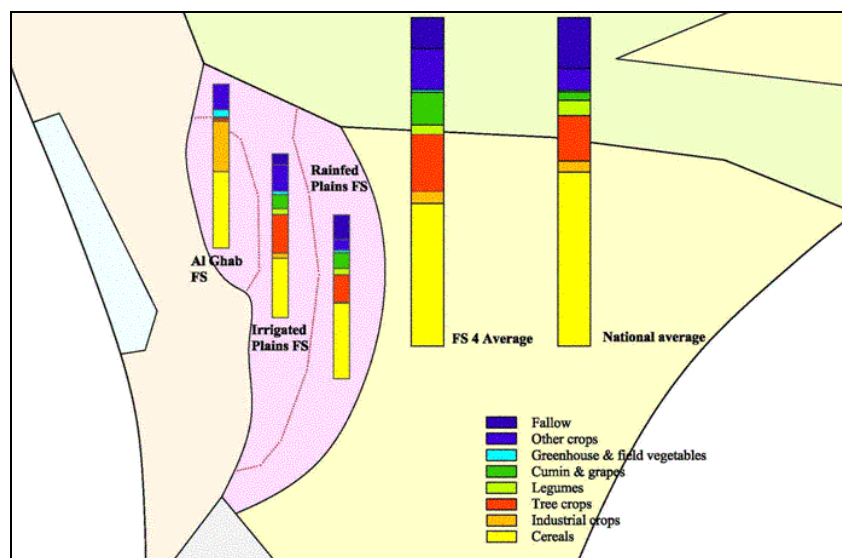
Irrigated s-sys		Mixed s-sys	
Poor	Better-off	Poor	Better-off
Climate	Climate	Climate	Climate
Pr. Shocks	Pr. Shocks	Pr. Shocks	Pr. Shocks
Pol. change	Pol. change	Pol. change	Pol. change
Major crops		Major crops	
Wheat, cotton, cumin, lentil		Cotton, wheat, sugar beet	

Width of circles = vulnerability relevance

Mr Wattenbach clarified that the definition of major farming systems and sub-systems allows a clearer perspective on the geographical differentiation of agricultural production. The key role of large systems (like the one of the farming system of the Northern and North-Eastern Plains) to national production is obvious, simply for the size of the system. However, also small farming systems and niches can be important at the National level (as the greenhouse production in the Coastal Intensive Irrigated Farming System). At the same time, a farming system may depend on specific crops contributing to a small share of the national production. In such cases, the impact on the farming system of changing crop-related policies would be strong, but the effect would be little noticeable at the National level. In this regard, the average holding size and share of cultivated land under the major crop groups provides first information on the production structure and potential vulnerability of the farming systems. Indeed, different holding types, i.e. socio-economic groups within a farming system, show a remarkable differentiation of their livelihood and cropping pattern. Of these features, the speaker provided some visual examples that clarified how deeply a farming systems study can go in the understanding of the local characteristics of agricultural activities. The shares of crop groups in the cultivated land between

the major farming systems was presented, as well as the share of cultivated land under strategic crops, the differences in average holding size. He stressed that the general picture given by the examples is no surprise to experts, but a presentation of statistical information based on farming systems instead of Governorates (as used in most statistics) considerably improves such a picture. Furthermore, Mr Wattenbach noticed how the understanding of the dominance of major cropping groups by farming system and their vulnerability to different factors of stress (price shocks, climatic risks, policy changes) helps in noticing the vulnerability and resilience of farmers at local level. The examples presented culminated in some evidences he provided about the Farming System of Al-Ghab and the Central Rainfed and Irrigated Plains, also showing how further in depth the analysis can go. In this farming system the importance of major crop groups is remarkably similar to the national average. Though, considering the sub-systems, Al-Ghab has a very different structure best reflected by the high dominance of industrial crops (see figure 3). Therefore, households in Al-Ghab would be impacted by and react to factors of stress in a much different way than could be expected by the plain consideration of the average/broader figures.

Figure 3: A close look on Al-Ghab sub-system



The speaker followed his presentation noticing that household vulnerability to and perception of risks influence their vision of possible development strategies. In this regard, he further refined on the evidence already presented by Mr Hamzeh addressing the audience to the consideration that the development potential for a household type within a farming system is actually related to a dynamic economic environment and to institutional arrangements. Hence, despite poor households disregard off-farm work or exit from the sector as valuable strategies, they actually find in off-farm work and remittances from those of the household that exited the sector the best part of their sources of income.

On this consideration, Mr Wattenbach addressed the audience noticing that the Farming Systems Study allows policy makers to understand which development strategies are most viable for the different household types, which strategies are most viable within different farming systems and which policy support is required to foster such strategies.

Finally, he brought to the attention of the participants some specific policy issues that emerged from the study and should be of concern to policy makers for their considerable impact on the development potential of the different farming systems within the Syrian agricultural sector. In particular Mr Wattenbach referred to the following:

- Liquidity constraints are a serious problem, particularly for poor farmers. These affect seasonal production possibilities where they have lost access to formal credits for not

repaying earlier loans. Informal credit markets provide presently the only available solution, but they are expensive, as the creditor operates under high risk. The solution should be to provide competing credit facilities.

- Similarly unfavourable for poor farmers is the land tenure regime is unfavourable, due to the complexity of tenure registrations and ownership transfer for agrarian reform land. In this regard, it should be avoided that farmers seek informal arrangements, while an exhaustive regulation should be endorsed. Favourable to poor farmers are instead investments in industrial crops since these crops cultivations provide stability of income and employment.
- Water fees and water use efficiency should be connected. Beside, water fees levied per m³ would support other policies promoting modern, water saving irrigation techniques. Indeed, improving water use efficiency in rainfed agriculture deserves more attention, as it requires less public support than irrigation and contributes to risk reduction in farming systems suffering from high climatic risk.
- Timely and accurate price and market information correct asymmetric information and help smallholders in producing free marketed crops as part of their strategies. In this regard, Extension Units play a dual role. They are the local outreach of MAAR to communicate the agricultural plans and follow them up, i.e. Extension Units have an administrative and control function, in addition to their traditional advisory role. Noticeable is that where industrial crops play an important role, the administrative function restricts the advisory capacity. Instead, in farming systems dominated by free market crops, extension units are most successful in promoting better farming practices, particularly where extension agents are farmers themselves.

Mr Wattenbach concluded his presentation thanking for their excellent job all the members of the NAPC researchers that formed the Farming Systems Study team and Mr M. Al-Ashram, national consultant. The team, in addition to Mr Hamzeh and Ms Zoughbi, was composed by Mr A. Sahadeddin, Mr A. Shhaideh, Mr F. Yassin, Mr H. Al Mojahed and Mr M. A'Sayyed.

Discussion

The presentation was followed by a discussion that allowed to complement and clarify the issues addressed during the presentation.

Some questions and comments from the audience called for further clarification on the household classification, village sampling methods and farming systems boundaries identification. In this regard, the speakers clarified that the categorization of household was based on the information initially gathered discussing with village authorities and the extension units, refined during the group discussion with farmers. These group discussions also allowed to gather evidences on the changes in the farming systems as well as in the livelihood sources and cropping pattern by household type. The sampling of villages and households was addressed as principally a stratified sampling process, whereby large sample sizes were replaced through an iterative process. The grouping of farming systems was primarily based on expert knowledge and literature, while at the level of sub-units, the number of required differentiation was refined as a result from the field study. The number of selected villages was tentatively determined on the base of the rule that at least two villages were to be selected for each sub-system. The specification of representative villages was based on proposals from the Departments of Agriculture at the Governorate level, whereby several proposals were requested and the village location was revised based on the information of village characteristics and their location on maps in order to avoid roadside bias, extremes in village sizes etc. The households were invited to the group discussion based on information from the village authorities making sure to cover the different household types on the base of the already developed household classification, so to ensure the consideration of all the socio-economic groups in the information collection process.

Another set of questions/comments from the audience focused the attention of the speakers on the need to complement on issues pertaining the economy of the households. They clarified that farm economic quantification was mostly limited to the gross margins of crop and livestock, while a full farm income analysis was not carried out, as revealing such detail on the farm income would most certainly not have yielded high quality information from a single visit. In cases where crop income contributes to the vast majority of household income, however, some indications on the total farm income was estimated and in some group discussions, farmers themselves used farming income for classification. These were the exceptions, though, and the speakers stressed that should be treated with some care, as the concepts of cash income and the difference to net income was internally assessed by the farmers and some conceptual variation could have been underlying within the group. Total household income is therefore to be seen mostly as an order of magnitude.

Furthermore, the speakers agreed that the income from casual labour is often complementary to migration income, especially for landless farmers. Particularly in FS5 (Southern Semi-arid Mountains and Plains), families engage seasonally in share cropping arrangements for field vegetable production and the male family members migrate to neighboring countirs in the winter season to seek casual employment . The wage rates in such cases are difficult to compare, as field vegetable cultivation is prone to price and climate risks. Nevertheless, the sharecroppers interviewed in that system stressed the advantage of sharecropping arrangements as they allow the families to stay together, while migration implies separation of the families for several months.

Water related issues were also addressed during the discussion and the speakers stressed that such issues were of high concern in most farming systems and water access was frequently one of the elements of household classification. In the context of discussing recent trends and developments options, water related concerns were likewise important elements of the discussion. However, from the farmers' perspective, water conservation as such is not a primary concern and is secondary in importance to water access for crop production. Where water conservation is linked to increased production, such as in the case of the use of modern irrigation systems and for cost reduction, water conservation was raised as an issue during the group discussion. Some dissatisfaction was also expressed by farmers of FS3, for example, on the technical difficulties encountered during the early phases of using drip irrigation, while such concerns were not raised during discussion in FS5. In this regard, the speakers noticed that in FS5 drip irrigation is spreading in an area where wells provide the irrigation water for most farms and hence water savings directly affect production costs through the savings of pumping costs. At the same time, the size of irrigated area is directly linked to water use per hectare and the establishment of drip irrigation also allows farmers to expand the areas under irrigation, as in FS5 most crops are not strategic crops.

A final mention was given to demographic pressure issues an the speaker pointed out that in the course of discussing the development strategies by household types, given the population increase, the perspective on reducing farm sizes was an explicit factor taken into account. The individual household situation was included in the assessment of the group discussion participants. In this regard, past policy experiences and public system gave rise to some expectations on how the situation might improve, particularly where expansion of irrigation networks and distribution of state farms raises the expectations of acquiring improved production possibilities or new land resources.

Comparative Advantages of selected Syrian Commodity Chains

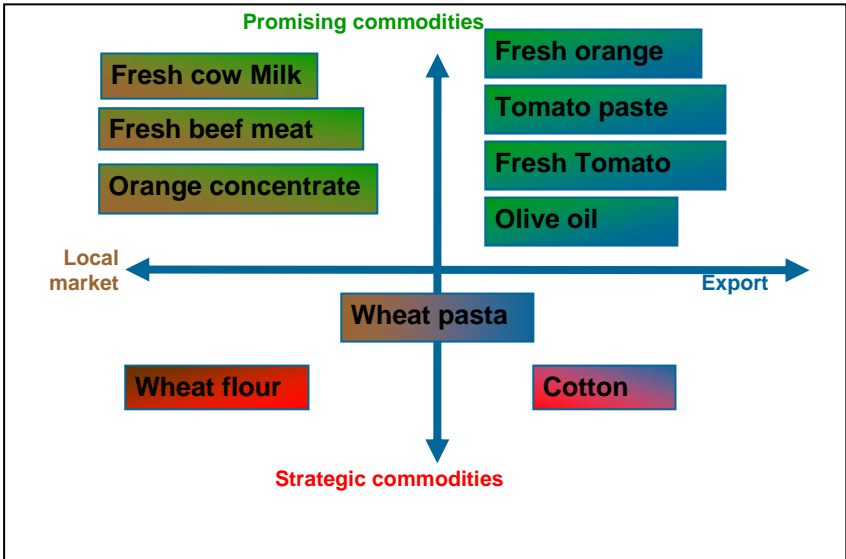
Mr Nabi Rasheed Mohammed, Deputy Minister of the Ministry of Agriculture and Agrarian Reform, chaired the session on Comparative Advantages of selected Syrian Agricultural Commodity Chains. He introduced the speakers, Mr H. Al-Ashkar, NAPC researcher, and Mr F. Lançon, FAO international consultant, remarking the importance for Syrian products to compete in the international market.

The presentation firstly clarified the scope of a Comparative Advantages (CA) study in Syria and its role as an exercise for capacity building at the NAPC. With regard to the scope of the study, Mr Al-Ashkar noticed that the gradual shift from a planned to a market oriented economy, opening to the international trade, put at stake the capacity of the Syrian agriculture to maintain its contribution along the entire set of functions it fulfills. Indeed, he observed that, in the last decade, Syrian agriculture has been able of a remarkable performance in terms of production growth, but the extend to which such a trend could be maintained in a more competitive environment, considering the increasing scarcity of natural resources (water in particular), also depends on the capacity to adapt to the opportunities of trade liberalization. Opening to foreign markets may benefit several commodity chains through a higher demand, but it also has consequences on the economic viability of other agricultural commodity chains. The assessment of the CA of selected agricultural commodity chains has been conducted to address these crucial issues, taking into account the impact of policy intervention on each commodity chain.

The speaker mentioned that the study was conceived as an on the job training in order to build within the NAPC the required capacity to further expand this type of analysis to a larger number of commodity. The study was conducted by six NAPC Researchers, under the supervision of two international consultants and the assistance of three national consultants from the MAAR, the Ministry of Finance and Trade and from GCEPT.

The selected agricultural products have been categorised along two major criterions (see figure 4): their current positions in the agriculture, distinguishing between strategic commodities (cotton and wheat) and promising commodities (orange, tomato, milk), crossed with the category of market that is currently targeted, local or export market. Furthermore, they have been selected to cover the major categories system: field crops, perennials and livestock production systems.

Figure 4: Selection of the commodities



This first classification has been further subdivided into representative systems of the commodity chains on the basis of the type of raw materials used (hard and soft wheat), the

cropping techniques in place (networks irrigated, wells irrigated or rainfed), the processing techniques, the export targeted markets (Regional market or the European market). A total of 28 systems have been retained for the analysis (see box 1).

Box 1: Selected representative systems

<p>Cotton <i>1a Lint cotton all</i> 1 Lint cotton network irrigated 2 Lint cotton well irrigated</p> <p>Wheat Flour <i>3a Flour all</i> 3 Flour soft wheat network irr. large pub. mill 4 Flour soft wheat well irr. public mill 5 Flour soft rainfed irr. public mill 6 Flour hard wheat network irr. large pub. mill 7 Flour hard wheat well irr. large pub. mill 8 Flour hard wheat rainfed large pub. mill 9 Flour soft wheat network irr. small pub. mill 10 Flour soft wheat network irr. large pub. mill</p> <p>Wheat Pasta <i>11a Pasta low quality all</i> 11 Pasta low quality network irr. 12 Pasta low quality well irr. 13 Pasta low quality rainfed 14 Pasta high quality rainfed</p>	<p>Filtered olive oil 15 Olive oil filtered centrifuge rainfed 16 Olive oil filtered hydraulic rainfed</p> <p>Tomato 17 Tomato fresh open field regional mrkt. 18 Tomato fresh green house regional mrkt. 19 Tomato fresh green house European mrkt. 20 Tomato paste open field regional mrkt.</p> <p>Orange 21 Orange fresh network irr. regional mrkt 22 Orange fresh well irr. regional mrkt 23 Orange fresh rainfed regional mrkt 24 Orange fresh network irr. European mrkt 25 FOCJ network irr.</p> <p>Livestock 26 Fresh meat 27 Live animal 28 Packed milk</p>
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The tool used to assess the comparative advantage of these systems has been the Policy Analysis Matrix (PAM). The PAM (see table 1) consists in the comparison of two accounting entities (Income = Input cost + Factors cost + Profit), one being computed for a level of price observed under the current economic conditions (called private prices), the second being computed using the price (social price) that would prevail under perfect market conditions. The last line of the matrix is computed by subtracting social values from private 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.

Table 1: The Policy Analysis Matrix

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

The PAM provides straightforwardly a range of indicators for assessing the efficiency and the comparative advantages of a system. If D is positive the system generates profit under the current policy and market conditions and is competitive. Similarly, if H is positive the system is able to generate profit without benefiting from subsidy or conversely being constrained by taxes, and the system is said to have a comparative advantage. If a system is benefiting from subsidy for input use, or has to pay a lower price for casual labor than it would have if the labor market was efficient, the system can be competitive (i.e. D>0), while having no comparative advantages (i.e. H<0).

The comparison of the PAMs, developed for different systems, relies on the computation of ratios that are scale, product and time independent in order to draw meaningful comparison. In this regard, the speaker illustrated the following ratios:

- The Financial Cost Benefit ratio (FCB), which is the value of the Domestic Factors against the difference between the Revenue minus the Tradable Input [$FCB = C / (A - B)$]. If this ratio is above one, it means that the systems utilize more value of Domestic factors than the wealth created or the Value Added, then the system is not profitable. If the $FCB < 1$, the system is profitable; therefore the systems that are the most profitable are the ones that have the FCB closest to zero.
- The Domestic Cost Resources ratio (DRC) which provides a measure of 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 advantage, if it is below one the system has a comparative advantage, and the system is said to be economically efficient.
- The Nominal Protection Coefficient (NPC) which measures 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 benefits from a protection since it gets a higher revenue at private prices than it 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 Effective Protection Coefficient ratio (EPC) compares the added value at private price to the added value at social price [$EPC = (A - B) / (E - F)$] which gives a combined index of the level of trade distortion on both tradable inputs and outputs and provides a more accurate measure of the level of protection than the NPC. An EPC above one means that the selected system is protected while an EPC below one means that the system generates less added value at market price than it would at social prices.
- The Equivalent Producer Subsidy (EPS) which is a ratio of the total net transfer (L) above revenue at private price [$EPS = L / A$] and provides a synthetic index of the divergence between the efficiency of the system at private price and at social price. It indicates the share of income gained (or lost) by the system due to divergence induced by the current policy or market distortions.

Following the introduction to the indicators Mr Al-Ashkar left the floor to Mr Lançon to present the results of the analysis. Mr Lançon, first of all, mentioned that, since the indicators computed from the PAMs rely on the comparisons of the value of tradable and domestic factors, the cost structure of each representative system has a determining impact on the value of these ratios and hence the relative performances of the selected systems. Tradable inputs represent the major share of the total costs for most of the systems, meaning that the level of custom duties on tradable input imports is an important factor of the profitability of the systems at social price, and hence the DRC achieved. In this regard, the speaker addressed the audience to note that for cotton and olive oil production labor is the major cost. For most of the systems with the exception of cotton lint produced from wells irrigated cotton, flour produced from wells irrigated wheat and the Fresh Orange Concentrate Juice (FOCJ), capital costs do not represent more than 20% of the total costs of the selected representative systems.

Mr Lançon stressed that under the current policy framework and market prevailing conditions, i.e. at private price, all the systems are profitable. At social price, however, irrigated network and wells irrigated cotton systems are not profitable ($DRC > 1$) indicating that they don't have a comparative advantage. The same is observed for well irrigated hard and soft wheat. Instead, all the promising crops targeting exports, olive oil, fresh tomato and oranges, show a strong

comparative advantage while the crops responding to the expansion of livestock product on the Syrian market have no comparative advantage (FOJC, beef meat) with the exception of fresh packed milk.

The speaker also highlighted that the differences between the level of DRCs compared to the level of FCB at private price are mainly due to the effect of the policies in place that unequally support each commodity chains, in order to improve the profitability at private price of the less efficient ones. In this regard, it is worth noting that even the most efficient systems benefit from some protection. Only three systems show an $EPC < 1$, fresh tomato, oranges and tomato paste sold on the regional market, which means that these systems are actually taxed, directly or indirectly by the current policy and market setting, when (or if) they supply the selected market.

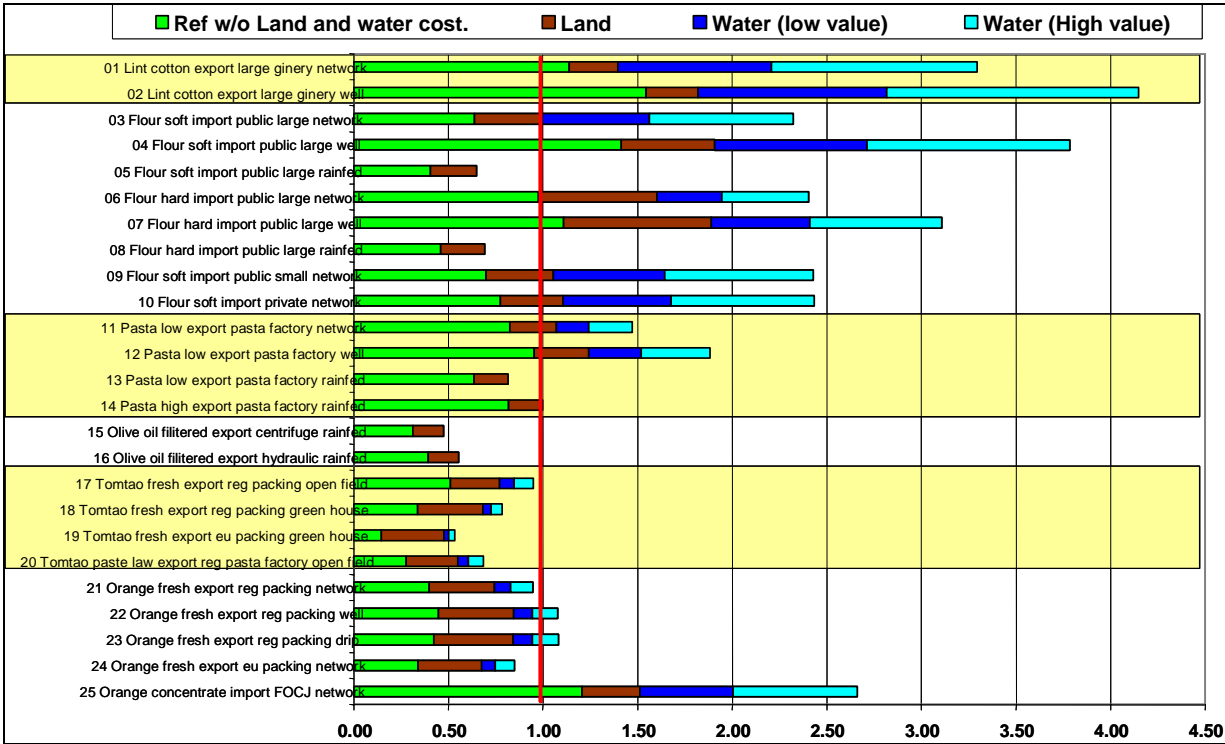
Being land and water the natural resource base of any agricultural activity, the speaker clarified that the first set of PAMs has been developed without inputting a price or a value to the utilization of these resources to simplify the computation procedure and to identify more easily any inconsistent technical ratio or prices used for the tradables, labor and capital cost.

To introduce land cost into the computation of the DRC, Mr Lançon clarified that it was decided to take as a reference the value of the usual share cropping contract rather the value of land rent, given the high segmentation of the land tenure market. The sharecropping system mentioned in the literature varies according to the crop: 15% of the value of the production for the land owner, and 20% for cereals. As no value was available for tomatoes and oranges a value of 30% has been applied, to take into account the rather more risky nature of these crops.

The method applied to find a proxy for the value of the water was to compute the residual value of the water once all other costs (including land cost) have been deducted from the revenues of each system. Then the ratio of these residual profits divided by the volume of water required by each system provides the maximum cost that can be supported by each system, otherwise the profit will be negative. The analysis has been conducted at as social prices since there is no market for water under the prevailing conditions (missing market). This first analysis clearly showed the very low efficiency of irrigated cotton and wheat systems, all of them losing money with or without inputting the land price, therefore remarking a negative value of the water use indicating that the utilization of water turn actually into negative value added. The others water based systems (irrigated oranges and tomatoes) obtained a positive value, meaning that the major issue in terms of water used efficiency concerned wheat and cotton irrigated systems. The opportunity cost for water for these two systems was taken as corresponding to the value of water forgone in the most profitable alternative crops that can be produced under equivalent conditions. Tomato being the only alternative for which we had data available, although using other major field crops (maize, barley, tobacco...) would be a better alternative, we assumed that a less intensive tomato cropping systems than the one surveyed in the south of Syria would be more likely in the major wheat and cropping area of the north. The water value computed for these low intensive systems was 6 SP; taking into account the higher agro-climatic and market risk attached to tomato cropping that is a perishable crop, we assumed that the actual value of water foregone by a farmer who decide to crop wheat or cotton rather than tomato would be of 3 SP/cm³. Another set of DRC was computed taking the value of 7 SP/cm³ to assess the possible impact of a higher water value on the relative efficiency of the system analyzed.

The imputation of water value does not change the previous hierarchy established among the systems. Wheat and cotton irrigation based cropping systems DRCs exceed 2 with the highest opportunity cost of water (7 SP/cm³), while being already around 1.5 when the lowest value is imputed (3 SP/cm³). Wheat produced under rainfed condition remains below the 1 threshold. The position of other crops remains below one except for Fresh Orange produced with irrigated wells (see figure 5).

Figure 5: DRCs value for selected systems with land and water value inputted



Given the overall results of the analysis, the speaker clarified that the computation of the PAMs relies on a certain number of assumptions of estimation to cope with the lack, or the uncertainty pertaining to certain data. Therefore, in order to assess the robustness of the budget and the ratio computed to these estimations and assumptions a sensitivity analysis has been carried out for each systems. The parity price, i.e. the price that would prevail if there were no distorting policies or market imperfection, for the main output and the yield at farm level came clearly as the most influential factor on the DRC level. In this respect, the probability of each system to be efficient has been assessed, taking the variation of these two variables along the past decade on the basis of international and national statistics,

The results showed that cotton network irrigation systems would have a probability of 39% to have a comparative advantage, while the wheat production under the same systems could never have a comparative advantage. If we assumed a higher level of international price and yield, wheat irrigated network system can have a comparative advantage in 11 case out of 100, confirming the very low probability for these systems to have a comparative advantage under the prevailing technical conditions. All the other systems tested have 100% chance to have a comparative advantage, while the highly protected FOJC systems could compete without any policy support in 30% of the cases.

Following the analysis of data, Mr Lançon discussed some policy implications differentiating between macro-level issues, cotton and wheat and promising crops issues. Concerning the policy implications at macro-level, he noticed that all the selected representative systems benefit from a net transfer of resources from the whole economy. The major shares of the transfers of resources to the systems are caused by:

- Trade protection (tariff and non-tariff barriers) that increases the price of the systems' main outputs on the domestic market compared to the price prevailing on the world market.
- Subsidies and fixed prices for cotton and wheat.
- Non-accountability of the opportunity cost for natural resources (water).

On the input side the current policy generates limited distortions as the average level of custom duty applied on agricultural input imports is quite low. However it should be noted that important tradable inputs acknowledge a significant level of distortion:

- The fee paid for network irrigation utilization at private price represents only 1/3 of the total irrigation cost that would prevail at social cost.
- The low price of energy compared to the prevailing parity price for diesel on the world market price is an implicit subsidy to systems that are energy intensive.
- For agro-food industries, a high tariff on the imports of packaging device have an impact on the profitability of agro-food industries

For domestic factors, the current labor regulation does not have a significant impact on the systems' efficiency since a limited share of labor is employed on a permanent basis. Under the current level of knowledge, the study assumed that there is no imperfection on the labor market, but the evolution of the wage level for casual labor should be carefully monitored if new job opportunities arise on the domestic or regional labor market. The profitability at private prices and the efficiency at social price of commodity chains that are labor intensive relatively to the others, such as cotton and olive, could be significantly affected by such increase in casual labor costs. The lack of any mechanisms to incorporate water value at private prices is another source of transfers in favor of the water intensive systems such as cotton and wheat that are not able to cover these costs with the value added generated.

The impact of the exchange and interest rates variation depends upon the cost structure of the systems. Exchange rate variations have a limited impact on the systems efficiency given the high share of tradable (45%) on total cost which compensates the effect of exchange rate on the tradable output. Interest rate variations, alike, have a limited impact on the systems' efficiency due to the low share of capital (17%) in total cost.

Overall, Mr Lançon noticed that the results indicate that the current macro-economic policy framework is supporting the development of the selected systems.

Under the current level of technology and within the current trends of world markets' prices, irrigated wheat and cotton systems have a low probability to have a comparative advantage. The simulation done with the highest level of prices recorded in the past decades indicate that the probability would be still very low for the wheat systems to have a comparative advantage. The least efficient systems are the wells irrigated systems for both commodities which combine most of the distortions: subsidy, high cost in energy due to the pumping and higher volume of water uses because of the lack of any restriction. Rainfed systems have a comparative advantage, but there is no rainfed cotton and they roughly represent only 40% of the total wheat supply, and therefore have a relatively low weight for the overall efficiency of the wheat commodity chains.

The first option to enhance the comparative advantage of the wheat and cotton is to explore ways to improve the productivity through yield increase or costs reduction. Due to the rather high level of yield already achieved, one the most promising ways would be to improve the water use efficiency of the irrigated based cotton and wheat systems. Water use efficiency can be improved at short term by the dissemination of new irrigation technologies (drip irrigation) although the current study was not in a position to thoroughly assess the relative gain in economic efficiency that can be obtained by alternative irrigation technology. NAPC is finalizing a preliminary study on this subject, and this field should be further investigated. Another way that can be explored at mid-long term is the dissemination of new varieties that are less demanding in water for an equivalent yield level. The technical efficiency of the system can be also improved by looking at improvement at the post-harvest level. For instance the ginning output recorded for the ginneries (43 kg of lint cotton for 100 kg of raw cotton) is rather low compared to the ginning output achieved in other major exporting areas (38 kg of lint cotton for

100 kg of raw cotton). Therefore there is an urgent need to identify and exploit source of productivity increases at the post-harvest level.

Another option to respond to the low economic efficiency of the cotton and wheat commodity chains is to promote the utilization of the less costly systems in social terms: rainfed and network irrigation. Nevertheless, as already noted, the area available for rainfed and network systems is limited which would imply a net reduction in the cotton and wheat output as the national level. Furthermore, irrigated and rainfed systems do also have peculiar environmental costs that would have to be accounted for. While the wheat level of output should be in line with the food security objectives, it would be rationale on a short term to limit as much as possible the allocation of the wells irrigated land to cotton which is the least efficient.

The last option to reduce the social cost induced by wheat and cotton production is to promote crop substitution from cotton and wheat to promising crops, at least for the systems that are the least economically efficient. However, this crops substitution strategy would be constrained by the absorption capacity of the domestic and world market for the crops that are promoted, a factor that would be crucial given the huge areas targeted.

In any case, the mitigation of the high social cost induced by cotton and wheat production would likely rely on a combination of these options and would require the establishment of appropriate institutional mechanism to internalize the cost of water in the business plan elaborated at private prices of, cotton and wheat farmers to incite them to shift as much as possible to less water intensive crops.

Approaching the conclusion of his presentation, Mr Lançon remarked that Syria has certainly a comparative advantage for the production of olive oil, fresh tomato and oranges, but having a comparative advantage does not mean being able to export. Attention should be given to:

- Reinforcing the current policy for trade agreements to reduce barriers to entry.
- Quality issue: quality and sanitary issues are becoming more and more determining, even for standard quality product to access markets.
- Appropriate marketing strategy. Syria traditional markets are highly competitive and might become saturated. It is important to explore new market opportunities where habits are changing with income increase

The promising crops targeting the local market to respond to changes in food habit, such as beef meat, milk or FOJC, do not show any comparative advantage except for fresh packed milk. Although, the selected representative systems do not cover the entire diversity of technology encountered at farm level (cattle breed) or the existing institutional set ups (cooperative sector was not taken into account for beef production), it is likely that the current level of technology does not allow reaching a level of productivity required to have a comparative advantage. The promotion of new systems should carefully assess the viability of technical options within the Syrian economic environment. The low efficiency of the FOJC system is mainly due to the low conversion ratio at the processing level due to the unavailability of appropriate oranges varieties. The efficiency of the system depends also on the capacity of the Syrian agriculture to supply enough volume of juicy oranges to allow using the processing capacity at their optimal level.

Reaching the point of some conclusive notes, the speaker clarified that the economic efficiency should not be the only criteria for deciding whether or not a specific system should be supported or abandoned in terms of policy priorities. If there is no alternative for a system that has no comparative advantage, the cost of inefficiency should be put in perspective with the human costs of rural exodus and uncontrolled urbanization. When alternatives do exist, the PAM allows selecting the option that has the least social cost.

Beyond the computation of the indicators of comparative advantage, the PAM should be considered as a tool for policy dialogue to support discussion among policy makers but also with other stakeholders, especially with private entrepreneurs and farmers, to explore policy options. Given the increasing role of the private sector in the processing and marketing of Syrian agricultural based product, the involvement of the private sector in the establishment of an enabling policy environment is crucial to enhance economic efficiency.

Discussion with stakeholder can also improve the accuracy and the coverage of the information collected by presenting the results obtained and the assumptions made on certain technical issues and costs. The investment done in building the human capacity at the NAPC and in developing this first set of PAMs will be fully recovered through the establishment of a policy monitoring systems by focusing on:

- Increasing the number of commodities covered to explore possible alternatives.
- Developing a set of PAMs for major commodities by agro-ecological zone or governorate to take into account the spatial/ecological dimension of the comparative advantage.
- Developing a cost efficient mechanism to update the technical coefficients through an institutionalization of the process with appropriate services of the MAAR and other technical ministries (industry, transport...)
- Integrating the results on the comparative advantage with other analytical tools such as Farming Systems poverty mapping to better put into perspectives equity and efficiency.

Discussion

Several questions address the selection of the products included in the study, claiming that they covered Syrian agriculture only partially or that the study should have focused on the crops that have a high probability of having a comparative advantage.

In this regard, it was pointed out that given the time availability for the study, it was necessary to focus on a limited number of products. Furthermore, the selection also considered the major type of activities (field crop, perennial and livestock) in order to develop analytical capacity at NAPC for the entire range of products likely to be analyzed. This study should be seen only as the initial step in a mid-term endeavor to assess and monitor policy impact on agriculture. Beside, while attention should be given to products that may exploit export opportunities, it is equally important to consider products that would have to compete with imports on the domestic markets since an improvement in foreign market accessibility cannot be achieved without opening the Syrian market to foreign competition.

Another set of questions and comments focused on the difficulty faced to find on the international market products that have the same attributes in term of quality of the Syrian agricultural products or by-products. Along the same line, it was also asked if the PAM allows taking into account the effect of the quality on the comparative advantage.

On these aspects the speakers clarified that the identification of equivalent products to compute the parity price can be rather challenging for certain categories of products that present a wide variety of quality (meat, wheat pasta, flour...) that is not clearly reflected in the world price or in the import unit price used as a reference for the parity price. The integration of quality attribute into the PAM does not present in itself particular difficulties as far as corresponding values can be obtained from market price quotations or from traders' practices.

The discussion also concerned the necessity to disseminate the results of the study among decisions makers.

In this regard, it was recalled that relevant stakeholders, including the members of the price committee, have been involved in discussing the study since the outset in order to take into consideration their comments and suggestions into the formulation of the study's objectives. Along the same lines, preliminary results have been discussed with selected stakeholders, while national consultants, coming from the public bodies involved in agricultural policy formulation, also contributed to the implementation of the study, providing valuable information and orientation for its realization.

Syrian Accession to WTO: Requirements and Opportunities

The session was chaired by Mr Marcello Gorgoni, University of Rome, and included two speakers. The main lecture was presented by Mr Atieh El Hindi, Director of the NAPC, followed by a discussion by Mr Jose M. Alvarez-Coque, University of Valencia-UPV.

Mr El Hindi's lecture mainly referred to the analysis of the implications of WTO membership for Syrian agriculture, with focus on the steps to be taken for preparing the accession negotiations. The lecture started with a description of the WTO and a reference to the main developments that led to the creation of the WTO and its principles of transparency and multilateral and reciprocal trade concessions. In this regard, he stressed the need for developing countries to integrate into the international trade system. Generally speaking, the system, per se, undeniably has got advantages and disadvantages. Nevertheless, any country, especially if small and developing, by staying aside the WTO will certainly renounce the possible advantages, but will not be able to avoid being affected by its shortcomings.

The lecturer followed referring to the policy conditions for accession, the main steps in the application process, the areas where commitments are to be offered and other formal requirements to be presented to the WTO Secretariat, including, for Syria, a detailed description of trade system and policies. In this respect, standard forms have to be elaborated and submitted to facilitate the presentation of the required information to the WTO members. Subsequently, bilateral negotiations are to be held between interested member countries and applicant countries (Syria). For the accession process the applicant can benefit from the technical assistance of the WTO secretariat or some other member countries.

As Mr El Hindi pointed out, a number of advantages can be enumerated in relation to the accession process, including: new trade opportunities through easier market access in goods and services; proper trade environment that facilitates predictability for export planning; commitments and rights restricted to member countries; transparency achieved through continuous trade policy reviews of member countries; dispute settlement system in solving controversies arising during implementation; special and differential treatment for developing countries, which comes from the recognition of the special needs of these countries for facing international trade.

On the other hand, on Mr El Hindi's view, accession to the WTO may have also some disadvantages, with special reference to: loss of government independence in designing its own intervention policies; significant costs of policy adjustments to ensure compatibility WTO; costs for developing countries of the implementation of the TRIPS agreement.

Nevertheless, he remarked that, in spite of the disadvantages, accession to WTO is worth the effort, especially considering the higher costs of non participation.

Mr El Hindi added that the experience of newly acceding countries reveals some central areas of negotiation such as the elimination of all non-tariff barriers, the limitations on export subsidies and stricter disciplines on State Trading Enterprises (STEs). Nevertheless, consumer subsidies do not, per se, contravene WTO rules. As regards to the SPS and TBT Agreements, Mr El Hindi indicated that recently acceding countries did not have many difficulties in complying with these agreements, although some obligations appear on matters such as standards, packaging, food control and hygiene, quarantine, etc. Regarding the TRIPS agreement, acceding countries have to pass regulations on Geographical Indications and plant variety, but such legislation does not usually contradict existing policies.

From the experience of the recently acceding countries, Mr El Hindi stressed that the accession negotiations require well prepared and qualified negotiators capable of balancing between the commitments offered and the advantages gained. Thus, the amount of work needed should not be underestimated, as well as the importance for securing funds required for staff training and for the participation in related international meetings. Nevertheless, accession to WTO can be

regarded as a means to benefit from the “opportunities” offered by market access for national exports.

Mr El Hindi indicated that desirable outcomes for agricultural negotiations:

- special and Differential Treatment for Syria as a developing country;
- better chances to obtain flexibility in a number of areas such as tariffication of non-tariff barriers, domestic support, export subsidies, protection for strategic crops’ producers;
- the possible application of Special Safeguards for sensitive products.

However, immediate actions have to be undertaken by Syrian authorities, such as the preparation of the information required on market access, export competition, domestic support, SPS, TBT and TRIPS. To carry out these tasks, negotiators should be named as soon as possible with the assistance of an agricultural unit, participated by representatives of all the concerned ministries and the private sector.

Mr El Hindi finalised his lecture by concluding that despite the large amount of work needed to prepare the negotiations, Syria’s accession to the WTO will help getting a number of advantages, including:

- better integration with the international economic system;
- benefits from the concessions given to developing countries;
- more market access opportunities for non oil exports;
- benefits from financial and technical support programmes of the WTO secretariat and from specific partners;
- benefits from the development dimension of the Doha declaration;
- reduction of input and other raw materials prices;
- on the longer term, acceleration of the economic reform in Syria, with enhanced competitiveness.

Mr Alvarez-Coque opened the discussion on Mr El Hindi’s presentation by underlining that the Syrian accession to the multilateral trading system is not only of the interest of Syria but also to achieve a better balance in the world trading system. Mr Alvarez-Coque pointed out that the system needs significant improvements, but the worst scenario would be the absence of the system. To understand if the system offers advantages to developing countries, the speaker referred to the accumulated experience of agricultural negotiations since 1986. While Uruguay Round negotiations on agriculture were heavily concentrated on the interests of US, EU, Canada and Japan (called the “quad”) a large number of developing countries have been working together during the present phase of agricultural negotiations, inserted into the Doha Development Round. The Cancun talks in September 2003 represented a good occasion to test the level of organisation of developing countries in the agricultural negotiations as illustrated by two examples. One is given by the emergence of a new force, the G20, a grouping of developing countries led by China, India and Brazil, among other WTO partners. In Cancun the Group of 20 succeeded in avoiding the negotiations to be monopolised by the Quad. Another example is given by the “cotton initiative”, launched by four African states to call for an end to unfair subsidies granted by developed countries to their cotton producers. Since the Cancun failure, the EU has taken some positive steps, including a reform of its cotton policy and, in May 2004, the U.S. Government lost the first round of a trade dispute on US cotton programs.

Sensitive issues in the agricultural negotiations appear to be the claim of developing countries for improving market access in the industrial economies and to give contents to the Special and

Differential Treatment. Though, developing countries have shown by their own acts that it is worth using the rules of the system to defend their interests and prospects for them to achieve positive outcomes are not pessimistic. As Mr Alvarez-Coque concluded, the WTO provisions still open a significant degree of freedom for the management of own policies, but adequate actions have to be taken in Syria to prepare for the negotiations, as well as for the “day after” accession when agreements will have to be implemented.

Discussion

After the presentations, the Chairman invited the public to pose questions to the lecturers. Questions covered various areas concerning the preparation of Syria for trade liberalisation. Thus, some of the participants expressed their concerns about the possible impacts that accession to the WTO might have on producers, underlying that Syria would need to take actions for preparing its agricultural sector against the increased competition related to trade liberalisation. Participants made questions on the relations between the multilateral trading system and specific aspects, such as: (i) impact of liberalisation of trade of textiles on Syrian industry, in connection with the phasing out of the quota related to the Multi-Fibre Agreement; (ii) the need for subscribing international agreements on pest and plant control such as the International Plant Protection Convention (IPPC); (iii) the importance of taking appropriate actions to enhance export quality and marketing; and (iv) the compatibility of the WTO agreements with regional trade arrangements between partners that can be or not WTO members.

Mr El Hindi stressed the need for quick and technically qualified actions to prepare the Syrian agricultural sector for the WTO membership, highlighting that the process of negotiations will eventually lead to positive results for Syrian agriculture, but agricultural trade policies should adapt to the new scenarios as soon as possible. As regards trade liberalisation in textiles, Mr El Hindi pointed out that such multilateral process is taking place but this should not affect the Syrian decision of joining the WTO. As for the IPPC and its relation with the WTO agreements, Mr El Hindi stressed the fact that Syria has interests in taking part into this kind of agreements, independently from WTO membership, although the IPPC can be useful to assist the implementation of the WTO on Sanitary and Phytosanitary (SPS) measures.

Mr Alvarez-Coque referred to the consistency between regional integration and multilateral liberalisation, underlying that both processes are compatible, as actually recognised by the GATT agreement. This consistency is valid even when partners that are non-WTO members take part in the regional agreement. Finally, Mr Alvarez-Coque stressed that many options for trade policies remain even after the accession to the WTO, and that proper actions have to be taken to adapt small producers to the requirements and competition related to foreign markets, with or without accession to the WTO.

Annex 1
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Annex 2

Programme

3rd National Agricultural Policy Workshop
Damascus July 1st 2004
Cham Palace, Umayyad Hall

- 09.00 **Opening session**
H.E. The Representative of FAO in Syria
H.E. The Ambassador of Italy in Syria
H.E. The Minister of Agriculture and Agrarian Reform
- 09.30 Coffee Break
- 10.00 **Introduction to the Workshop**
Syrian Agriculture at the Crossroads: main features
Atieh El Hindi, Director, NAPC, MAAR
- 10:15 **Farming Systems in Syria**
Ms Samira Al Zoughbi and Raed Hamzeh, NAPC Mr Atieh El Hindi & Mr Horst Wattenbach, FAO Consultant
Chairman: Mr Jacques Vercueil, FAO Project SPA
- 11:00 Discussion
- 11:30 **Comparative Advantage of Selected Syrian Products**
Haitham Al Ashkar, NAPC Researcher
Frederic Lancon, CIRAD, FAO Consultant
Chairman: Dr Nabi Rasheed Mohammed, Deputy Minister, MAAR
- 12:15 Discussion
- 12:45 Coffee Break
- 13:00 **Syrian Accession to WTO: Requirements and Opportunities**
Atieh El Hindi, Director, NAPC, MAAR
Discussant: Alvarez-Coque, FAO Consultant
Chairman: Dr Ghassan Habash, Deputy Minister, Ministry of Economy and Trade
- 13:45 Discussion
- 14.30 **Conclusion**
H.E. The Deputy Minister of Agriculture and Agrarian Reform

Annex 3
Papers Presented

3rd National Agricultural Policy Workshop

**Farming Systems of the Syrian Arab
Republic**

In Support of Policy Analysis

June 2004

Executive Summary

The development and analysis of Farming Systems is an instrument adopted in support of agricultural policy analysis at the National Agricultural Policy Centre. The specific contribution of the national Farming Systems Study to the tasks undertaken by the NAPC lies in providing a framework of analysis based on a consideration of both the geographical differentiation as well as the socio-economic stratification of the agricultural sector of Syria.

The Farming Systems Study considers the potential impacts of changes in agricultural policy (e.g. prices, institutional support) at the household as well as aggregate level. Within the framework of the study, staff of the Centre implemented the overall concept in a selected number of systems. Given that this is the first broad implementation of a farming systems study in Syria, a remarkable degree of differentiation was achieved, as reported in more detail in the individual systems reports.

The specific objective of the study is to define relatively homogenous areas of agricultural production, based on appropriate agro-ecologic and socio-economic characteristics. These zones of major farming systems cannot be based on statistics based on administrative boundaries. Each farming system is characterized by its natural conditions, market integration and historic influences leading to differentiation and specialization of production within it. The contribution of each farming system to the national production of major crops and the degree of specialization is presented. Within each farming system, typical households represent the socio-economic variation, which exists naturally in any rural society. These household types are developed in light of typical resource endowment, their mix of livelihood assets and changes in the last decade. The share of each household type in the farming system in combination with their production orientation allows analysing ability to adjust to, opportunities deriving from, and vulnerabilities to changing production conditions.

The methodology of the study comprises of several analytical steps. In a first step, the team defined the major farming systems, which reflect geographic zones, marked by different agro-climatic, agro-ecologic and market conditions as well as production traditions based on socio-demographic characteristics and supporting public investments. Secondary literature was used to develop a preliminary structure and criteria for differentiation, which was subsequently refined in collaboration with experts of the different regions.

This resulted in the distinction of six major farming systems. Within the analysis of the structure of these systems, field-level information resulted in sub-divisions of the broad farming systems. A number of typical villages, representing the variation of the defined farming systems, was selected and the NAPC team spent on average three days in each one of the selected villages. The purpose of the village visits was to develop and adjust household typologies and to obtain information on major changes in the agricultural sector of the particular village.

The fieldwork included the household selection for individual farmer interviews as well as group discussion focussing on the compilation of information for each of the three household types, which represent socio-economic groups and their corresponding livelihood systems. Available statistics provided descriptions on the importance of each system in the national context in

terms of contribution to production of key commodities as well as the calculation of socio-economic characteristics of each system in terms of average holding sizes and cropping pattern.

Policy change and technological innovations will affect each household type differently, depending on the relative importance of the different income sources and livelihood strategies of the household. The characterization of each farming system in the national context allows reviewing the possible aggregated effect of policy change as well as the dependence of a farming system on major crops, which could be subject to policy adjustments.

For each household type, past developments in terms of resource endowment and composition of income sources shape the capacity to adjust to future challenges. Understanding the geographical expression of these patterns permits to address aggregate as well as social aspects for each household type, based on the presented framework for analysing the agricultural sector.

A summary description of the six farming systems with reference to their internal differentiation in subsystem and characterization of prevailing household typology is summarized in the following pages¹.

Coastal Intensive Irrigated Farming System (FS1)

The **Coastal Intensive Irrigated Farming System** covers 140000 ha along the Mediterranean coast. It is marked by very favourable agro-ecologic conditions and a very old cultivation tradition. The high rainfall levels and humidity throughout the year combined with mild winter climate creates a favourable environment for sub-tropical crops. Despite the small size of the system (0.8% of Syria), it contributes a very high share of its specialized products, especially citrus and greenhouse crops. Small average holding sizes (1.3 ha invested land) reflect the high population density and result in a disproportional share of holders (5.6%) compared the size of the broad farming system. The specialisation in crops under free market arrangements (greenhouses, citrus, field vegetables) are specific systems characteristics, as are the extremely good infrastructure for input supply and market access and the high importance of off-farm employment across the farm size classes. These off-farm opportunities are found in the public sector located in the two Muhafazat centres (Lattakia and Tartous), the important service sector of Lattakia as a national summer resort, as well as in the agricultural processing industries.

Within the system, a differentiation between the northern and the south part is observed, with a marked specialization in greenhouse cultivation in the Tartous part of the system, while the part belonging to Lattakia Governorate specializes more on citrus cultivation. This differentiation is the result of historic processes, whereby knowledge transfer from the Syrian workers employed in the Lebanese greenhouse sector coupled with a warmer climate caused the specialization on intensive greenhouse cultivation. In the northern part, the economic success of innovators provided a stimulus for the commercially minded farmers. The gradual adoption of the most successful crops led to the expansion of citrus at the expense of the previously dominating olive orchards. The characteristics of these two parts permit the definition of two small farming systems.

In the southern, **Greenhouse-based Farming System**, 5.2% of invested land is under greenhouses, taking the border of Baniyas Mantika as the border. Such a high share under greenhouses determines the agricultural economy of the farming system, through the production, employment generation as well as forward and backward linkages in the local economy. This greenhouse area corresponded in 2002 to 85% of the entire greenhouse area of the country (with most of the remainder being located in the Citrus-based coastal farming system).

¹ The review highlights the main issues, while the Annex tables, maps and the main reports present further detail.

According to official statistics, almost 80% of the greenhouse areas of 3230 hectares were devoted to tomato cultivation, followed in order of importance by cucumber, green pepper and eggplant.

The highest share of cultivated land in the farming system is under rainfed olive, particularly in the wider southern part of the plain and towards the east, followed by 11.2% of invested land under citrus. Particularly the land under olive orchards leads average holding sizes in the system being 1.6 hectares, i.e. that average holdings in the Greenhouse-based farming systems are larger than in the northern system.

Field vegetables are likewise important, as they allow the application of skills developed under greenhouse conditions, but permit savings of input and capital costs. Their areas taken from statistics cannot be directly related to land areas because of double cropping and due to their partial cultivation as a second crop under new young tree orchards. The statistics indicate eggplant and squash as the most important field vegetables, each covering with slightly above 2500 hectares almost 6.5% of the invested land. The five most important field vegetables (eggplant, squash, cucumber, haricot and tomato) jointly occupy slightly above 22% of invested land. Recent trends include the expanding cultivation of strawberries, indicating the preparedness of the farming community to engage in new crops.

Livestock plays a relatively little role in the farming system due to the underdeveloped milk marketing system and little on-farm resources for forage production. Small numbers of dairy exist across the farm types, but are not distinguishing feature between the household types.

The average holding in the farming system as calculated from statistics has just below 1.6 hectares and cultivates 0.74 ha olives, 0.175 ha citrus, 0.35 ha field vegetables and own 0.08 hectares greenhouse areas (leaving 0.21 ha for other crops).

The northern, ***Citrus-based Farming System*** is dominated by 67% of cultivated land under irrigated citrus. It is therefore among the farming systems with the highest share of land under a single crop. Some diversification in citrus species and varieties occurs, but the basis features in terms of asset fixity on market trends of a single crop group and marketing structure remain. Rainfed olive cultivation is second in terms of area and covers 28% of cultivated land. This structure is the result of substitution of olives with citrus over the last decades. The most important other crop is irrigated tomato (3.3%), while intensive cultivation in greenhouses covers only 1% of cultivated land (equivalent to 15% of national area). The share of irrigated land in invested land is 35% in this farming system.

The almost 30000 holders jointly cultivate 32300 hectares, resulting in an average holding size of 1.2 hectare cultivable and 1.08 hectare of invested land per holder. Considering the average family size in the area, the available cultivated land per person stands presently at 0.08 hectare per person, which gives a clear indication of the limits to continued dependence on agricultural income for the population of the system.

The criteria for the establishment of household types were relatively homogenously applied in both farming systems. The three household types resulted in 75% belonging to the smallholder group, while 14% have holding sizes between 1.8 and 3.5 hectares and only 11% of holders operate larger farms. A slight, but unimportant north-south variation in this distribution exists.

Among the small farm type, livestock plays only a minor role for the livelihoods, while off-farm employment is very important as income source and future strategy. In the greenhouse-based system, the meaning of farm size is a relative one, as the economic performance depends much more on individual success in crop management and marketing than farm size itself. Most farm operations in the small farm group are carried out by family labour, with hired labour being limited to few operations with peak labour requirements, such as pruning and harvesting.

In both coastal farming systems, farming is marked by a relatively high specialization on few selected crops, with the risk spreading occurring via different citrus species and varieties.

Marketing of citrus is little differentiated. Climatic risks are relatively lower than in most other systems (but existent for citrus through frost and pests and for greenhouse in storms and pests). Major risk is however, the price risk associated with any intensive crop such as vegetables. Small households are at risk because of a lack of savings to compensate crop or price failures.

Poverty levels, in comparison with many other systems of Syria, are low because farm income risk is partly compensated by high levels of off-farm employment in the public sector.

Decreasing farm sizes put pressure on the system, exacerbated by the increasing expansion of areas under construction. The low average farm size is a risky factor for future incomes of the household, especially in the case that public sector and other off-farm employment opportunities fail to keep up with the population increase. In the former agrarian reform areas, land tenure will inevitably become an issue over the next decade. The absence of commercial credit limits the possibilities for the poorest in the system to invest flexibly in new opportunities.

Environmental risks, caused by the high use of fertilizer and other chemicals in the system, require further study and attention. Potential threats from chemicals exist for farmers that are directly exposed without adequate training and equipment as well as for the general public due to limited controls of residuals in the produce and to possible damage to groundwater cause by chemical infiltration into the aquifers. Within the greenhouse system, nitrate leaching is of particular concern.

Overall, the farming systems have shown great adaptability to market opportunities and farmers are prepared to capture new production and market opportunities, taking advantage of the very favourable environmental conditions. The introduction of new species and varieties to satisfy more differentiated demand could reduce price risks. The public sector could contribute significantly through the creation of an enabling trade environment, but also by strengthening quality control, including produce relevant for the export market. Adequate attention to land tenure issues and credit development can prepare the system for a positive performance over the next decade.

Hilly and Mountainous Farming Systems (FS 2)

The **Hilly and Mountainous Farming Systems** cover the Syrian western mountains from Lattakia and Rural Damascus to the northern hills in Idleb and Aleppo governorates. They account for 6.5% of the area of Syria, 17% of its population and about 27% of the agricultural holders. High annual rainfall with relatively little variability, sloping terrain, and a high share of perennial crops and forest areas characterize the system. The basic farming systems characteristics of the broad farming systems are their smallholder structure based on tree crop cultivation and a high reliance on off-farm income and little livestock presence.

The high population density for a mountain system leads to holding sizes of just above 2 hectares, which is the lowest average after the coastal system. Combined with high population growth, this results in increased fragmentation of agricultural land. The agricultural income of the producers depends mainly on Olive, Apple Cherries and Tobacco. The specialisation of the farming system in these crops leads to high shares of national production stemming from this system (66% of olives, 70% of cherries, 63% of apple and 84% of tobacco).

Poor and medium households dominate the system (60% and 30%, respectively), with a high reliance on off-farm and non-agricultural income combined with relatively high education levels. Within the systems zones, the differences in production orientation related to the agro-ecological conditions has led to a sub-division of the broad farming system in two units.

Low hills and gentle slopes at altitudes of 300-500 meter above sea level characterize the **Hilly Farming System**. It is mostly located in Idleb Governorate and includes 470000 hectares of total land, of which 275000 hectares are cultivable. Most cultivable land is invested, with almost no fallow and only 15% under irrigation. The average holding size is approximately three

hectares with almost two-third of cultivated land under rainfed olive production. The only field crop with some importance is rainfed wheat (9%). This area provides the national market with 31% of its olives, 24% of its cherries and 64% of its Kakis.

Limiting production factors are the small agricultural holdings, the reliance on rainfall and restrictions of capital access, especially for the poor. The farming system is self-sufficient in labour and exports surplus labour to neighbouring systems, especially skilled agricultural labour for orchard operations. International labour migration is likewise important (Lebanon and Gulf States).

The household types for the farming system were developed, based on holding size, livestock ownership as well as assets and income indicators and resulted in an estimated distribution of households into poor (60%), medium (28%) and better-off (12%) holders. The groups differ in their livelihood sources, strategies and production orientation. It is estimated that poor farmers obtain an annual income in the order of magnitude of 75000 SP, compared to 300000 to 500000 SP for the better-off farmers.

Based on their income sources, poor farmers obtain 25% of their income from crop (and livestock) production, while 35% is derived from off-farm casual work and 30% from non-agricultural employment. For some farmers in this group, considerable income is earned through international migration, which is estimated to generate 10% of income in the household type. Better-off households, in contrast, obtain a higher share of their income from agriculture (40%), but off-farm employment is also important in this household type, with medium households falling in between (i.e. they differ mostly in scale of income and holdings, less in the composition of income sources).

Changes within the livelihood system in the last decade refer to decreasing livestock numbers and cherry areas as well as a decrease in the share of off-farm casual income and an increase in non-agricultural income. In addition, some expansion of olive areas within the system coincided with more rapid expansion at the national level.

For their future strategies to increase income and ensure food security, poor farmers focus on non-agricultural and off-farm strategies, while better-off farmers focus on the agricultural intensification and diversification in addition to increasing their agricultural land. Moreover, in the case of poor farmers, exit from the agriculture is considered, while better-off farmers still have the opportunity to combine non-agricultural and agricultural income.

The ***Mountainous Farming System*** stretches from border with Turkey to the coastal mountains to Rural Damascus and includes approximately 725000 hectares (of which 270000 hectares invested) and 175000 holders, resulting in an average holding size of only 1.5 hectares. The farming system is characterized by high rainfall dependence (78% rainfed cultivation) for the dominant perennials, mostly olive and apple trees. The only crop with strictly controlled agricultural plans is tobacco, which covers 3% of invested land, mostly in concentrated niches under the influence of the processing factory. The system includes Mantikas in Lattakia, Tartous, Aleppo Idleb, Hama, Homs and Rural Damascus governorates.

The extremely small average holding size of land on steep slopes with narrow areas and shallow agricultural soil characterizes this farming system particularly and explains the high importance of off-farm employment for the livelihoods (casual agricultural labour as well as international migration) of the majority of holders. Livestock cannot play an integrating role in the farming system, partly due to the absence of grazing areas.

The farming system provides the national market with more than 30% of the olive production, 59% of apple production, 82% of quince production and 42% of cherries. Within the system, farmers produce 67% of the Syrian tobacco. Other commodities like pomegranate, fig and almonds are produced in small quantities, in addition to crops for home consumption i.e. wheat, barley, lentil, onion, legumes and vegetables.

A special feature of the household types in the mountainous farming system is the absentee owner. These 20% often keep their land with their relatives and migrate for higher income. The remaining rural population is classified in three household types: poor (60%), medium (30%), better-off (10%), where the threshold income levels between the groups are somewhat lower here than in the previous system (50-75 thousand SP and 200-500 thousand SP).

The importance of livelihood sources differ between household types, whereby poor households obtain only 20% of income from crop (and some livestock) production, while 40% each come from off-farm casual and from non-agricultural work (including work outside the country). In contrast, better-off households obtain a higher income share from agriculture (40%) and 10% from the livestock.

The above income composition affects their future strategies. Poor farmers are oriented towards non-agriculture and off farm strategies, while better-off farmers focus on agricultural intensification and diversification. For poor farmers, exit from the agricultural sector is considered, while better-off farmers focus more on a combined agricultural and non-agricultural strategy.

Several changes occurred in the farming system, starting with a strong decrease in livestock numbers, as well as cherry and apple areas with negative effects for the casual labour market. Olive areas expanded. The role of non-agricultural employment increased and women have a larger share of formal employment due to better education and social change.

These developments are shaped by several cross-cutting factors: Land scarcity and land fragmentation increases, which makes land ownership the most limiting agricultural production factor. The high share of unregistered agrarian reform and public land influences the adjustment possibilities of agricultural holders. Easing the land administration process, envisaging transparent procedures for the sale of agrarian reform land and registering land rented from the state under private ownership could contribute to reduce land pressure.

The formal credit market relies heavily on the ACB, which deals with individual farmers either directly or indirectly through the cooperatives. Credit access is complicated by two factors, which particularly hamper smallholders in their development by causing liquidity constraints. First, poor and medium private farmers often lack sufficient collaterals from small holdings; second, they possess incomplete documentation of ownership (unregistered and agrarian reform land). A particular concern is the credit needed to reclaim uncultivable land.

All policies that affect the areas under cotton in neighbouring systems impact the off-farm income possibilities within the system by decreasing the work for the migrating labour groups, particularly contracted for harvesting cotton. Similar effects occur with developments in the coastal greenhouse- and citrus- based farming systems, whereby these changes are more based on market trends than on policy decisions. Furthermore, the labour market has been affected negatively by the new introduction of modern irrigation, such as drip irrigation, in citrus orchards. Non-agricultural work gains importance, supported by public investment in rural education allowing surplus labour to seek employment outside the system.

Most crops of the farming system are subject to free marketing arrangements, with exception of tobacco, which is subject to monopoly arrangements with the GEOT. The GEFV has mostly disengaged from direct marketing of fruits and vegetables or their market regulation. Particularly poor farmers with market access difficulties resort to advance sales contracts for credit and reduction of price risks, particularly in case they require credit.

Official tobacco prices are determined in an annual review of estimated national-average unit-cost-of-production and apply pan-territorially. However, producer prices have not increased since 1996, despite the increasing cost of production, in order to reduce the differences between

domestic and international prices. Stable prices have nevertheless proven attractive and farmers tend to expand areas beyond licensed areas. Private traders purchase additional quantities.

The apple market operates without public intervention, since the production share marketed by the GESMAAP is below 2% and marketing through it provides an element of price stability. The apple area exceeded its peak following expansion from 1993-2001, promoted then by public reclamation projects combined with apple planting and marketing support. Increasing input costs (chemicals), pest resistance and price risks led to a reduction in the apple area, mainly of poor and medium holders. The increasing role of product quality and diversity of varieties relatively favours better-off farmers, who have better access to timely market information.

A so-called “quantity approach” led in the past to rapid expansion of olive areas. Attempts to export the increasing production initially failed due to quality constraints and difficulties in the post-production chain. Increased attention to these constraints shows positive effects on the olive oil quality, but securing export markets is still needed to stabilise the key role of olive in this farming system. Public attention to encourage improvements in storage, processing and to ensure quality control are required.

Suitable agricultural diversification could spread the labour peaks; generate additional income and minimizing the risk associated with the high dependency on olive production. Considering the agricultural land nature and the prevailing farm sizes (small) in the system, most field crops are unsuitable, especially in the Mountainous farming system. There are already tendencies that statistics over-represent some crops (e.g. cereals and lentils) as these records are partly estimates due to lacking facilities for recording.

In the Mountainous and Hilly Farming Systems, agricultural remains vital to the livelihood of many farming families, despite the importance of non-agricultural income. Increasing off-farm income and acquiring non-agricultural employment are the most important strategies for the future, especially for poor and medium households. Preferred strategies of better-off farmers are agricultural diversification and intensification, complemented by non-agricultural work. The poorest farmers, who tend to improve their skills through higher education, often envisage exit from agriculture. In addition, due to population growth, poor farmers need to increase the share of income from non-agricultural income to prevent declining living standards with falling holding sizes in the future.

The Government incentives to expand olive cultivation (e.g. in FS3) could negatively affect olive farmers within this farming system, especially if this policy should result in price declines. These would particularly hurt poor and medium farmers. Negative effects could be prevented, if the expanding production is met with increased and competitive processing capacities and the access to niche markets for low-input high-quality olive products from this system.

The beauty of the landscape and the view on the sea offer a potential for rural development policies, which aim at environmentally friendly and aesthetically attractive agriculture. This in turn would strengthen linkages in the rural economy by attracting tourism and could generate employment and income from accommodation, restoration and the marketing of locally processed products.

Farming System of the Northern and North-eastern Plains (FS 3)

The **Farming Systems of the Northern and North-eastern Plains** are the largest one in terms of area (4.7 Million hectares), covering one quarter of the national area, one third of agricultural holders (346000) and almost half of the invested land (2570000 hectares, i.e. 47%). A high dependence on so-called strategic crops, relatively large holding sizes and low market access conditions characterize these farming systems. Rainfall levels are in parts relatively good and are in other (large) parts improved with public investment or private wells.

From an administrative point of view, the areas in stabilization zones one to three from four Muhafazats (Der-Ezzor, Al-Hassakeh, Al-Rakka and Aleppo) are completely located within this system, as well as the areas under public irrigation networks in stabilization zones four and five. The system therefore includes rainfed farming in the northern part (partly complemented by private irrigation from wells or small rivers) as well as intensive irrigation from public irrigation schemes. Due to the concentration of public irrigation from the Assad Lake and along the Euphrates River (including the tributaries), large irrigation schemes show specific characteristics useful for classification.

Crops considered strategic by the Government, especially wheat (51%), cotton (6%) as well as barley (18%) and olives (6%), dominate the invested land in the farming system. The latter are the result of recent Government projects in the western part of the system.

Given the large size of the system, its' major and sometimes even crops with a minor share of invested land within the system contribute a huge share of their national cultivated area. The most noticeable among them are rainfed and irrigated wheat (77% and 79%, respectively), cotton (80%) and rainfed lentil (68%). A particularly good example for the effect of the size of the system is sugarbeet, of which one third of the national area falls into the system, even though it covers only 0.4% of the invested land in the system.

The vast size and low population density within the system give it an overall more rural structure than the other farming systems (with exception of FS6), implying that public sector and other fixed employment are relatively less important. Educational levels are considered lower than at the national level (85% of the system population was estimated not to exceed basic education levels, with a disproportionate share of women among them).

Livestock is of medium importance, with sheep having some relevance for part of the producers. Dairy supports mostly the family needs, except where large villages and cities create a market.

The scale of the system zone in combination with the large average holding size attracts huge flows of seasonal casual labour from all across Syria, most dominantly from the neighbouring agro-pastoral system, but also from the mountainous and hilly as well as the central plains farming systems of FS4 (Idleb, Homs and Hama areas). Casual and seasonal employment is of high importance for the poorer households.

The subdivision into two separate farming systems was based on the exclusion of large public irrigation networks for their special characteristics in terms of average holding size, water availability, dominant crops and tenure regime. Therefore, the broad farming system is further analyzed as a smaller, intensive irrigated farming system and the larger part as mixed rainfed and irrigated farming system.

The **Irrigated Farming System** is based on large-scale irrigation schemes covering approximately 180000 hectares. Land use is by definition extremely intensive and the implementation of the agricultural plan is relatively closely monitored. Water access is by definition a less distinguishing feature, leaving holding size and the role of the complementary income sources (livestock and casual labour) as main criteria for household classification.

The relative importance of crop income for the total livelihoods is least important for the poor households, as they own or sharecrop-in less than 1 hectare of irrigated land. They depend primarily on income from off-farm work, complemented by small livestock income from up to 10 heads of sheep. This household type represents approximately 40% of holders in the system.

Medium households, making up half the holders, typically cultivate 2.5-4 hectares of irrigated land, complemented by 7-10 hectares under rainfed conditions outside the irrigation scheme. Small sheep numbers (25-35) are typical, while one cow complements income occasionally. The rainfed land is mostly cultivated to wheat in areas with higher rainfall reliability, but also to barley where rainfall is less reliable.

In terms of the cropping pattern on irrigated land, poor and medium households follow a surprisingly similar pattern and differ mostly in scale. Mostly poor, but also medium households tend to exceed the licensed cotton area to increase household income. The recent drought has affected the livestock assets of many households and the reduction of irrigation water availability has partly resulted in credits for financing crop inputs remaining unpaid.

Approximately 10% of holders are better-off households, depending mostly on agricultural income, with a dominance of the crop sector and a variable contribution from livestock (in function of the local feed availability). The success of the introduction of intensive crops such as maize in the Al-Rakka area promotes increasing crop livestock integration, particularly for this household type.

The preferred strategy of small farmers and to a lesser degree of medium farmers is clearly on producing wheat for home consumption and as a food security crop. The main limiting factor for the increased crop-livestock integration in these households lies in the lack of capital to invest in animals. The high reliance on cotton as cash crop should be reviewed, as its long occupation of the land limits the possibilities for intensification of land use. The same is true for sugarbeet. However, any considerations of alternative crops should carefully consider the strong preference of farmers for price stability.

The vast majority of the land in the broad farming system (almost 96%) relies on a combination of rainfed farming and complementary irrigation. This ***Mixed Farming System*** has as distinguishing features a more variable water supply and a north-south decrease of average annual rainfall parallel to the so-called stabilization zones (SZ). SZ1 and SZ2 are most suited for rainfed cultivation, but complementary irrigation is frequently applied. Rainfed wheat (mostly durum) exceeds irrigated wheat. Where the risk perception of the farmer allows it, wheat is preferred to barley. The optimal choice of crops shifts to more drought-resistant species towards the south and barley gradually replaces wheat as the lead crop. Families who have heavily invested in sheep tend to shift more rapidly to barley cultivation to reduce the potential hazard caused by drought. The total barley cultivation area in 2002 was recorded as 475000 hectares (40% of national production area). Since cultivation was banned in SZ5 in 1995, the barley area tends to decline, even though records of harvested areas obscure the trend because of the high share of barley used for grazing.

Lentil and cumin occupy jointly approximately 5% of invested land and as rainfed crops are preferred in the northern, more humid parts of the farming system. Lentil varieties differ by area, with white lentil dominating in northern Aleppo and red lentil in Al-Hassakeh. High price fluctuations characterize Cumin (e.g. 35 SP/kg in the previous season compared to 85 SP/kg on average). Both crops are much less mechanized than the leading cereals, hence their influence on labour allocation and seasonal employment, especially for the harvesting operation.

Briefly, the farming system has the following regional variation. In terms of complementary crops, the Aleppo side includes more beans and cumin and little lentil cultivation. Towards the east of Aleppo, perennials are increasingly added to the system due to the Ali Ali project (olive and pistachio). The Rakka area is dominated by wheat, cotton and maize, while Deir-Ezzor systems are extremely focussed on wheat and cotton (i.e. maize is not favoured there). In Al-Khabour, wheat and cotton dominate in the high rainfall parts and on irrigated land of its villages. In Al-Hassakeh, wheat and barley are complemented by lentil. In the rainfed areas north of Rakka, well-based wheat and cotton tends to contribute to the overexploitation of water, while wheat and barley dominate the rainfed parts.

The West of the system belongs to the traditional cultivation area of Syria and is under a much higher urban influence than the eastern part of the farming system. Land expansion in the east is a phenomenon of recent decades and heavily influenced by public investment in land reclamation and water provision for large-scale irrigation and private well drilling.

Near Aleppo, market access leads to more diverse cultivation patterns and a higher share of crops under private marketing arrangements. The specifics of this urban influence are not part of this report, though.

The household types vary largely within the farming system due to the variation in production orientation, while the basic distinguishing features are similar to the irrigated system. Lower population densities lead to much larger average holding sizes in all three household types.

Differing degrees of land scarcity among the villages has led to poor households being defined as cultivating between 0.5 and 1.0 or 3-5 hectares, reflecting also different water availability. With 50% of holders, this is the largest household group. Medium households make up 40% of holders and typically cultivate 7 hectares of rainfed land or 12 hectares under mixed conditions. Large farms typically cultivate 15-17 hectares and farmers classify 10% of holdings into this group (with large farms of the group considerably exceeding this number). The role of other livelihood sources is similar to the irrigated system, with the additional feature of asset ownership (tractors and threshers as well as cars) of the better-off farmers.

The resource endowment and livelihood sources lead to different vulnerabilities between household types. Specific risks for poor households in the system stem from their double exposure to drought effects: Crop loss affects all households in the system, while the poor also lose the important casual employment opportunities. Particularly the loss of capital in the recent drought period left most marginal households without working capital and credit-worthiness with traders and public institutions alike, which critically affect their possibilities to recover economically. Medium and particularly better-off households recover relatively easier, as they are able to start from a broader capital basis and with better institutional credit access. This is particularly the case where holders are in possession of title deeds to use them as collateral. Livestock ownership increases parallel with the social strata in this farming system. The availability of capital to purchase complementary feed makes better-off households less exposed to animal losses, despite of similar risks for cheap grazing between all households and better information and access to transport facilities make their adjustment to drought easier. Social relationships and higher social capital (education) clearly reduce the vulnerability of better-off households. In terms of adjustment and modernization, the lower vulnerability, better working capital endowment and education levels of better-off and medium households make them potential promoters of modernized agriculture. Prime candidates for modernization are technologies for increasing water use efficiency, which would conserve scarce resources and allow expanding irrigated areas at the same time. The structure of water user fees could provide better incentives for increasing water use efficiency than at present.

Crop management differs between household types, as better-off households operate with higher capital intensity and mechanization than smaller and poorer households. This is reflected in the technology levels, whereby most better-off households mechanize all input applications such as seeds, fertilizer and herbicides, as they usually own the machinery. Poor households, in contrast, focus on expenditure avoidance and self-employment in most circumstances and apply seed and fertilizer by hand. Better-off households also tend to plough land twice, while the poor do it only once.

The marketing structure favours the better-off farmers in the system due to economies of scale and allows them to sell non-strategic crops at better markets, while poor households tend to rely on traders buying on-farm, hence obtaining lower gross margins for their crops. These marketing arrangements are often associated with credit provision by traders, which may provide an entry point for asymmetric arrangements. Particular exposure of poor households exists, when water shortage depresses yields and farmers fail to produce the quantities to repay the credit. Credit provision is partly the primary objective when traders enter marketing arrangements.

The development options within the farming system differ notably from all other Syrian farming system, given the high reliance on strategic crops, water availability and generally lower population density. Market access is often the limiting factor to crop diversification, parallel to state incentives to focus production on the few dominant crops. Near the urban centres in the system, tendencies to diversification are observable, but the low population density limits spreading of the strategy. Crop livestock integration exists already, however across farming systems as it provides an important share of the feeding requirements of migrating sheep from the agro-pastoral and pastoral farming systems. The farm sizes are likely to decrease in the future parallel to population growth, however in this farming system starting from a high level.

Policies relating to strategic crops are particularly important here, due to their share in cultivated land in all household types, but particular of the poor. Wheat is more important as a cash crop for the better-off farmers, who are able to benefit from economics of scale, while poor and medium households depend much more on cotton due to their higher return to land and its productive employment generation (return to labour). Poor households depend even more on the employment opportunities on other farms created by industrial crops. Often, the local administration does not impose the limits for industrial crops from the agricultural plan to smallholders. Medium households employ only complementary casual labour, but devote a high share of self-employment for the production of the labour intensive crops. These factors determine the different exposure of the three household types to policy decisions on the price level of these crops or the strictness with which agricultural plans are being implemented.

Credit access to finance crops is a concern for all, but particularly for poor households. The heavy dependence on the ACB for formal credit has closed credit access for many farmers, particularly those who defaulted as a consequence of the recent drought years. Traders provide alternative sources of credit through the advance sale of crops, but the terms factor in the default risk and credit is therefore expensive.

Policy decisions and research orientation should particularly consider their impact on land use intensity and water use efficiency within the system. The high reliance on long season annual crops leads to surprisingly low land use intensities for a system with huge public investment in irrigation development. Complementary crops, which would allow increasing crop-livestock integration and soil fertility management need to be considered. However, the farmer reliance on crops offering price security needs to be carefully considered in policy decisions.

Farming Systems of Al Ghab and the Central Rainfed and Irrigated Plains (FS4)

The **Farming Systems of Al Ghab and the Central Plains** cover an area of approximately 1.15 Million hectares (6.3% of national land) along the central section of the international road, which also connects Aleppo and Damascus. Due to its mostly long settlement tradition, historic cities or special development efforts, its infrastructure was regularly upgraded in recent decades, creating overall very good market access to large urban markets, combined with relatively good rainfall levels and water availability.

The combination of a relatively favourable temperate climate with the good market access has led over time to a varied cultivation pattern with a number of local niche systems. The common feature is, however, a relatively modern farming community, which includes almost 1620000 holders (17% of national figure) with a very diverse cropping pattern. Land use in the system is fairly intensive, frequently also including irrigation from wells and partly from public networks. Average holding sizes within the broad farming system is 4.76 hectares of cultivable and 4.54 hectares of invested land. Across the system, 63% of invested land is rainfed, 27% irrigated and 10% fallow. Of the invested land, 52% are under so-called strategic crops and 4.2% under industrial crops. Within the above general characteristics of the broad farming system, three geographical sub-units are defined which are differentiated by public sector involvement and irrigation prevalence with the associated farming systems differentiation.

The ***Intensive Irrigated Farming System of Al-Ghab*** (Al-Ghab system) is the only farming system, which is already a separate unit in the agricultural statistics of MAAR. Homogeneous ecological conditions, intensive irrigation and cropping patterns based on the agricultural plan jointly with the dominance of Agrarian Reform Land are typical for the farming system. Intensive cultivation of wheat, cotton and sugarbeet dominate in the 141000 hectares of the system (0.8% of the national total). High population density (41000 registered holders and 80000 rural families) compared to other rural areas of Syria, results in an average holding size of 2.1 hectares per registered holder. Al Ghab was created by huge public investment to drain the swamps starting 45 years ago and these drainage canals serve at the same time as main irrigation water source in the zone. The reclaimed land from this investment, which is the larger part of the farming system, was distributed under the *Agrarian Reform Law* and resulted in homogenous holding sizes and land tenure regimes.

Al Ghab is the farming system with the highest share of invested land under irrigation (92%) and no fallow land. The most dominant crops are wheat (52% of invested land), followed by industrial crops (cotton 13.6% and sugarbeet 11.1%). Despite the small size of the system, the specialization on industrial crops makes it a major producer even at the national level and almost one third of the sugarbeet area of Syria is located there, driven by investment in processing plants and the advantage of relatively low transport costs in the densely developed area. The large cotton areas in other farming systems reduce the national importance of the cotton area in the system somewhat, but they contribute nonetheless 6% to national crop area (compared to 1.6% of invested land). The farming system further includes 17% of the national irrigated potato area and is a major contributor to the national market.

Several changes have occurred in the farming system during the last decade. The strict application of the agricultural plan, coupled with a considerable decrease in the available water has changed the relative importance of the three strategic crops in the cropping patterns. This resulted in a decline of the cotton and sugarbeet areas in favour of wheat. However, the expansion of the irrigated area in the southern part of the system, which was the result of drilling deep wells, has partly offset the change, where the area of cotton has increased at the expense of previously rainfed wheat. The intensive cultivation of cotton and sugarbeet accompanied partly with unsuitable land management has caused soil deterioration especially in the north of Al-Ghab. This resulting yields decline reduced farm income.

The criteria for developing a household typology Al Ghab were mostly farm size combined with water cost and livestock ownership. The poor households constitute approximately 80-85% of holders, who cultivate less than 2.5 hectares of irrigated land, or slightly above that size under poor irrigation conditions. These holders derive the major part of their income through casual agricultural labour with instable income throughout the year. Poverty is most prevalent among landless and where the entire holding was received during the agrarian reform process, (i.e. limited to original receipt of 25 dunum under irrigation), but water provision is insecure or the farm is located far from the canal (i.e. high pumping cost). This situation is exacerbated in large families who informally need the scarce land to employ several nucleus families.

Medium households are those 15-25% of holders with up to 5 hectares under irrigation, which occurs mostly in villages where private land was held in addition to land received under the agrarian reform process. In villages of originally rainfed agrarian reform land (i.e. they received 50 dunum), part of the families benefited from the expansion of irrigation canals to their land at a later stage. Part of these households complement agricultural income with public employment.

Better-off households holding more than 5 hectares (50 dunum) of irrigated land are a minor share of holders (1-2%), and they are more numerous in the southern part of the system where land is less scarce. Higher-level off-farm employment, fishery activities or trade may complement income, but exclusive farming is also possible in this household type.

Some variation of the system-wide cropping pattern is observable due to variations in soil quality and hence crop suitability, leading to the local importance of peanut, bean or cucumber. A special adaptation to the land scarcity is the accommodation of *freekeh* within the rotation to increase the land use intensity. *Freekeh* is harvested one month earlier than wheat and resolves land use conflicts with the long-season cotton crop. Poor and medium households cultivate most non-controlled crops, while the better-off focus on strategic crops for their easy marketing.

The part not belonging to the Al Ghab farming system (1 Mio ha of total and 685000 ha of invested land) is under the influence of the good market access, the presence of two major cities and a differentiated production structure of commercially focussed farming and off-farm income possibilities. Calculated average holding size for the 121000 holders is 5.7 ha of invested land. Nevertheless, the differences in characteristics, trends and development options based on their water availability, justify treatment in two different units. The first part is the Irrigated Farming System of the Central Plains (the Irrigated Farming System), and the second one is the Rainfed Farming System of Central Plains (the Rainfed Farming System).

The ***Irrigated Farming System*** has benefited from public investment for the construction of the public irrigation canals, resulting in one third of invested land being irrigated. The 475000 hectares under this system include 76000 holders, i.e. on average 3.9 ha invested land. 36% of invested land in this system is under cereals, most of which is wheat. The second most important crop group (1/3 of invested land) are trees, of which olive is dominant across the system, but others (such as pistachios and almonds) are extremely important in their specialized pockets of cultivation.

The household stratification in the irrigated system is mostly based on access to irrigated land, but depending on the pockets of production orientation, size limits vary. The field survey results suggest that the better-off farmers of the irrigated system have higher tendency to cultivate regulated crops (wheat, cotton, and sugarbeet), while the poor and medium farmers have more focus on fruits, vegetables, and some spices such as cumin and anis.

Some of the pockets of cultivation within this farming system are highly specialized and proven commercially viable even at the international level, most notably the pistachio based local system of Mourek, where a strong farming community provides a high share of the Middle Eastern fresh pistachios. The case is remarkable in two respects: It has evolved from a mere producing area with marketing in Aleppo into a wholesale market with direct export links. In addition, it is noticeable for the integration between producers and extension unit staff, where agents are producers themselves and provide effective links between the public administration and the agricultural sector, which is free of the notion of plan-control associated with the extension units in so many other farming systems.

The ***Rainfed Farming System*** is located to the east of the broad farming system and is influenced by bans to expand well drilling out of environmental concerns. Nevertheless, 6.6% of the invested land (363000 ha) is irrigated, while 15% of it was fallow in 2002 (a high rainfall year). Given the lower land productivity, average holding sizes are 8.2 ha of invested land, with one third of it being under barley cultivation, implying that the barley area exceeds wheat by 3:1. Tree crops play a role in the system, but almond exceeds olive areas (jointly 15% of invested land) in this farming system. Cumin is an important cash crop, but at lower productivity levels than in the FS3. Part of the perennial crops in the system has been established under support from the Green Belt Project.

Off-farm income sources in the rainfed farming system depend mainly on casual agricultural or non-agricultural labour. The reasons are mainly the low yields of agricultural crops due to the rainfed cultivation in area of low rainfall (less than 250 mm per year on average), coupled with the scarcity of other income sources. The rainfed cultivation is the consequence of the Government policy to prevent drilling wells in that area due to water conservation concerns.

Several cross-cutting themes will influence the further development of the systems: Population growth will predictably increase pressure on land resources and reduce the average farm size, unless off-farm jobs opportunities absorb the excess labour outside of the agricultural sector. Constraints in the land market prevent adjustments in the holding structure. In Al-Ghab, the land tenure arrangements stemming from the *Agrarian Reform Law* imply that most land is collectively owned and selling such land is prohibited. On the other hand, inflated land prices in the irrigated farming system render land purchases unfeasible for most holders. Some subdivision of land goes unreported in statistics, while the families effectively divided it. The *Agrarian Reform Law* makes such approaches a necessity, while in the other two farming systems it occurs due to slow administration of the cadastral system. Specific difficulties are caused by the backlog of issuing updated land titles even on private land.

One of the objectives of pricing policies of regulated crops (wheat, cotton, barley and sugarbeet) is to achieve stable, reasonable farm income, which is in reality only partly achieved due to administrative procedures for the delivery of cotton and wheat to the Establishments. Especially in Al-Ghab, a significant part of poor farmers is unable to credit even for regulated crops due to accumulated debt with the ACB. Consequently, they resort to private credit at high interest rates and part of the subsidies is transferred to the traders. In both central plains farming systems, small (poor) farmers devote a major share of their production to home consumption (especially wheat, vegetables, and dairy products); although surplus sale occur in good rainfall years. Hence, administratively increased wheat prices result in marginal additional cash income for small farmers compared to large ones.

Due to the integration into international markets, price reductions of the strategic crops wheat, cotton, and sugarbeet are likely, which would probably have a negative impact on profit margins of farmers. This effect applies to all farmers in Al-Ghab, while it would mainly affect better-off farmers in the irrigated farming system, as poor and medium farmers focus more on fruits and vegetables production.

Farmers' reaction to such changes would differ between farming systems and household types. Poor and medium farmers in the entire farming system are likely to diversify production, including into dairy keeping or expanding crops such as peanuts or cabbage. However, these adjustments could be hampered if markets for such products are not developing. Milk markets far from major urban centres are clearly under developed.

The negative impact of the policy change upon better-off farmers is expected to be lower in both systems, due to their higher flexibility in adapting to new conditions, associated to no liquidity constraints, since they can operate depending on their own finance. This adaptation can be achieved through the adoption of new cost-saving technologies.

In order to support incomes of poor farmers, Government policies should focus more on intensifying and increasing the value of products such as fruit and vegetables, for which Syria has a comparative advantage, and that are mainly produced by poor and medium farmers. Government policy towards better-off farmers should focus more on increasing their efficiency by encouraging them to be more capital intensive.

In fact, the land use intensity in both plains farming systems is relatively low (R-value almost 1). Therefore, the increase in the intensity could have a positive impact on farmers' incomes especially if animal-plant integration is taken into consideration. The latter can be encouraged through the introduction of fodder crops in the cropping pattern, coupled an enabling environment for improved markets for local livestock products. Both changes would improve soil management and soil fertility.

Public investment, particularly of irrigation canals, shaped the distribution of production systems, without exploiting so far the potential of the farming systems fully. Among the most important barriers for further development are low irrigation efficiency and limited credit access

especially for poor farmers. Their removal would increase production intensity, conserve water and lead to productive employment creation for the increasing population.

Farming Systems of the Southern Semi-arid Mountains and Plains (FS 5)

The **Farming Systems of the Southern Semi-arid Mountains and Plains** cover an area of 1.9 Million hectares (10% of total), of which 610000 ha are cultivable (2/3 of which are invested). The systems contain an estimated agricultural population of 1 Million (out of a total of 1.7 Million) and are bordered by the agro-pastoral system to the east and north-east, while Jebel Sheikh of the neighbouring hill farming systems (FS2) is a landmark towards its north-west.

The FS5 is characterized by a highly market integrated production structure, good market access to the main national market in Damascus as well as a strong tradition of export to neighbouring countries. Its agriculture is dominated by freely marketed crops under conditions of generally good rainfall conditions, which are in the west complemented by a large number of (increasingly licensed) private wells. Crops considered strategic are cultivated on 48% of invested land, which is below the national average (61%). Tobacco is the only industrial crop of the system, which occupies 0.4% of the invested land (compared to 4.3% at the national level). The system contains one third of land under cereals (wheat and barley), 12% tree crops and 55% of other crops (most prominent are 13% of chickpea). The latter group (legumes, field vegetables etc) is the highest share in any of the farming systems.

Average holding sizes are on average one third below the national average (3.7 ha compared to 5.6 ha). Agro-climatic and market factors have led to a variation within the farming system, which permits the differentiation of two farming systems. Their main distinguishing feature is the nature of the terrain and differences in production orientation, while average holdings sizes are rather similar. The two farming systems are the mountain farming system and the farming system of the rainfed and irrigated plains, with key features as summarized in the following paragraphs.

The ***Mountain Farming System*** is located in the eastern part and totally included in Sweida Governorate, with an altitude ranging between 650 and 1800 meters and cropped cereals in the marginal eastern part of the Mountain and rainfed fruit trees (apple, grapes, and other perennials). The estimated size of the farming system is 550000 hectares and contains a population of approximately 37000 holders (218000 persons). About 20-30% of the land areas is uncultivable due to volcanic rocks.

Agriculture on the mountain is based on considerable investment of capital and labour for land improvement. The farming system is famous for the cultivation of perennials (traditionally grapes but recently shifting to apple cultivation), which shape the general impression of the system. Cereal cultivation is mostly confined to marginal zones.

The three household types established in the Mountain farming system have the following characteristics: Poor households cultivate about 1 ha of land and constitute 25-30% of the families in the system. They reside mostly in the marginal cereal areas, i.e. outside the areas where public investment in land reclamation has improved production conditions in the last decades. These families derive part of their income from the low productive cereals, but migration to urban areas has increased and remittances to families remaining in these households play a significant role. Where available, livestock is used for cereal cultivation or needs to be rented or borrowed, as the rocky area is unsuitable for mechanized cereal farming. A small number of families maintain low-intensity tree orchards, but due to low soil quality and water deficiencies, they are not comparable in productivity to the improved land.

Medium households own 2.5-5 ha, which applies to 60% of holders. This household type includes a small share of the holders in the marginal cereal zone, but is mainly composed of the

small and medium producers in the improved land in the higher rainfall part of the mountain farming system. On average, the area pertaining to medium households is planted to 70% apples, 20% pears, and 10% grapes. Medium households own cows mostly for household needs. Cattle in the marginal area is used agricultural work and is rented inside the village. Off-farm work is the main source of income of poor and medium households. Crop sales, particularly of apples, are the second important income source. Non-agriculture income is least important due to declining possibilities to work abroad, leading to pressure on the income levels.

Better-off households are those 15% of holders who own above 5 hectares. The largest part of their cultivated land (75%) is under fruit trees (apples, grapes, olives, and pears), while 5% is under winter field crops (which remain fallow in summer). They have more livestock than the other two household types and own 40% of all cows in the system. Part of these households owned sheep for milk production in the past, but keeping them in the farming system has been banned as a consequence of land use conflicts in recent years. Fixed employment complements crop income of this group, based on their generally above-average education levels.

The main change within the farming system during the last decade in the reclaimed land areas, was the expansion of apple areas from 20% to 70% of the cultivated land, while the grape area decreased from about 80% to 10%. Peach trees are recently are expanding. The role of income from non-agricultural work as well as from working abroad has decreased. Changes in the marginal cereal land were minimal due to a lack of profitable investment opportunities for owners as well as lack of capital to do so.

In conclusion, apple offers the highest return to land and labour, evidenced by its increasing share of land, followed by pear. Both are at the same time perceived to create most employment for both family and hired labour. On the other hand, apple prices are in decline and the price risk appears to increase. Given the high specialization of farms on apple production, this risk is serious should it continue, as the orchards are still increasing production. Similar effects have been reported for pears, which contribute a lower share of household income while being more perishable. Marketing channels and prices are critical for the future strategies of the large household type. In case of transfer income, most farmers express interest to intensify existing orchards and to diversify, while desires for land expansion are difficult to put in practice.

The mountainous farming system has potential for production intensification based on effective management of natural resources and improved market access. Development options are conservation agriculture on slopes and vulnerable soils, cover cropping under trees, water resource management and water harvesting methods besides the available few dams, and the introduction of new crops and varieties to cope with the short growing period and droughts.

In the eastern, marginal areas, part of the households face difficulties to produce enough cereals for home consumption under conditions of decreasing holding sizes and the marginal cereal production areas. Emigration to urban areas and increasing reliance on off-farm income and transfers to the remaining population are increasing under such conditions, considering the lack of productive investment opportunities.

Wind erosion and inappropriate land management are increasing environmental concerns. Especially the poor can often not afford to apply fertilizers and consequently mine the soil. The success of improved soil fertility and productivity is closely related to higher water use efficiency. Given the difficult water situation on the mountain, investment in expanded irrigation – if feasible at all – may not necessarily be economic unless for higher value crops. A cheaper alternative could be measures for increasing the crop water use efficiency, Runoff water is probably the cheapest water source from an economic perspective, but the social acceptability of runoff farming unclear at present. Decisions about public funding for further land reclamation within the marginal Basalt plateaus would require should carefully consider the benefits from alternative investments.

The ***Plain*** (Horan Plain) ***Farming System*** covers the western part of Sweida and the Dara'a and Quneitra Governorates. It is a diversified farming system of approximately 280000 hectares invested land (out of a total area of 1.35 Mio. ha), based on commercial and highly mechanized agriculture under mixed water use conditions (rainfed and irrigated). On average, one quarter of the invested land is fallow, with 57% being fallow and 17% irrigated. The average holding size in the farming system is 3.7 ha of invested land. Wheat is an important part of the rotation, but rainfed and irrigated legumes contribute an important part. Characteristic for the system are field vegetables (mainly tomato, cucumber, and eggplant), often using modern (drip) irrigation.

Owners and investors were identified as the two main agricultural household types, whereby the investors are leaseholders owning no or only part of their cultivated land. Their family may traditionally own small holdings and seek investment opportunities or are sons of large families seeking to expand their holdings. This groups mostly invests in vegetable and crop cultivation except in tree orchards. Where holdings exceed the management capacity of the owner, partly if children found other employment, all or part of the land is rented to these investors. Alternatively, holders who lack labour often engage in sharecropping arrangements, which reduces supervision costs. Owners provide capital and inputs for either the fourth or the third of the output at the end of the season. These farmers plant trees (grapes and olives) and crops in the smaller areas.

The owners (only) do not exceed one-third (30%) of the households, while the investors are the majority (70%). The average holding of large owners (10% of farmers) is 4-7 ha, but frequently considerably exceeds this range. 60% of their land is allocated for trees (olives and grapes), 30% of their land is for wheat, and 10% is under tobacco and summer vegetables on wheat land. A wheat-legumes-fallow rotation (rainfed parts) or a double rotation without fallow is applied. Farm income stems mostly from vegetable production. Drip irrigation has reached 90% in the study villages (which is probably above the average of the system).

The Plain farming system has changed in the last 20 years ago with a rapid expansion of well drilling, which created the basis for the now dominant irrigated cultivation. The originally formally illegal practice was not sanctioned at the time and the wells are becoming licensed in recent years. New crops entered the system due to new irrigation technologies, especially drip irrigation, more productive varieties and new experiences of the farmers.

In conclusion, the southern plains farming system is at present amongst the most dynamic ones in Syria and it attracts considerable private investment, which includes land purchases and the renting of wells for the irrigation of intensive crops. These processes are at the same time highly diverse, as in some villages returning workers from abroad exit the agricultural sector and sell their land, while in other villages available capital is heavily invested in land expansion.

Wheat is the most profitable crop for large holdings, particularly as it offers a calculable return due to fixed prices and the relatively good climatic conditions in the farming system. At the same time, wheat also generates the highest returns to irrigation water compared to vegetables. The main disadvantage of the latter is the price risk. Tomato and other vegetables are less profitable due to the unstable prices and the absence of storage possibilities. Livestock is kept for its return to family labour and price stability. Land expansion is permanently present as a strategy among investors, as they consider it a profitable investment for the future, even if they need to engage in sharecropping arrangements to reduce supervision costs.

The plain farming system is a recipient of seasonal agricultural immigration. The outside workers come from the northern governorates of Syria in the summer for the high wage rates. Sharecroppers are part of the system structure, as they are the ones who cultivate the land for which the investors provide the capital. A particular social component of these sharecropping arrangements compared to the alternative employment in the construction sector in Lebanon is that the entire family can stay united and is employed in vegetable cultivation.

Particular development concerns of the plain farming system are the high volume of water extraction from deep aquifers, which contributes to declining water tables. Larger local involvement in water use management could increase the awareness and acceptance of water conservation measures. Legal and institutional constraints associated with attempts to reduce the average crop-water demand needs further study. Market-related problems due to saturation of the local market with the varieties of some kind vegetables add insecurity to the development of the farming system. Further differentiation of market demand in terms of new vegetable varieties and species could reduce the risks associated with excessive degrees of specialization in the system on a small number of vegetables.

Pastoral and Agro-Pastoral Farming Systems (FS 6)

The **Pastoral and Agro-pastoral Farming Systems** represent slightly over half (ca 10 Mio ha, i.e. 55%) of the Syrian area, making it the largest farming system in terms of size. According to estimates from Al Badia directorate, the system includes slightly above 1 Million inhabitants, who jointly raise the far majority of the 12 Million sheep. Of the broad farming systems, 890000 hectares or 7.5% are invested land (one third of which was fallow in the high-rainfall year 2002) and slightly above 70% of the cultivated area (600000 ha) was planted with barley.

The farming systems cover most of the area located in the so-called Stabilization Zone 5, marked by land unsuitable for rainfed cultivation, an average annual rainfall below 200 mm (after exclusion of the parts under irrigation schemes, mostly along the Euphrates River), high rainfall variability and the associated sparse natural vegetation. Furthermore, these farming systems include most of the Stabilization Zone 4, defined as rainfall of up to 250 mm, characterized by cereal cultivation under high risk of failure of the grain harvest. Given the high to exclusive reliance of the population on sheep (and occasionally camel) raising, the frequent absence of a barley grain harvest is not perceived as a failure but part of the natural cultivation conditions in the system. Pockets of irrigated farming from oasis and wells have a long tradition, often in small areas.

This entire zone is marked by considerable Government intervention in terms of settlement policy of its population, social organization (promotion of co-operative organization of Bedouins), provision of social services and subsidized feed and intervention in the grazing rights of the traditional social groups. Definition of boundaries for the legal cultivation of the fragile environment and the permit system for the establishment of wells are important policy decisions influencing the development of the systems.

Within the above area, the composition of livelihoods, development options and policy interventions suggest the definition of three farming systems, of which two are defined geographically, while the pockets of irrigated farming are subject to special regulations and disperse in nature. Presenting the distribution of population and sheep between the farming systems is not feasible due to the migratory nature and the fact that the registration of residence provides little information on the source of livelihoods.

The **Pastoral Farming System** represents the traditional land use type in Al-Badia, based on a livelihood system adjusted to the fragile and highly variable environmental conditions. Taking the SZ 5 as indication, this farming system covers approximately 8.5 Million hectares (including the cultivated niches). Migratory cycles to provide the sheep, goats and camels with their feeding requirements were established on negotiated grazing areas with other tribes and detailed movements are adjusted at the lower levels of social organization, i.e. the clans and families.

The annual movement cycle involves grazing in the Badia in spring and early summer, followed by migration to cultivated areas where sheep feed on crop residues, starting with cereal stubbles (or dry plants) followed by cotton plants. In irrigated areas, other crops such as maize and vegetable fields or legumes are grazed. In the winter, the families return to Al-Badia and feed their animals on concentrated feed, part of which is provided at subsidized rates through the co-operative system. Hence, the migrations traditionally include moving beyond the farming

system into the cultivated areas to graze crop residues, particularly in the irrigated and rainfed crops in the north and the west of Syria. The length of these migration cycles depends on the quality of forage within the system, while their general direction is more a function of family ties. Apart from the income derived from sheep products, mainly milk and meat, off-farm income and self-employment are the only available livelihood sources. Most of the sheep milk is processed, partly by the family or traditional processors (*Jaban*), while wool processing is increasingly limited to complement family needs.

The Badia area has been subject to cycles of expanding and contracting encroaching by cultivation, with noticeable damage to the natural habitat. Cultivation in SZ 5 has been banned for that reason. Over the last decade, the Government established a large number of forage reserves on land under the jurisdiction of the Badia Department and partly on co-operative land. These grazing reserves had indicated the technical feasibility of improving the range quality through regulated access. The decentralized management responsibility of the local communities has so far not been sustainable and been hampered by events of the past drought years. The provision of subsidized feed was established to buffer feed shortages in drought years and their provision support the winter-feeding by reducing feeding costs. Co-operatives as a social organization, including management of designated grazing areas, have been tested, but the exclusive use of co-operative land was granted only in exceptional cases. Grazing boundaries for most co-operatives were abolished during the recent drought and open access is the standard situation.

The differentiation of household types in the pastoral population depends only on the combination of livestock with off-farm income sources. Poor households make up about 60% of holders, who have small ruminant herds below 200 heads (typically up to 100), which are often village-based. They rely heavily on off-farm and transfer income, partly seeking employment as herdsmen. The capital loss in drought years affects them very seriously, as they have no access to credit to re-stock. Some minimum livelihoods are guaranteed by local and state transfers at a low level, which do not suffice to exit poverty, though. Access to employment possibilities even in the irrigated farming system (cotton harvesting) are limited for this household type, as contracts for cotton picking are partly given with preference to families from within that system, who have experience in cotton farming.

Medium households typically own 200 to 500 heads of sheep, making up about 30% of holders, who partly complement their income through casual labour. The larger owners in the group may employ a herdsman, but these cases are unusual for the household type.

The better-off households own large herds (above 500, but herds above 1000 are exceptional) and derive all their livelihoods from it, unless they are absentee herd owners. Capital access and urban relatives (transfer income) make them less vulnerable, as they can more easily buy feed in case of drought and can recover more easily than the poor. Off-farm employment is unimportant for the better-off, who with more regularity employ herdsmen. Their good access to the social network provides them with information on market opportunities, improved feed access and considerable economies of scale. Camel Bedouins are relatively few in number, but are generally considered part of the better-off households. Large herd owners often prefer a northern migratory cycle and graze in areas where stubble grazing is paid for, as under clear grazing arrangements, the exclusive use of fields and flock management are easier.

The structure of the system allows only two strategies within the system. The first one is to expand herd sizes to build capital and be prepared for crises or to rebuild herd sizes after a crisis. Markets provide the possibility to those with information access and skills to react to it. Alternatively, employment can be sought, which is available as herdsmen, in casual employment or outside the farming system. The possibilities for income generation through processing are largely limited to milk processing and they are largely exploited. The household possibilities to explore the different strategies are obvious when considering the asset and skills available in each household type.

NGOs and Government programmes often focus on traditional weaving and traditional Bedouin handicrafts in promoting opportunities for increased self-employment. Marketing of these items is frequently a constraint and the opportunities for higher sales margins by the Bedouin families are related to the general development of tourism in the country. Additional income generation could stem from the involvement of Bedouins in the tourism sector, either through provision of accommodation, guided tours to natural scenery or wildlife sights. At present, some initial developments are observable, but they are confined to the Palmyra area and mostly organized by Hotels. Additional and largely unexplored potential exists near other historic sites (such as Resafah), but their development requires careful development and possibly international guidance.

The co-evolution of the farming system with its' harsh ecologic environment resulted in livelihood strategies, which have shown high resilience to stress conditions. Policy change is one factor, which could add stress to the system. The acceptance of policy signals as new frameworks, which should guide the development of the farming system, such as grazing management regulations or water access regulations, occurs only over time. Too frequent and sporadic policy change leads to mistrust in the institutions identified with these measures. In case the confidence to institutions is lost, a second driving force derived from a harsh ecological system might otherwise be applied, which is the rapid exploitation of new opportunities without entering long-term commitments.

Such behaviour should not be seen as backwards or reminiscence to the past, but as an asset: once, range management strategies have become engrained in the society, they become stress resilient - if sufficient flexibility for local range management decisions is permitted. The pastoral farming system can only then contribute to valorisation of the steppe areas, if its livelihood system can survive the stress from the natural and the institutional framework. Locally managed and socially acceptable range management strategies are a key to its success, such as are stable and predictable policies influencing the pastoral farming system. Range policies have not always provided incentives, which encouraged social groups (co-operatives or traditional forms of social organization) to reap the benefits from improved management of the range.

The **Agro-Pastoral Farming System** is a transition between the traditional grazing areas of the pastoral farming system and the crop-based farming systems in the north and the west of the country. The agro-pastoral system is mostly located in the so-called stabilization zone four (200–250 mm average annual rainfall), as rainfed farming is permitted, but rainfall is too low and insecure for crop-based livelihood strategies. The system covers approximately 1.7 Million hectares and is characterized by the close barley-sheep integration. The system faces high risks to produce a grain harvest due to the rainfall variation, even when planting mostly barley. The frequent use of the crops for grazing instead of grain production is an inherent part of the system. Off-farm income and casual employment is a frequent element of the livelihood strategy. The agro-pastoral farming system is relatively free of large-scale policy interventions (except on the establishment of wells) and operates under free marketing of its produce.

The criteria for developing household types include herd size, but also the size of cultivated land, off-farm income and asset ownership. Poor households depend mainly on agricultural or non-agricultural casual labour (50%). The preferred employment is often as a herdsman, as skills can be directly applied against a fixed wage without changing the lifestyle. Many households lost the majority of their sheep during the drought and they have found no possibility to recover the livestock loss. Consequently, sheep income contributes at present only 20% of family income, compared to half before the drought. The capital loss and lack of credit has partly reached levels that they rent their land to investors, who provide the capital and who are able to face the production risk. After each consecutive crop failure, the investor enters a new agreement based on the condition that for the new attempt to cultivate the share of output is adjusted in his favour. Important parts of the marginal barley and wheat cultivation in that system are therefore carried out by urban investors and not by the land owners. The better-educated

members of these households pursue a clear exit strategy from the system, while people with lower education seek possibilities to re-invest in sheep.

The better-off households are characterized by high (30-50%) off-farm income from agricultural or non-agricultural income, while sheep provide only 10-20% of income. Cultivation is estimated to provide only 10% of income. A special development occurs in the western part of the system, where experiences from the green belt project have been transferred into the agro-pastoral farming system and farmers invest in establishing olive orchards. In addition, capital is invested in poultry farms, which permit a quicker recovery of capital than crops or investment in sheep. The latter strategy is only available to those with access to credit or capital available from other income sources. These new strategies document a considerable shift in livelihood strategy, as in the study villages, half of the income in that group was said to be obtained from sheep a decade ago.

The cropping pattern in the agro-pastoral farming system is very simple; rainfed barley is the main crop, even though with low average grain yield (but very high yield variation due to the lack of water in most years). Wheat plays a minor role. Perennials expanded in the west, especially olives under influence of the neighbouring Green Belt Project.

The ***Pockets of Irrigated Farming*** are based on licensed wells and are developed either in oasis or in newly licensed well areas near the Euphrates River. Cultivation restrictions for water conservation apply these areas as well, but sheep are frequently an important component of these systems as well. To the extent possible, farmers cultivate regulated crops such as cotton and wheat with reportedly high yields.

Policies affecting the pastoral and agro-pastoral farming systems relate to the marketing conditions, input pricing and resource management. Major changes have occurred in all of these areas. Changes in the meat export policies in 2000 have supported income generation from exploiting the preference for Awassi meat in Arab countries, which could be further exploited if combined with policies on the feed provision side aimed at encouraging increased returns per head of sheep and per grazing-day in the Badia. Investors from outside the farming system presently carry out most fattening. Support to the engagement of traditional breeders in fattening of lambs should be explored to generate additional income while reducing pressure on the range. A stronger role of traditional social organization or of co-operatives (particularly where the tribal structure coincides with co-operative affiliation) in the supervision of improved rangelands could ensure more sustainable management of emergency feed resources. This would prevent particularly medium-size holders from losing their herds (i.e. capital stock) in drought situations. Exercising such a role is a long-term development, though, in order to develop confidence that the benefit of feed resources accrues to the managers without fear of spontaneous external interference in stress situations. Technical possibilities for increased the forage production in the traditional run-off areas in Al-Badia (*Faydat*) (instead of the barley cultivation, which occurred in these flood plains prior to 1992) should be considered. Experiences for area-based insurances for breeders could be explored, but careful implementation in a socially adjusted manner and a long horizon for slow implementation would be indispensable to be accepted and sustainable. Policies allowing particularly poor and medium holders to recover from their loss of capital should be pursued, which would involve allowing careful re-stocking, but also working capital provision of rainfed producers in the agro-pastoral system to prevent the long-term resource use of these lands by external investors. The development of additional income sources beside sheep breeding will be indispensable to raise the living standards of a growing population, but increased resource use efficiency and income generation within the farming system could considerably reduce this pressure.

COMPARATIVE REVIEW OF FARMING SYSTEMS

The farming systems of Syria show a remarkable degree of differentiation in terms of production orientation, but also in their socio-economic characteristics of the typical producers. The former influences the contribution of each farming system for the agricultural sub-sectors of Syria, which sometimes differs vastly from the size of a farming system. The latter reflects the differentiation social impact of the underlying trends and effects of policy and institutional changes. This comparative review summarizes the agricultural differentiation and specialization, before presenting the main conclusions relevant for policies to support the adjustment process of these farming systems.

Systems level comparison:

The summary of the six major farming systems of Syria lays out their expected relative importance for the contribution of major food and industrial crops. Given the size of the system, the farming systems of the northern and north-eastern plains contributes more than half the production area of wheat, cotton and lentils and a high share of many other crops. The medium size crop-based broad farming systems (FS2 & FS4) are the main contributors to crop areas of their specialized crops, such as tobacco, olive and cherry in case of FS2 and almond, irrigated pistachio and almonds (FS4). A high degree of specialization brings from the perspective of contribution to the national crop areas even the small farming systems to the attention. The coastal irrigated farming systems (FS1) contributes above 90% of the national greenhouse and citrus production, while the small Al-Ghab farming system (part of broad FS4) contributes from its 0.8% of total area one third of the national sugarbeet cultivation.

From a farming systems perspective, the relative resource endowment of its producers is likewise a main consideration, as it influences the production orientation and development potential, particular in the context of a growing population. Based on the late settlement and investment in land improvement, the northern plains farms are on average endowed with by far the largest farms (7.5 ha), which are even larger after exclusion of the smaller holdings of its irrigated part due to the land attribution under agrarian reform regulations. At the other end of the spectrum is the densely populated coastal farming system (FS1), where average holding sizes of invested land are 1.3 ha. The high availability of off-farm income and non-agricultural employment in FS1 makes others more critical from a poverty perspective. The Al-Ghab farming system (in FS4) provides little possibilities for non-agricultural employment and has average holdings of only 2.1 ha (based on statistics, but smaller in reality due to informal sub-divisions). Similar farm sizes prevail also in the hilly and mountainous farming system (FS2: 2.0 ha) in difficult terrain and under a high percentage of olives, cherries and other perennials, which provide productive employment potential. The pastoral and agro-pastoral farming systems are particularly vulnerable, as the main capital of the holders consists of livestock, which is easily lost in drought years or must be sold at considerable loss at depressed prices to purchase feed.

Most systems (except FS1) produce a high share of so-called strategic crops, many of which are subject to much less practical regulation compared to the past. In terms of sensitivity to policy reform, most relevant is therefore the reliance on industrial crops. The national average of 4.5% of invested land is exceeded most in the Al-Ghab farming system (26%) and absent in the coastal and the farming systems of the southern mountains and plains (FS5).

The characterization of the farming systems in terms of their individual crops is not very well suited to analyze the risk exposure due to the large number of crops grown across the country. However, the dependency on four major crop groups was used as an entry point for discussion (cereals, industrial crops, tree crops and other crops).

At the level of major farming systems, it is noticeable that FS1 has the most extreme reliance on tree crops (80%), followed by FS2 (56%). The farming systems FS4 and FS5 (16% and 12%) represent approximately the national-average (13%) share of invested land under tree crops, while they are relatively unimportant at present in FS3. The characteristics of tree crops in

terms from a farm management perspective should be recalled, in that they present a long-term investment, which considerably restricts the adjustment possibilities of farmers. Among the tree crops, olive represents a high share in FS2 and FS4, which are characterized by lower price fluctuations than the fruits and nuts dominating the other FS. The citrus dominating the FS1 (especially the northern FS) permits some storage on the tree, while apple (FS5 and 2) compete for limited storage space as production increases.

Industrial crops (tobacco, sugarbeet and cotton) provide price security given much importance by farmers and areas are most strictly controlled compared to all other crops. The national average of 4.3% of industrial crops driven by the 6.6% cultivated in the huge FS3, while it constitutes 4.2% of the invested land in FS4. However, due to the specialization within FS4, the AlGhab FS is cultivated to almost 25% with industrial crops. These crops are relatively unimportant at the aggregate level in FS2 (1.7%), but are extremely important within pockets of tobacco cultivation near processing plants and are nearly absent in the other FS.

Cereals dominate the cropping pattern of the vast majority of the cultivated land and constitute over half (53%) of invested land at the national level, with the highest share (70% in FS3, followed by the FS4 (43%) and FS5 (33%). Cereals are particularly suitable for larger farms due to the achievable economies of scale, but traditional wheat farming (animal traction) still exists in the marginal cereal producing areas of FS5. The share of barley in the cereal crop increases parallel to increasing rainfall risk (in absence of irrigation) and a high share of barley is grazed as part of the livelihood strategy of sheep breeders. Price risk is not an issue for the cereal producers, while climate risk is a serious problem.

The last crop group comprises mostly crops under private marketing arrangements, including most importantly legumes (important in FS3 to FS5) and field vegetables (FS1 and FS 5). The former group is more characterized by climatic risks, while the second group is regulated when based on irrigation and subject to very high price risk, but offers high profit to growers who succeed to market at the correct moment.

This presentation by crop groups allows the differentiation of different **vulnerability factors**, notably the vulnerability to price shocks (by relying highly on crops subject to price fluctuations), climatic risks (mostly drought vulnerability of the system) and policy change (notably by controlled areas and adjustments in the official prices). The comparative review indicates the highest exposure to policy change is FS3 due to the high reliance on wheat and cotton, the latter particularly of the poor farmers who frequently exceed the permitted share under the agricultural plan. Policy change at the broad farming system level is next important for FS4, while at a close look, the Al Ghab FS within is overall strongest exposed to political prices and agricultural plan adjustments (25% of invested land under industrial crops). Policy sensitivity of the FS6 is of a very different nature, as the system is not affected by direct output price control. Policy decisions have affected in contrast mostly resource use decisions, frequently out of environmental concerns. The first intervention area has been through the ban to cultivate floodplains in or the Badia itself. The second intervention refers to restrictions on water use from wells for the irrigation of crops, for which exemptions are reportedly under consideration. The establishment of grazing reserves and the provision of subsidized feed are supporting the population living in a risk-prone environment. At the same time is this support outside the influence of decentralized institutions close to the Bedouins, which adds insecurity to a system where it requires certainty. Past policy decisions on grazing area access and the role of co-operatives have raised concerns about the stability of policy decisions. The Badia policies are theoretically neutral to scale, i.e. poor farmers get the same benefit for their animals as large holders. Asymmetric information on markets and credit access make better-off member of the system less vulnerable and adjust quicker to the risks of the system.

A high reliance on crops under free market arrangements, particularly if these are perishable and highly seasonal exposes farmers to great profit opportunities but also vulnerability to price shocks. FS 1 and mostly is southern, Greenhouse dominated part, are most sensitive to it. Years

with high losses is the most important factor preventing the smallholders within that system to continue cultivating in all seasons due to capital loss. Successful farmers there and in the southern plains farming system of FS 5 are on the contrary well prepared to make high profit, particularly where they combine good crop management knowledge with knowledge about the commercialization of their produce. The substantially improving supply with fruits and vegetables in the last decade provides testimony for this success.

Climatic risks increase generally from west to east, making FS1 and FS2 least exposed. FS6 is clearly most risky one of all systems due to the direct dependence on the range. Within FS6 again, the non-migrating herd owners (coinciding with the poor ones) have least flexibility by migrating to other areas compared to owners of larger herds. In a drought situation, these farmers lose the highest share of their capital as they lack resources to purchase feed at increased prices and small herd sizes make migration uneconomic. Within FS3, the irrigated farming system (Euphrates Basin and tributaries) are less exposed to climatic risk than rainfed areas, as water deficiencies are prevented through irrigation. In practice, however, not all irrigation systems are resilient to fluctuating rainfall conditions and in the Khabour basin particularly, low rainfall years transmit their effect through the irrigation system through reduced water quantity and coverage of the schemes. Lack of irrigation water affects household differently depending on their position in the scheme and sharecroppers lose the possibilities to engage into cropping arrangements. Climatic risks and policy risks increase each other partly, when the agricultural plan announcement (irrigated or rainfed “plan” in an irrigation scheme) is announced belatedly due to insecurity of the planners themselves to provide water in the irrigation scheme. By nature, the vulnerability level of rainfed agriculture is highest, be it the rainfed barley cultivation of the agro-pastoral farming system (of FS6) or the mixed farming system (of FS3). Access to complementary water resources, such as wells, is correlated with the socio-economic classification and owners of deep wells are less likely to be hit hard. Poor households are often losing not only their own crops in a drought, but also their casual labour possibilities, often in harvesting cotton or other crops.

This review of vulnerabilities is focussing primarily on short-term effects. Perennial systems are subject to specific price risks in cases where long-term price declines occur when a steadily increasing supply is not met with increasing demand. Some citrus varieties appear to be in such a decline (due to the private expansion from late adopters of a successful strategy), as might occur with apple and olives in the future due to public promotion of orchard expansion. Ensuring markets for these crops is important to avoid the negative effects of asset fixity of farmers’ investments, as declining margins would hurt poor producers most.

Apart from the natural conditions, several cross-cutting themes influence the present structure and development potential of the farming system.

The endowment with land as the principal agricultural resource was a long-standing public concern in Syria and social equity concerns led to the agrarian reform process of the 1960s. Nevertheless, the growing population and sub-division of land requires further attention to the role of land fragmentation when discussing the farming systems of Syria. Agrarian reform was achieved through the redistribution of large, privately holdings as well as the distribution of public land, partly after considerable state investment in land reclamation. No systematic study on land tenure was part of the present study, but the legal restrictions of holders of such land arouse frequently. Comparing the share of agricultural land under restrictions from the agrarian reform law, it is apparent that the Al Ghab (FS4) and the irrigated farming system of the northeastern plain (FS3) have the highest share of agrarian reform land.

The farming systems are furthermore differentiated by the prevalence of absentee and part-time farming. The remoteness of many holdings from urban centres leads many large farmers in the rainfed plains of FS3 to visit their holdings mostly for the supervision of agricultural operations, which are highly mechanized for the dominant wheat. The phenomenon is at the same time associated with holdings, where owners engage in share-cropping arrangements to reduce

supervision costs. This is most important in labour intensive field vegetable cultivation and on irrigated land. Share-cropping is therefore most important in the irrigated parts of FS3 and the plains of FS5, while it is less important in the plains farming systems of FS4. In several tree-based systems, smallholdings do not provide sufficient employment capacity for full-time presence on the farms, resulting in seasonal absence from farms in FS2 and the mountain FS5. The land relation policies, e.g. the law of agrarian relations, intends to protect share-croppers, but at the same time reduces the interest of land owners to engage in new longer commitments which could affect their ownership rights.

Poor and landless individuals and families seek employment within their own farming systems and move to other farming systems known for their need for casual labour in specific seasons. A review of employment generation in the farming systems involves considering the potential for productive employment generation for family labour as well as the possibility of a system to absorb casual labour (often resource-poor or even landless households) on a seasonal basis. Apart from the self-employment on their managed land, casual agricultural income within the system is a standard feature and the extremely high importance of this income source across all systems has been pointed out.

Seasonal agricultural labour flows to the areas with cultivation of the labour demanding cotton or sugarbeet, but also regions with field vegetable cultivation, among others. The most importance receiving systems are FS3 (particularly the irrigated system), FS5 and FS1, while the areas of out-migration are the agro-pastoral farming system of FS6, FS4 (particularly Al-Ghab) as well as FS2. The poor households within a system (particularly harvesting) mostly migrate for unskilled labour, while better-paid skilled operations such as pruning of orchards attract to a higher degree also medium household types. Population growth and increasing labour availability within the systems (declining average holding sizes over time) leads to an increasing reliance on labour from within the systems, which appears to affect the employment possibilities for the poor from the agro-pastoral FS in the FS3 (particularly the irrigated part). A similar trend exists for local casual employment in the FS1. Poor households from within FS3 are preferred for cotton picking as they provide higher experience in the operation. The irrigated plains of FS5 continue to attract casuals for field vegetable cultivation, but also engage migrant labour to a considerable share through share-cropping arrangements. These labourers, for example originating from FS2 and FS4, complement these contracts with migration to non-agricultural work, e.g. in the construction sector of Lebanon. With increasing labour supply and use of internal labour within the system, the capacity to absorb surplus labour between the systems is likely to decrease, which will increase pressure on the labour market. This has already happened in the rainfed part of FS3, where labour flows within the system are now more important than in the past.

The environmental concern most commonly raised across all farming systems are those on the present and future water availability, possibly less marked in the FS1 & FS2. Policies restricting the drilling of new wells tapping into already overexploited aquifers are in place, but enforcement is partly an issue. More attention on the role of water use or service fees for demand management is required, in order to increase the crop-water use efficiency. Efforts for upgrading traditional to modern irrigations have been more successful in FS5 than in most other farming systems, particularly FS3, partly due to unresolved technical problems. The role of runoff management under rainfed conditions deserves more attention than at present, including for forage production. The success of better soil fertility management especially under rainfed conditions is closely related to water management as well as credit facilities.

A particular environmental concern in vegetable cultivation, most markedly under greenhouse conditions, is the pesticide and insecticide use. Spraying intensity has not specifically been studied, but the public facilities presently appear underdeveloped to analyse for a significant sample the compliance with prescribed waiting periods after application and potential hazards to ground water resources. Pesticide application in cotton is at levels considerably below many

other countries and offers the possibility to seek price premiums if used for marketing. The control function of the public sector in ensuring the quality of sold products in the interest of farmers and consumers should be strengthened. The requirements for obtaining training and licenses by agro-chemical traders should be assessed from this perspective, as should procedures to ensure the safe and efficient operation of spraying equipment.

One of the most important concerns for increasing the flexibility of farm management across Syria is the access to seasonal as well as longer-term credit policies. Particularly where farming systems have been affected by the recent drought and assets have been lost, e.g. FS6 and part of FS3, mechanisms need to be established to give these farmers new access to crop finance. Marginal producers will otherwise face serious difficulties to avoid expensive alternative credit sources. The governing procedures for guaranteeing credits within the co-operative system include an element of decentralized social control for debt repayment, but are not fully functional at present.

Governing **policies on the registration of land** and the transfer of registered ownership of agrarian reform land require urgent attention. The transition from original reform beneficiaries to the next generation has started. It will rapidly broaden the negative effects faced by holders without title deeds in the near future. Under the practical difficulties to obtain credit using such land as collateral, part of the farmers informally sought pragmatic solutions, which occasionally involve formally illegal land sales and distribution of land among several young families. This approach is relatively inefficient and carries with it the risk that particularly smallholders negotiate from a weak position in these circumstances and are consequently forced to accept expensive credit arrangements. In some farming systems, holding sizes will become too small to be viable and the social implications if such resulting holdings cannot be sold should be considered.

The gradual move towards an indicative planning process has led to the decentralization and flexibilization of many production decisions. **The agricultural plan** for non-strategic crops serves mainly as approximate orientation point of a desired situation except for well-irrigated crops affected by water conservation policies. **Industrial crops** are under the strictest control of their cultivated areas, which is necessary to contain excessive budget effects and meet the requirements of processing facilities or to meet export objectives. The policies and procedures for influencing the cultivated areas, delivery time and product quality are at the same time expensive, complex and not always transparent in their application. Other critical areas are the procedures to obtain yield estimates, the assignment of delivery dates (sugarbeet) and inefficient delivery mechanisms to factories causing long waiting periods and additional cost. Procedures for grading of industrial crops are a necessity to ensure the quality of supply. Area control may also be required as long as crops remain highly desirable for many farmers and production tends to exceed requirements of factories (which imply no statement about the economic efficiency of the commodity chain as such!). However, from a social point of view, inefficiencies of the procedures tend to favour large producers compared to smallholders, which is partly compensated at the local level in that smallholders are permitted to exceed licensed areas without sanctions. At the same time, the monetary importance of the administrative process of certifying product grades (as certificates of origin) becomes a part of a negotiation between employees and farmers. Part of the illegal practices are possible because of the serious cash and liquidity constraint faced by farmers with irregular cash flows and where delayed payments by public institutions are particularly hurting.

Given that the **extension unit** is the branch of the agricultural support system with the most regular and direct contact with the farming community, it is heavily involved in the collection of local information and the transmission of agricultural decisions from the higher administration. The activities required for the planning, data collection and supervision of the agricultural plan are among the most important and time-consuming extension unit tasks, particularly in farming systems with a high importance of industrial crops. Agricultural extension advice in the sense of

providing information on modern farming practices and being an active partner of farmers in solving practical problems receives therefore less attention. Apart from the time aspect, the role as a control institution, which at least historically had even the task to have illegally cultivated crops destroyed, occasionally reduces the precision of information given by farmers. The research-extension linkage is presently relatively weak and the generation of technical solutions would benefit from a better information access to international research results by researchers. The outreach capabilities in the extension systems should be strengthened.

3rd National Agricultural Policy Workshop

**Comparative Advantages of Selected
Syrian Commodity Chains: implications
for policy formulation**

Technical note

July 2004

Objectives and Issues at stake.

This memo presents the outcome of a study carried out from September 2003 to May 2004 by the National Agricultural Policy Centre with the assistance of the Food and Agricultural Organization of the United Nations on the comparative advantages of selected commodity chains. The study assess the impact of the structural changes, that are taking place in the Syrian economy since the early 90's, on the economic viability of these commodity chains. With the gradual shift from a state led to a market driven economy, combined with an increasing opening to the world economy, and the corresponding increasing competition between local and foreign source of supply for food supply, the capacity of the Syrian agriculture to remain competitive in a new policy environment is a crucial issue for policy formulation. Conversely, it is equally important for policy makers to identify commodity chains that can benefit from new market opportunities created by trade liberalization, and thus, durably increase their contribution to country's economic growth.

Within the limited period of time available to carry out the study it was not possible to cover the totality of the agricultural sector, therefore a number of commodity chains have been selected by the NAPC in consultation with members of the Ministerial Price Committee; the selected chains include cotton, wheat and olive oil for the group of strategic crops, tomato for vegetables, orange for fruit production and beef meat and cow milk production for livestock. These chains and their related final outputs under the form of processed agro-food products have been selected in order to provide a first set of indications about the capacity of the agricultural sector to continue to fulfill is expected contribution to the economic development in a new policy environment.

Historically food security is considered as the core function devoted to the agricultural sector to maintain the stable social environment required by the country global development strategy. Beyond the steady supply of affordable staple food to the population the agricultural sector is also considered as a key element of the industrialization strategy through the provision of raw material to the agro-food industry that has acknowledged a rapid development of private investment in the past decade under the impulsion of the Law 10 framework. This downward linkage is also a key element in the expected increasing contribution of agro-food products with higher value added content to exportation and currency earning. Concurrently the agriculture is also expected to play a crucial role in counter-balancing the rural-urban increasing social and economic unequal development engendered by the economic growth, through the provision of jobs and income opportunities to a rural population that still represent the largest share of the population. This issue is particularly important for women, their livelihood depending largely upon rural and agricultural based jobs. Last, but not least, with the rapid extension of irrigated production that was key for agricultural output growth in the past 15 years, an optimal utilization of natural resources, and water in particular, is from now on a major element of the formulation of the Syrian Agricultural policy.

In the past decades, the Syrian government pursues simultaneously most of these objectives through output/input prices control and through the allocation of financial support to selected commodity chains or groups of agents such as producers or processing industries. This transfer of resources from the whole economy to the agriculture was facilitated by the availability of revenue generated by oil exports, a policy option that would be less and less feasible at mid-term with the expected decrease of oil surplus exports. Concurrently the gradual liberalization of the Syrian economy materialized in the AFTA membership, the Association Agreement with EU and the application to WTO means that direct public intervention in the agricultural sector would become more an exception than the usual policy option for promoting the development of the Syrian agriculture

The results presented in this memo aim at assisting policy maker in formulating policy options and priorities on a commodity basis that address the whole range of functions devoted to the agricultural sector with the most cost-effective compromise between economic efficiency and

social equity. The following Section 2 provides a brief explanation of the method applied to measure the comparative advantage of the selected commodity chains and summarizes the various sources of information used and the process through which they have been collected and analyzed. Section 3 presents the most relevant results obtained for decision makers while the fourth and last section will address more specifically policy implications. The conclusion reviews the possible follow-up action for expanding and maximizing the usefulness of this approach to assist policy makers in decision making.

Methods and sources of information.

The Policy Analysis Matrix

The assessment of the comparative advantages of a given productive system encompasses a broad range of conceptual works emanating from cost-benefit analysis and the theory of international trade. The basic concept is that an economic activity in a given country has a comparative advantage as far as it can be profitable while competing with alternative source of supply from import, without benefiting from any specific support from the rest of the economy under the form of transfer of resources. The comparative advantage of a productive system is measured through the computation of several accounting entities and ratios that have been gradually developed through applied research. In the eighties these different methods have been consolidated into one analytical framework, named the Policy Analysis Matrix (PAM), a three lines by three columns table containing all the different accounting values needed to compute the ratios required for the analysis of the comparative advantage (Table 1). This analytical framework has been widely used to assist in decision making to monitor trade liberalization process in European, South-East Asian and Sub-Saharan countries from the eighties onward.

The distinction between tradable goods and domestic factors is at the core of the conceptual framework. Tradables are goods and services that can be internationally traded and includes both intermediate inputs required during the process of production, and the final output of the production process. It should be emphasized that tradables include any inputs and outputs goods even if they are not actually internationally traded. The second category of costs are the domestic factors which include basically labor and the capital required to produce the final output, 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 factors is central to the theory of the comparative advantages as they correspond to the resources available from which goods can be produce in the 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.

The profit generated by a selected system is measured by subtracting from the value of the total tradable output the value of the tradable inputs and the values of the domestic factors utilized to produce the output. Considering that the total output sale is the revenue of the system, this accounting identity can be noted as: Revenue = Tradable input + Domestic Factors + Profit. This accounting identity is computed using two price systems. The first line of the PAM contains the value for the accounting identity measured at private prices (A B, C, D), which are the price currently used by the different agents to purchase their inputs and domestic factors and sell their outputs. The second row of the PAM gives the value of the same identity but measured at social prices. Social prices are the prices that would prevail if the value of tradables inputs and outputs and domestic factors were not modified either by the economic policy in place (tax, subsidy, price intervention) or by output, input or factors markets failures (market segmentation) which result in a distorted price system. In short the second row is a

“benchmark” that will be used to assess the economic efficiency of the system. Consequently, the third row of the PAMS obtained by subtracting the social value from the private value indicates the magnitude of the divergence between the situation at private price and social price.

Table 1 The Policy Analysis Matrix

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

The PAM provides straightforwardly a range of indicators for assessing the efficiency and the comparative advantages of a system. If D is positive the system generates profit under the current policy and market conditions and is competitive. Similarly, if H is positive the system is able to generate profit without benefiting from subsidy or conversely being constrained by taxes, and the system is said to have a comparative advantage. If a system is benefiting from subsidy for input use, or has to pay a lower price for casual labor than it would have if the labor market was efficient, the system can be competitive (i.e. $D > 0$), while having no comparative advantages (i.e. $H < 0$). The computation of a PAM for one system is of little help for decision makers who often need to choose between different alternatives, it is therefore much more relevant to build a PAM for different technical combinations of inputs and domestic factors or for different category of outputs or for different period of reference to analyze changes across time.

The comparison of the PAMs, developed for different systems, relies on the computation of ratios that are scale, product and time independent in order to draw meaningful comparison. The following ratios will be used in this memo:

- The Financial Cost Benefit ratio (FCB), which is the value of the Domestic Factors against the difference between the Revenue minus the Tradable Input [$FCB = C / (A - B)$]. If this ratio is above one, it means that the systems utilize more value of Domestic factors than the wealth created or the Value Added, then the system is not profitable². 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.
- A similar ratio is computed at social prices, the Domestic Cost Resources ratio (DRC) which provide a measure of 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 advantage, if it is below one the system has a comparative advantage, and the system is said to be economically efficient.

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 get 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 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

² The value added of a given commodity chains is its output value minus the value of tradable inputs used in the production process but that have been produced by others chains and should, therefore, not be counted in the additional value created by the commodity chain considered.

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 ECP above one means that the selected systems is protected while an ECP below one means that the system generates less added value at market price than he would at social prices.

- The last coefficient retained in this memo provides a synthetic index of the divergence between the efficiency of the system at private price and at social price. 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 divergence induced by the current policy or market distortions.

Construction of the PAM for representative systems

The development of a PAM begins with the selection of representative systems for each group of selected commodity. The representative systems have been differentiated firstly on the basis of the main final output, then by the type of farming technology with a particular emphasis on the type of water management technology, then by processing technique or different size of processing unit (large and small processing unit), when it applies, by the intuitional status of the marketing and processing agents (public or private) and then by the targeted market (domestic market, AFTA countries or European market). Table 2 presents the list of representative systems that have been identified and the different characteristics of each system. The last column indicates the main objective assigned to each systems with respect to agricultural policy. For certain commodity, representative systems have been selected in order to address a specific issue like the possibility to export a specific market. For instance, in the case of olive, table olives have been excluded from the analysis because they only represent a minor part of the sales. Furthermore, the analysis was limited to the filtered olive oil export to Europe, which was considered as the most challenging market.

For cotton and wheat based product (flour and pasta), as different technologies co-exist a farm level to produce raw cotton and wheat it was decides to develop specific PAM integrating the results obtained for each different water management techniques (public network irrigation, well irrigation and rainfed in the case of wheat). This consolidation has been done on the basis of the crop planted area under each technology. For cotton (system 1a), data on the planted area under public networks irrigation (37%) and under private well irrigation (63%) was provided by CMO. For the consolidated PAM for standard flour (System 4a) produced by the GECPT (a combination of 75% of soft wheat flour and 25% of hard wheat) the share of network irrigation, well irrigation and rainfed production was estimated to be respectively 36%, 12% and 27% for soft wheat production, while the share for hard wheat production are 7%, 10% and 8%. Wheat pasta production used exclusively hard wheat and the share used to develop the wheat pasta integrated PAM (system 11a) are 23% for hard wheat irrigated network, 28% for well irrigated production and 50% for rainfed.

Table 2 : Combination of criteria for representative systems characterization.

N.	Commodity	Main output	Farm level technology	Processing technology	Institutional status	Targeted market	Main policy objective	
1a	Cotton	Lint cotton	all system	large ginnery	public	export EU	currency earning downward linkage	
1			network irrigation					
2			well irrigation					
3a	Wheat	Standard Flour	all system	large mill	public	domestic market	food security	
3	Wheat (soft)		network irrigation					
4			well irrigation					
5			rained					
6	Wheat (hard)		network irrigation					
7			well irrigation					
8			rained					
9	Wheat (soft)		network irrigation		small mill			public
10			High Qual. Fl.					network irrigation
11a	Wheat (hard)	Macaroni (law quality)	all system	pasta factory	private	export AFTA	downward linkage and currency earning	
11			network irrigation					
12			well irrigation					
13			rained					
14		Macaroni (high quality)	rained		private			
15	Olive	Filtered olive oil	rained	centrifuge	private	export EU	currency earning return to tree plantation for land improvement	
16				hydraulic				
17	Tomato	Fresh tomato	open field	sorting/packing	private	export AFTA market	currency earning	
18			green house					
19			green house					
20		Tomato paste (low concentration)	open field	tomato paste factory	private	export AFTA market	currency earning downward linkage	
21	Orange	Fresh orange	network irrigated	sorting/packing	private	export AFTA market	currency earning	
22			well irrigation					
23			drip irrigation					
24			network irrigated					
25		Orange concentrate	network irrigated	Evaporation unit	private	Domestic market	downward linkage	
26	Livestock	Beef meat	specialized fattening farm	Butcher	private	Domestic market	income opportunity and food security	
27		Live Animal	specialized fattening farm					
28		Fresh packed milk	small private farmers	dairy factory				

After the selection of the representative systems, the next step consists in computing the first line of the PAM at private price. It starts with the identification of the main agents involved in the production process from the farm to the step where the commodity is transformed into the main final output. Then a standard budget is computed each agent involved along the chains. This information has been obtained through specific surveys carried out at farm level in each agro ecological zone and interviews of private traders and processors, while the data for public agents (CMO and GECPT) has been obtained through official channels. Farm level information have been cross-check and validated with national statistics provided by the Ministry of Agriculture, in particular to adjust yield level. For budget items having both tradable and domestic factors content, like tractor hired for agricultural operation, the share of each type input was estimated on the basis of a standard budget prepared separately. Then, the standard budgets for each agent are aggregated into a unique budget for the whole representative system

in main output equivalent, taking into account conversion ratio from the raw agricultural commodity to the processed main output.

The second row of the PAM, at social prices value, is computed on the basis of secondary data. The estimation of the representative system's revenue at social prices use the price paid for importing the main output produce by the system without duties when the domestic market is the target, or the price received for exporting the main output to the targeted foreign market. While for cotton the world prices quoted in various markets places (Liverpool, New-York...) can be easily used as a reference or parity price, the determination of the appropriate parity price for other main output such as flour, or fresh product is more difficult because transaction are settle on a bi-lateral basis where prices are largely determined by the quality of the product and the specific situation of the supplier and the buyer. For these cases, the determination of the parity price relies on FAOSTAT database, using average import value per ton as a reference price for the targeted area. Tradable input values at social prices are determined by deducting from the corresponding value at private price the value of the custom duties, and conversely by adding the value of any subsidies. For the cost of energy, an implicit subsidy was applied for fuel consumption since the price in Syria is far lower than the prevailing price on the world market. The PAM are computed in Syrian Pound, therefore the exchange rate is an important determinant of the value of tradable input usually quoted in US Dollar on the world market that need to be converted in SP. Given the rapid integration of the various currency exchange mechanisms that were still enforced in the recent years, the small gap between Syrian inflation rate and the one observed in its main trading partners country, and the depreciation of the US Dollar against the Euro, the currency of the major Syrian trading partners outside the AFTA region, no distortion was accounted for between the current exchange rate and the social exchange rate. Therefore, we applied the same exchange rate to estimate the private and the social value of the tradables.

The estimation of the social value of the domestic factors is less straight forward 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 labor, the value of skilled labor or permanent laborer, who required the payment of various social contributions (pension fee...), was adjusted accordingly. As the tax on capital invested was minimal, we didn't account for any tax on capital invested. However, for domestic factors, a large share of the divergence between private and social price values might be caused by factors markets inefficiency. The assessment of these inefficiencies is a challenging task that requires specific studies. Based on expert judgment, it was assumed that there is no particular distortion on the labor market and that the current wages reported for various tasks reflect the true opportunity cost of labor. For the capital market, the current saving rates offered by the Commercial Bank of Syria, 5.5% per year, was used to compute the opportunity cost of the capital immobilized in the process of production at private price, while a rate of 3% equivalent to the weighted rate computed by the FMI for the newly industrialized Asian economies was applied at social prices. Given the high level of public intervention on the financial market and the tighten credit policy for private agents it is likely that the opportunity cost of capital could be higher at private price. However, it is important to note that the value of the private interest rate does not enter in the computation of the DRC to assess the comparative advantage of a representative system. Therefore, it is preferable to keep observed value in the current situation and to assess with sensitivity analysis the impact of higher interest rate on the private profitability of the system.

Land and water represent the natural resources base of any agricultural activities. The first set of PAMs have been developed without inputting a price or a value to the utilization of these Domestic Resources to simplify the computation procedure and to identify more easily any inconsistent technical ratio or prices used for the tradables, labor and capital cost.

DRC with land rent and water cost. However it is clear that each of the selected systems do not use land and water with the same intensity and efficiency. To introduce land cost into the

computation of the DRC it has been decided to take as a reference the value of the usual share cropping contract rather the value of land rent, given the high segmentation of the land tenure market. The sharecropping system mentioned in the literature varies according to the crop: 15% of the value of the production for the land owner, and 20% for cereals. Has no value was available for tomatoes and oranges a value of 30% has been applied, to take into account the rather more risky nature of these crops.

While the value of the land is a complex issue, putting the value on the water used is even a more challenging task, because there is less references available as actual transaction occurring on water concerned limited quantities used for establishing perennial to take care of the seedlings and are not comparable with volume of water required for larger fields. The method applied to find a proxy for the value of the water was to compute the residual value of the water once all the cost (including land cost) have been deducted from the revenues of each systems. Then the ratio of these residual profit divided by the volume of water required by each systems provide the maximum cost that can be supported by each systems, otherwise the profit will be negative. The analysis as social price since there is no market for water under the prevailing conditions (missing market). This first analysis clearly show the very low efficiency of irrigated cotton and wheat systems, all of them losing money with or without inputting the land price, therefore we obtained a negative value of the water use indicating that the utilization of water turn actually into negative value added. The others water based systems (irrigated oranges and tomatoes) obtained a positive value, meaning that the major issue in terms of water used efficiency concerned wheat and cotton irrigated systems. The opportunity cost for water for these two systems correspond to the value of water forgone in the most profitable alternative crops that can be produced under equivalent conditions. Tomato being the only alternative for which we have data available, although using other major field crops (maize, barley, tobacco...) would be a better alternative, we assumed that a less intensive tomato cropping systems than the one surveyed in the south of Syria would be more likely in the major wheat and cropping area of the north. The water value computed for these low intensive systems is 6 SP/cm³; taking into account the higher agro-climatic and market risk attached to tomato cropping that is a perishable crop, we assumed that the actual value of water foregone by a farmer who decide to crop wheat or cotton rather than tomato would be of 3 Sp/cm³.

Results

Comparative advantages of the representative systems

Selected PAMs' values and indicators are presented in Table 3. The left hand columns provide the results for one ton of main output, including the profit at private price (column 1), the value at social price (column 2), while the net transfer is listed in column 3. Columns 4 to 6 provide the same figure but with reference to one hectare of cropped area (or head of animal), which might be a better reference for agricultural policy formulation, in a context where land become a scarce resources with an increasing rural population.

All the system achieved a positive profit at private price, the highest profit per hectare being achieved by tomato, followed by orange - with the exception of system 25 for Fresh Orange Juice Concentrate (FOJC) production - and olive oil production. Field crops, cotton and wheat achieved a much lower return per hectare compared to the tomato and perennial production systems. However, cotton still generates a profit that is around four times the profit per hectare obtained by wheat based systems, where flour production get the lowest profit per hectare while past production is more profitable on a hectare basis.

Looking at the profit obtained at social price, the group who achieved the highest profit at private price, i.e. tomato, fresh oranges and olive oil, maintains its profitability under the new policy environment, while for the field crops group only systems producing pasta, hard wheat flour and some of the systems producing soft wheat maintain their profitability. In the live stock group only the production of packed milk is profitable at social price while meat production

becomes unprofitable under live animal form or fresh meat form as well. Cotton production also is not profitable at social price while, the same apply to the production of FOJC. It is worth noting that with the exception of cotton, systems targeting foreign markets have a comparative advantage, while systems targeting the domestic market do not have a comparative advantage, with the exception of the milk system. With the important exception of cotton, these results indicate that the current structure of trade flow is not significantly affected by the current Syrian agricultural policy; in other words that systems such as oranges, tomato or pasta systems which are already exporting a share of their output will do so even without any policy or market induced distortion.

However, the positive transfers computed for most of the systems indicate that the current policy still results in a transfer of resources from the other sectors of the economy to these commodity chains. Only three systems, fresh tomato and oranges export to European markets (system 19 and system 24) and the production of tomato paste (system 20) display a negative transfer, corresponding to a transfer of resources from the selected commodity chains to the rest of the economy, meaning that the system will get a higher profit at social price than at private price.

The impact on economic efficiency of alternative technology, targeted market or other characteristics is assessed by comparing the result of representative systems producing the same main output, with the same characteristics, but the considered one

Processing technology are less variables than farming level technology, only a few of them were retained at the system selection stage to deserve special attention. For soft flour there is almost no differences in profit level between the large capacity public mill (400 t of flour/day – system 4) and the small capacity public mill (100 t of flour per day- system 6) although the profit level is slightly higher for the larger mill at social price. This small difference can be explained by the similarity of the milling technology used in both cases, the capacity of the larger mill being actually increased by multiplying the processing lines rather than through a shift in the technology used. The same situation is observed for the olive oil production where there is almost no difference between the profit of system 15 using centrifuge oil extraction process and the profit achieved by system 16 using the older hydraulic press process. The limited impact of processing technology on the efficiency of the systems is also due to the limited share of the processing technique in the total cost of these systems as they represent on average less than 9 % of the total systems' costs. The comparison between performances of the flour produced by the GECPT' mills and the one produced by private millers does not reveal any significant differences, as both systems achieved a comparable positive profit per ton of output at private and social price.

The impact of farm level technology on the systems' performance is far more important. Water procurement technique was the factor used to differentiate systems at the farm level. For field crops in all cases systems relying on wells irrigation generate the lowest profit. System based on network irrigation acknowledges the highest profit for cotton and soft wheat, while rainfed systems have achieved the highest profit for hard wheat at private price. At social prices, rainfed and network irrigation system are able to maintain a positive profit except for network irrigated cotton production with a profit slightly below zero, while field crop relying on well irrigation display a negative profit and therefore do not have a comparative advantage. Well irrigated based systems profitability is highly constrained by the cost of pumping for irrigation which represents 39% of the total cost in the case of cotton and 25% for soft wheat production. The major component of well irrigation costs is the fuel used to operate the pump, which has a higher price on the world market, and represents one third of the deficit recorded at social price. It is worth noting that, network irrigation cost at social price take into consideration the cost of developing the scheme and have been estimated at 9000 SP per hectare, while farmers currently pay 30000, at private price. Orange is the only other selected commodities where different

irrigation techniques are concurrently applied. In this case irrigation network still generates the highest profit per ton of output followed by well irrigation and drip irrigation.

The comparison between systems producing different main outputs rely on ratios computed from the PAM's value that are presented on the right hand side of the Table 3. The picture offered by this gauge of systems' achievements is less influenced by the type of commodities considered and display high variations between commodities but also within groups of systems producing the same main output.

The lowest FCB ratios, around 0.30, or the highest return to the Domestic factors at private price are achieved by the soft wheat flour rainfed systems (05), both olive oil systems (15 and 16), the fresh tomato produce in green house (18 and 19). The largest share of the other systems has a FCB around 0.4-0.5, while seven systems display a rather low level of return to the value of Domestic Factors allocated. This last groups includes soft and hard flour production public systems (n. 04, 06, 07) and pasta production systems (n.11, and 12) that are based on well irrigation and to a lesser extent on network irrigation. The production of FOJC also shows a very high FCB ratio which is consistent with the constraint faced by this industry to get an adequate supply of raw material.

In terms of return to Domestic Factors invested at social price, olive, tomato and orange (excepted FOJC) have the lowest DRC, around 0.40, corresponding to a strong comparative advantage. Among the field crops only two systems, soft wheat and hard wheat flour production ecology fall into this category. A second group of systems having a DRC inferior to 1, around 0.80, includes pasta and packed milk production systems; while the cotton network irrigated systems having a DRC slightly above the unity (1.01) could be included in this group. The remaining systems including, FOJC, meat production and flour and cotton production systems associated with well irrigation are not able to maintain their profitability at social price and therefore have no comparative advantage. In terms of the relative economic efficiency of the systems producing the same main output it is worth noting for fresh orange production, that even though drip irrigation (system 23) generates a lower profit per ton of main output or per hectare compare to well and network irrigated systems (systems 21 and 22) its DRC is comparable to the one achieved by the two other systems that are more water intensive.

All the systems benefit from protection ($EPC > 1$) with the exception of the fresh product export to the European markets (systems 19 and 24) and the production of tomato paste (system 20). The ratio of the EPC to the NPC can be used as an indication of the respective impact of the current policy on tradable outputs and tradable inputs prices distortions. When the value of the EPC is close to the value of the NPC, most of the protection is due to the output trade policy, and the ratio is close to 1, while a value of the EPC/NPC far above one indicates that prices distortions are also due to the policy on tradable input (subsidy). For most of the systems, the gap between the ratio of NPC to EPC is rather small, meaning that most of the distortion between the private price and the social price situation is due to divergence on tradable outputs. In other words the current policy, inputs and factors markets' configuration has a limited influence on the production costs. As expected, the gap between the EPC and NPC is higher for lint cotton and flour systems which are the only selected systems with a public intervention on the factor side through the form of price control and subsidy.

Table 3: PAM's selected values and indicators.

N.	System	PAMs selected values						Selected ratio					
		Per ton of main output			per hectare(or head of animal) in '000 \$			FCB	DRC	NPC	EPC	ESP	EPC/NPC
		FINANCIAL PROFIT- ABILITY	SOCIAL PROFIT- ABILITY	TRANSFERS	FINANCIAL PROFIT- ABILITY	SOCIAL PROFIT- ABILITY	TRANSFERS						
		(D)	(H)	(L = D-H)	(D)	(H)	(L = D-H)	C/(A-B)	G/(E-F)	A/E	(A-B)/(E-F)	(L/A)	
		1	2	3	4	5	6	7	8	9	10	11	
1a	Lint cotton all	32 369	-53 207	85 577	40	-67	107	0.62	2.60	1.11	2.59	0.78	2.33
1	Lint cotton network irrigated	45 310	-42 440	87 751	55	-52	107	0.50	2.22	1.11	2.60	0.77	2.34
2	Lint cotton well irrigated	27 719	-58 982	86 701	35	-75	111	0.68	2.81	1.11	2.64	0.79	2.38
3a	Flour all	-2 997	-7 593	4 596	-14	-24	10	1.34	2.80	0.85	2.09	0.33	2.46
3	Flour soft wheat network irr. large pub. mill	2 446	-4 607	7 054	14	6	9	0.73	1.97	0.78	1.89	0.51	2.43
4	Flour soft wheat well irr. public mill	-904	-7 047	6 143	-3	-24	21	1.11	2.72	0.78	1.96	0.45	2.52
5	Flour soft rainfed irr. public mill	6 430	3 671	2 759	12	7	5	0.30	0.40	0.78	1.48	0.21	1.90
6	Flour hard wheat network irr. large pub. mill	-873	-5 385	4 512	-3	-17	14	1.11	2.13	0.68	1.59	0.32	2.36
7	Flour hard wheat well irr. large pub. mill	-800	-5 426	4 626	-3	-18	15	1.11	2.19	0.68	1.65	0.33	2.44
8	Flour hard wheat rainfed large pub. mill	3 446	1 946	1 500	8	4	3	0.68	0.77	0.68	1.25	0.10	1.85
9	Flour soft wheat network irr. small pub. mill	2 446	-4 921	7 368	7	-14	21	0.73	2.08	0.78	2.03	0.52	2.59
10	Flour soft wheat network irr. large pub. mill	2 795	-6 542	9 337	7	-16	23	0.75	2.20	1.44	2.05	0.55	1.43
11a	Pasta low quality all	3 228	-1 093	4 321	7	-3	10	0.78	1.11	1.26	1.48	0.19	1.17
11	Pasta low quality network irr.	3 020	-4 481	7 501	9	-13	21	0.83	1.40	1.26	1.55	0.27	1.23
12	Pasta low quality well irr.	2 185	-5 605	7 790	6	-15	21	0.87	1.54	1.26	1.62	0.28	1.29
13	Pasta low quality rainfed	5 717	1 832	3 885	11	4	8	0.71	0.88	1.23	1.36	0.13	1.10
14	Pasta high quality rainfed	26 358	-758	27 117	29	-1	30	0.50	1.03	2.03	2.39	0.34	1.18
15	Olive oil filtered centrifuge rainfed	97 268	77 290	19 978	127	73	55	0.25	0.28	1.19	1.20	0.14	1.01
16	Olive oil filtered hydraulic rainfed	67 664	34 900	32 764	91	47	44	0.53	0.67	1.33	1.35	0.21	1.02
17	Tomtao fresh open field regional mrkt.	4 476	1 453	3 024	235	76	159	0.57	0.81	1.29	1.37	0.20	1.06
18	Tomtao fresh green house regional mrkt.	10 123	5 211	4 912	601	310	292	0.48	0.67	1.17	1.21	0.20	1.04
19	Tomtao fresh green house European mrkt.	14 779	26 285	-11 505	559	994	-435	0.46	0.45	0.44	0.57	-0.32	1.31
20	Tomtao paste open field regional mrkt.	11 344	16 764	-5 420	177	262	-85	0.55	0.54	0.82	0.69	-0.14	0.85
21	Orange fresh network irr. regional mrkt	11 341	4 600	6 741	112	45	66	0.66	0.85	1.13	1.08	0.16	0.95
22	Orange fresh well irr. regional mrkt	9 225	1 807	7 418	91	18	73	0.70	0.93	1.13	1.13	0.18	1.00
23	Orange fresh rainfed regional mrkt	6 753	1 739	5 014	66	17	49	0.70	0.91	1.14	1.16	0.15	1.02
24	Orange fresh network irr. European mrkt	13 516	9 366	4 150	133	92	41	0.63	0.75	0.97	0.98	0.09	1.01
25	FOCJ network irr.	15 985	-31 331	47 315	5	-9	14	0.82	1.71	1.60	1.96	0.43	1.23
26	Fresh meat	68 337	-13 800	82 137	14	-3	16	0.50	1.30	1.77	2.93	0.34	1.66
27	Live animal	17 541	-2 832	20 372	9	-1	10	0.56	1.17	1.44	2.38	0.25	1.65
28	Packed milk	8 343	1 805	6 538	32	7	25	0.55	0.84	1.48	1.66	0.19	1.12

As indicated by the positive value of the transfers, the current policy framework and local tradable and factors markets conditions increase the profit perceived by all systems in comparison to the profit that would prevail at social prices. The level of support as measured by the ESP varies from 40% of the systems' revenue in the case of lint cotton and high quality pasta production, down to a range of 15% to 20% of the revenue at private prices for the other systems. Conversely, these figures indicate the magnitude of losses in revenue that would be borne by the agents of the systems if the agricultural trade was completely liberalized and support measures dismantled. There are only three systems, fresh oranges and tomatoes exports to Europe, and tomato paste exports to the regional market, which would be better off in case of full liberalization due to the high price differentials between the Syrian markets and the parity price estimated on the basis of the CIF value in the targeted market.

Sensitivity of commodity chains economic efficiency to tradable and factor prices changes.

As mentioned, the construction of the PAMs relies on the collection of primary and secondary data combined with a number of hypothesis made with regards to the value of parity prices for tradables outputs, macro-economic aggregates such as exchange rate, interest rate and prevailing distortions on domestic factors markets. It is therefore necessary to look at the effect on the PAM's results of the variations the prices in order to check to what extent these results are robust enough to be referred to in decisions making. Furthermore, several variables of the PAM varies across the years; this is particularly the case for yields that are affected by climatic conditions and for the world market prices of agricultural commodity and derived processed products which varies according to changes in demand and supply across the world. Thus, beyond the uncertainty of the estimation of several costs and prices inputted in the PAM it is also necessary to look at the effect of the instability of these important parameters such as yields and parity prices, the variations of which can be traced back with available statistics.

The parity price of the main output and the yield achieved at farm level being the most unstable parameters among the ones that influence significantly the value of the DRC, a sensitivity analysis was carried for the several systems to evaluate the probability to have a DRC below one. The variations of the parity price and yield inputted in the sensitivity analysis follow the pattern of variations observed during the last decade. For each system, Table 4 provides the probability to obtain a DRC below 1, the minimum DRC and the maximum DRC that was obtained during the simulation.

Taking into account world cotton price and yield variations there is a probability of 39 that the network irrigated cotton systems has a comparative advantage, the higher DRCs obtained when each cotton system. The lowest DRC achievable is about 0.5 and the highest is 3. This wide range of variation confirms the importance of the parity prices level and of the average yield retained for the computation, and hence in the utilization of the results for decision making.

Given the uncertainty about the future trends that would prevail on the wheat markets and the absence of a clear pattern emerging from the yield level achieved in the past decades, two scenarios have been developed to assess the impact of wheat parity price and yields on the comparative advantage of network irrigated soft wheat flour system. The first scenario trace back the impact of world wheat price variations and yield level for the last ten years. Under these conditions the systems would never has any comparative advantage. If we assume a higher tension on the world cereals market, with an average price above 147 USD/ton of soft wheat and an average yield at 3.9 t/ha, the second scenario, indicate that network irrigated soft wheat would have a probability of only 11% to get a comparative advantage.

Olive oil, fresh tomatoes and oranges based systems have a probability of 100% to have a comparative advantage, under the same price and yield condition as the one recorded in the past ten years. This indicates the strong comparative advantage enjoyed by these systems.

For FOJC, the CIF value per ton of concentrate imports in Syria's neighboring countries display large variations during the last decade (from 800 USD t up to 1770 USD per ton) giving evidence

of the high instability that prevail on this market. Under these world market conditions the FOJC commodity chains has a probability of 30% to have a comparative advantage, which corresponds to the probability to have a parity price above 1700 USD per ton.

Table 4 : DRC sensitivity to parity price and yield instability for selected systems.

N.	Systems	Scenarios	Probability for a DRC<1	Lowest DRC	Highest DRC
1	Lint cotton produced from network irrigated system exported to Europe	Prevailing conditions from 1990 - 2002 Parity price = 157 USD/t Average yield=3.9 t/ha	39%	0.5	3
3	Standard flour produced from network irrigate soft wheat	Prevailing conditions from 1990 - 2002 Parity price = 133 USD/t Average yield=3.7 t/ha	0%	1	2.8
		Increase in Parity price and yield Parity price = 147 USD/t Average yield=3.9 t/ha	11%	0.8	2.42
15	Filtered olive oil centrifuge exported to Europe		100%	0.25	0.7
17	Fresh tomato from open field exported to AFTA countries		100%	0.51	0.6
20	Tomato paste export to AFTA countries		98%	0.13	2.1
21	Fresh orange from network irrigation exported to AFTA countries		100%	0.3	0.7
25	Fresh Orange Concentrated Juice from network irrigation		30%	0.85	4

Policy implications.

Macro-level issues

All the selected representative systems benefit from a net transfer of resources from the whole economy. The major shares of the transfers of resources to the systems are caused by:

- Trade protection (tariff and non-tariff barriers) that increases the price of the systems' main outputs on the domestic market compared to the price prevailing on the world market.
- Subsidy and fixed price for cotton and wheat.
- Non-accountability of the opportunity cost for natural resources (water).

On the input side the current policy generates limited distortions as the average level of custom duty applied on agricultural input importations is quite low. However it should be noted that important tradable inputs acknowledge a significant level of distortion:

- The fee paid for network irrigation utilization at private price represents only 1/3 of the total irrigation cost that would prevail at social cost.
- The low price of energy compared to the prevailing parity price for diesel on the world market price is an implicit subsidy to systems that are energy intensive.
- For agro-food industries, a high tariff on the importation of packaging device (can, bottle...) have an impact on the profitability of agro-food industries

For domestic factors, the established regulation labor regulation does not have a significant impact on the systems' efficiency because limited share of labor is employed on a permanent

basis, and therefore subject to these regulations. Under the current level of knowledge the study assumed that there is no imperfection on the labor market, but the evolution of the wage level for casual labor should be carefully monitored if new job opportunities arise on the domestic or regional labor market. The profitability at private prices and the efficiency at social price of commodity chains that are labor intensive relatively to the others, such as cotton and olive, could be significantly affected by such increase in casual labor costs. The lack of any mechanisms to incorporate water value at private price is another source of transfers in favor of the water intensive systems such as cotton and wheat, that are not able to cover these costs with the value added generated.

The impact of the exchange rate and interest rate variation depends upon the cost structure of the systems. Exchange rate variation has a limited impact on the systems efficiency given the high share of tradable (45%) on total cost which compensates the effect of exchange rate on the tradable output. Interest rate variations, alike, have a limited impact on the systems' efficiency due to the low share of capital (17%) in total cost.

On the overall, the results indicate that the current macro-economic policy framework is supporting the development of the selected systems.

Cotton and wheat

Under the current level of technology and within the current trends of world markets' prices, irrigated wheat and cotton systems have a low probability to have a comparative advantage. The simulation done with the highest level of prices recorded in the past decades indicate that the probability would be still very low for the wheat systems to have a comparative advantage. The least efficient systems are the wells irrigated systems for both commodities which combine most of the distortions: subsidy, high cost in energy due to the pumping and higher volume of water used because of the lack of any restriction. Rainfed systems have a comparative advantage, but there is no rainfed cotton and they roughly represent only 40% of the total wheat supply, and therefore have a relatively low weight for the overall efficiency of the wheat commodity chains.

The first option to enhance the comparative advantage of the wheat and cotton is to explore ways to improve the productivity through yield increase or costs reduction. Due to the rather high level of yield already achieved, one of the most promising ways would be to improve the water use efficiency of the irrigated based cotton and wheat systems. Water use efficiency can be improved at short term by the dissemination of new irrigation technologies (drip irrigation) although the current study was not in a position to thoroughly assess the relative gain in economic efficiency that can be obtained by alternative irrigation technology. NAPC is finalizing a preliminary study on this subject, and this field should be further investigated. Another way that can be explored at mid, long term is the dissemination of new varieties that are less demanding in water for an equivalent yield level. The technical efficiency of the system can be also improved by looking at improvement at the post-harvest level. For instance the ginning throughput recorded for the ginneries (32 kg of lint cotton for 100 kg of raw cotton) is rather low compared to the ginning throughput achieved in other major exporting areas (38 kg of lint cotton for 100 kg of raw cotton). Therefore there is an urgent need to identify and exploit source of productivity increase at the post-harvest level.

Another option to respond to the low economic efficiency of the cotton and wheat commodity chains is to promote the utilization of the less costly systems in social terms: rainfed and network irrigation. But as already noted, the area available for rainfed and network systems is limited which imply a net reduction in the cotton and wheat output at the national level. Furthermore, irrigated and rainfed systems do also have peculiar environmental costs that would have to be accounted for. While the wheat level of output should be in line with the food security objectives, it would be rationale at short term to limit as much as possible the allocation of the wells irrigated land to cotton which is the least efficient.

The last option to reduce the social cost induced by wheat and cotton production is to promote crop substitution from cotton and wheat to promising crops, at least for the systems that are the least economically efficient. However, this crops substitution strategy would be constrained by the absorption capacity of the domestic and world market for the crops that are promoted, a factor that would be crucial given the huge areas targeted.

In any case, the mitigation of the high social cost induced by cotton and wheat production would likely rely on a combination of these options and would require the establishment of appropriate institutional mechanism to internalize the cost of water in the business plan elaborated at private prices of, cotton and wheat farmers to incite them to shift as much as possible to less water intensive crops.

Promising crops

Syria has certainly a comparative advantage for the production of olive oil, fresh tomato and oranges but having a comparative advantage does not mean being able to export. Attention should be given to:

- Reinforcing the current policy for trade agreements to reduce barriers to entry.
- Quality issue: quality and sanitary issues are becoming more and more determining, even for standard quality product to access markets.
- Appropriate marketing strategy. Syria traditional markets are highly competitive and might become saturated. It is important to explore new market opportunities where habits are changing with income increase

The promising crops targeting the local market to respond to changes in food habit, such as beef meat, milk or Fresh Orange Concentrated Juice (FOJC), does not show any comparative advantage except for fresh packed milk. Although, the selected representative systems do not cover the entire diversity of technology encountered at farm level (cattle breed) or the existing institutional set ups (cooperative sector was not taken into account for beef production), it is likely that the current level of technology does not allow reaching a level of productivity required to have a comparative advantage. The promotion of new systems should carefully assess the viability of technical options within the Syrian economic environment. The low efficiency of the FOJC system is mainly due to the low conversion ratio at the processing level due to the unavailability of appropriate oranges varieties. The efficiency of the system depends also on the capacity of the Syrian agriculture to supply enough volume of juicy oranges to allow using the processing capacity at their optimal level.

Conclusion

The PAM provides a consistent framework to assess the impact of policy options on the comparative advantages of commodity chains; it should, however, be seen as only one element in the formulation of agricultural policy that cannot be limited to the quest for economic efficiency and to the exclusive promotion of commodity chains that have a comparative advantage and to neglect the other ones. This is not acceptable because comparative advantage can change dramatically according to the evolution of the world market situation for tradable output and input as well, or through technical changes or following an increase in the price of domestic factors. It is important to keep in mind that this is a static method and that the application of sensitivity analysis does not thoroughly overcome this limit. Furthermore the method does not take into account non-efficiency policy objectives, such as income distribution along the commodity chains and/or among different socio-economic groups involved in the production process. However, it provides a means to estimate the social cost associated with policy options pursuing non-efficiency objectives and therefore to better assess the trade-off between different policy options.

In order to improve its relevance the method should be combined with other approaches to complement the results obtained with complementary set of knowledge. For instance, the outcome of the Farming System Study concomitantly carried out by the NPAC will allow to better grasp the function of a given commodity in the whole farm and might lead to mitigate conclusions derived from a high DRC. While the present study already provides a fairly large and in-depth coverage of commodity that are representative of the diversity of the Syrian agriculture, the development of additional PAMs for other commodity, planned by the NAPC, will further add value to this initial set of PAMs. Beyond, the provision of information on the situation of other important commodities, the expansion of the coverage in terms of commodity will allow to consider a larger number of crop alternatives at farm level and for different types of land, an important element in policy formulation. A regular update of the data inputted in this first set of PAMs will allow monitoring the impact of policy and market environment changes on the performance of the selected systems.

Rather than providing a definitive answer to issues raised by decision makers, this study should be rather considered as the starting point of an iterative process between policy analysts and decision makers. In the current context, where Syrian private entrepreneurs (including farmers) have an increasing weight in the allocation of resources for agricultural production, their participation in this process is crucial.

3rd National Agricultural Policy Workshop

**Syrian Accession to WTO:
Requirements and Opportunities**

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Introduction

Syria is one of the founders of GATT that was established in 1947, but it withdrew in 1948 for political reasons. In 2001, Syria presented a membership application which was formally received by the Ministerial Conference held in Cancun in 2003.

The working party dealing with the accession procedures has not been established yet. Nonetheless, Syria is preparing to follow up its application. In this context, it is modifying its regulations on foreign trade, investment, and monetary policies with the aim of facilitating future work. Moreover, it started working on issues related to intellectual property rights and several other issues related to WTO negotiations.

1. Background: GATT and Uruguay Round

The economic changes that followed the Second World War indicated the need for an international body responsible for regulating the international economic system, particularly after the establishment of the International Monetary Fund and the World Bank.

The international trade negotiations related to the establishment of such a body started based on the recommendation of the Socio-Economic Council of the UN. Accordingly, the first conference on “International Trade and Employment” was held in London in 1946, then in Geneva (1947), and finally in Havana (1948). These negotiations are referred to as the “Havana Convention”.

The Havana Convention included the creation of multilateral trade agreements and the establishment of an international trade organization. 56 countries participated in the negotiations, but due to the opposition made by some countries, particularly the American congress, the USA withdrew its approval leading to the failure of the establishment of such an organization. Whereas, concerning the area related to international trade agreements, negotiations went on among developed countries and a limited number of developing countries.

Accordingly, the General Agreement on Tariffs and Trade (GATT) was signed by 23 countries on 30/10/1947.

The GATT is defined as an international multilateral agreement that includes reciprocal rights and commitments of the member governments referred to as the “contracting parties”. It mainly aims at trade liberalization according to the classical theory and within the principles related to the freedom of external trade philosophy.

The GATT was based on four main principles:

- Most Favored Nation;
- National Treatment;
- Tariffication of border measures and tariff bindings; and
- Negotiations for reciprocal trade concessions.

Eight rounds were held since the establishment of GATT, the last and longest of which was the Uruguay Round (1986-1993) . In addition to the previous agreement it included liberalization in services and expanding the scope of trade of goods to include textile and agricultural products.

The final document, issued at the end of the Uruguay Round, signed in the Ministerial Conference held in Marrakech on 15/4/1994 and entered into force on 1/1/1995, includes several agreements that cover various areas such as: agriculture, textile and garments, antidumping measures, import licenses, investments measures related to trade, custom valuation, rules of origin, technical barriers to trade, services, trade related aspects of intellectual property rights, dispute settlement, government procurement, and a trade policy review mechanism.

2. World Trade Organization: Objectives, Functions, and Structure

The WTO was established in 1995 as a result of the UR negotiations. The Organization consists of 147 countries with full membership status, and 30 countries as observers out of which 26 have already started accession negotiations. Recent applicants, together with Syria, are Iran and Libya.

2.1 Objectives and Functions

The WTO is the main body responsible for the implementation of GATT and related agreements, such as the General Agreement on Trade in Services (GATS), and Trade Related aspects of Intellectual Property Rights, in addition to the other legal texts concerning the organization.

The main objectives of WTO are similar to those of GATT that became a part of the WTO. However, these objectives have been expanded to give the WTO the authority to regulate trade of services not originally included in GATT. Accordingly, the WTO reinforced the GATT objectives such as:

- improvement in living standards;
- employment generation;
- increase in production through the optimal use of resources;
- trade expansion;
- sustainable development enhancement;
- improving developing countries and least developed countries' share of international trade.

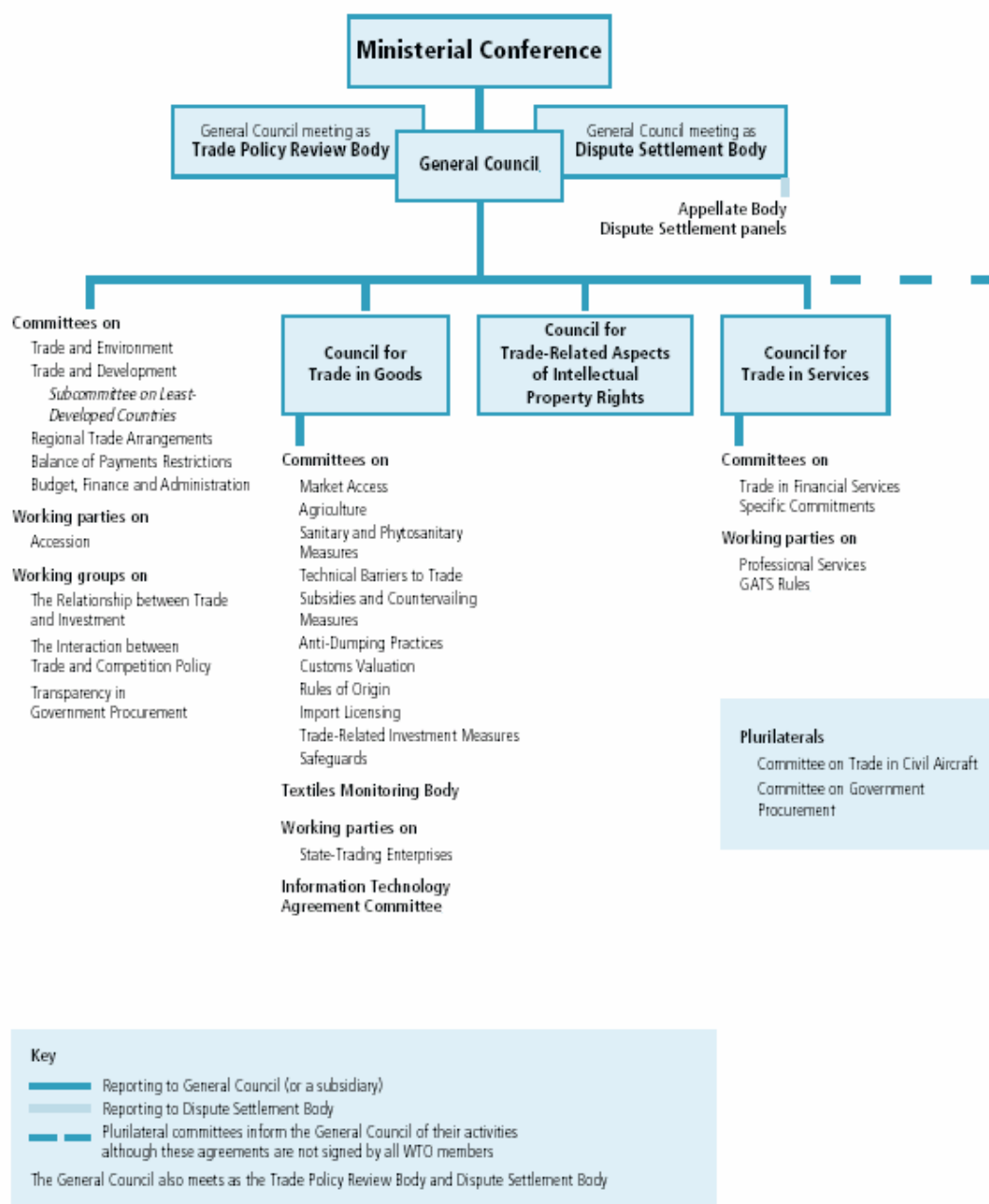
In order to achieve these objectives, the WTO establishment documents includes the following functions:

- 1- facilitate the implementation and management of the Uruguay Round agreements and any other related future agreement;
- 2- create a negotiation forum for member countries and enhance trade liberalization;
- 3- settle disputes that may arise among member countries;
- 4- review trade policies applied in member countries on a periodical basis.

2.2 The WTO Organizations Structure

The following diagram represents the organizational structure, which has at the top the Ministerial Conference that meets once every two years to make all the relevant decisions.

Five Ministerial Conferences have been held since the establishment of the WTO: Singapore (1996), Seattle (1999), Geneva (1998), Doha (2001), and Cancun (2003). The General Council acts on behalf of the Ministerial Conference on all WTO affairs. It meets as the Dispute Settlement Body and the Trade Policy Review Body to oversee procedures for settling disputes between members and to analyze members' trade policies. Moreover, it is supported by three more councils, namely: The Council for Trade in Goods; the Council for Trade in Services, and the Council for Trade-Related Aspects of Intellectual Property.



3. Accession Requirements: Provisions, Steps, and Commitments

According to article 12 of the WTO establishment document: “any country or territory that enjoys full independence in managing its foreign trade relations and other issues included in this agreement and other multilateral agreements has the right to accede to the organization according to the negotiated provisions”.

As the WTO provides a framework for negotiations on government contractual commitments related to multilateral trade agreement conclusion, management, and implementation, accession to it differs from accession to any other international organization. Moreover, the accession means the adoption of the rules and provisions of the related trade agreements that may have an impact on the country’s trade policies. Any applying country is committed to accept all the provisions of the related agreements and has the right to negotiate how the agreement is applied on the national setting and to renegotiate for better conditions after acquiring the full membership status.

Despite the complexities and challenges related to the accession process, all Arab and developing countries are trying to integrate into the multilateral trading system. The reason for this is that the disadvantages of this system will influence both member and non member countries, whereas the advantages will be restricted to member countries. This means that a country cannot avoid the disadvantages of this system simply by getting away from the WTO.

3.1 Accession Conditions

An applicant country should comply with the following:

- Commitment to the 24 Uruguay Round agreements related to goods trade, services trade, and TRIPS as one package;
- Definition of commitments in the area of goods trade (customs fixation) accepted by the other member countries;
- Definition of commitments in the area of services trade.

3.2 Main Steps In The Accession Process

1. A country makes a formal application (according to article 12) to Director General of WTO, which is then distributed to all Member country governments.
2. At the next (*normally*) meeting of the General Council (GC) of the WTO, this application will be considered and (*again normally*) a decision taken to form a Working Party (WP). (*All member countries have a right to join the WP: normally those with a significant interest in trade with X would choose to do so*).
3. The Chair of the GC consults with representatives of Member countries who have expressed an interest in joining the WP, and with country X, about the choice of a Chair for the WP. (*The Chair will often be a Member country's Ambassador to the WTO*).
4. The WP is established and the Chair appointed. (WTO Member countries who have chosen to be members of this WP are identified at this point).
5. The applicant country prepares and submits (*in standard format*) a Memorandum on its Foreign Trade Regime (FTR), which is distributed to WP members (*together with related documentation provided, such as X's existing tariff schedule in "Harmonized System" (HS) nomenclature, import data by tariff line and by country of origin, and relevant laws and regulations; it has also become standard practice for the applicant country to submit a "legislative action plan" at, or soon after, this point*).
6. After consulting with WP members and country X, the WP Chair establishes a schedule for future WP meetings.
7. After studying the Memo on FTR, WP members submit questions of clarification (*in writing*) to country X (*copied to other WP members*).
8. Applicant country prepares and provides answers to these questions (in writing; these answers are distributed to all WP members; steps "g" and "h" may be repeated at this point).
9. When an adequate documentary basis is available, the first meeting of the WP is held.
10. (*possibly*) Another (or more) round(s) of questions and answers.
11. (*possibly*) More meetings of the WP.
12. When the examination of country's FTR is considered to be sufficiently advanced, bilateral negotiations on market access will begin (*between WP members and applicant country*).
13. Applicant country prepares a comprehensive Draft Schedule of Concessions – referred to as an "initial offer" (*not obligatory, but the applicant country will be strongly encouraged to do so at this point*).

14. Individual WP members each submit market access “requests” to the applicant country (*relating mainly to import tariff levels, for “goods”, and also covering “services”*), on products and services of particular trade interest to them, and bilateral negotiations about possible (*further*) concessions related to these requests take place.
15. Concurrent with the bilateral negotiations on market access, multilateral negotiations about applicant country’s adherence to WTO rules take place in further WP meetings (*in the case of agriculture, these will include negotiations about X’s quantitative commitments on domestic support and export subsidies*).
16. After the conclusion of negotiations (*which requires each WP member to “sign off”*) “Draft Schedules of Concessions and Commitments to GATT ’94 and Schedule of Specific Commitment to GATS” are prepared.
17. These schedules are reviewed multilaterally by the WP.
18. The Report of the Working Party, a “Draft Decision” and a “Protocol of Accession” are prepared and submitted.
19. The GC (or a Ministerial Council) “adopts” the Report and “approves” the Decision by a 2/3 majority vote.
20. Applicant country ratifies its acceptance of the agreement reached, and the Protocol enters into force 30 days later.

Note: applicant country can request an “observer’s” status. When the request is endorsed by the General Council, the applicant country acquires the right to participate in the meetings but not the right to negotiate. This is particularly useful to keep the country informed of the daily activities and changes. The “observer status” is limited to 3 years after which the country can either indicate its desire to accede or to withdraw. However, the observer status can be renewed based on the justifications presented by the country to the General Council.

3.3 Requirements

It is worth mentioning that at the beginning of the accession process, the applicant country is required to present a Foreign Trade Memo (FTM) that includes a detailed description of its trade system and policies. In order to facilitate this process, the WTO secretariat produced a standard form for the FTM, agriculture, TBT and TRIPS:

- WTO/ACC/1: the general form for the FTM
- WTO/ACC/4: information related to agriculture;
- WTO/ACC/5: information related to services measures;
- WTO/ACC/8: TBT and sanitary measures;
- WTO/ACC/9: TRIPS.

These forms facilitate both the presentation of the required policies information to the WTO members and the comparison between current policies and multilateral agreements.

It is apparent from these forms that the WTO gives particular attention to details related to agriculture, services, intellectual property, and technical barriers to trade.

3.4 Commitments

Procedures related to the concessions and commitments tables can be summarized as follows:

In the Area of Goods

The applicant country should present commitment offers that will be used as a basis for potential bilateral negotiations.

In the Area of Services

The applicant country can either present commitment offers or respond to the requests of the member countries. In both cases negotiations are held on a bilateral basis.

In the Area of Bilateral Negotiations

Bilateral negotiations are held between interested member countries and applicant countries. The concessions and commitments tables of GATT 1994 and the service commitments should be prepared and reviewed in a multilateral framework and annexed to the accession protocol draft.

Notes

The applicant country should provide justifications that have to be agreed upon before the preparation of the commitments offers in the area of commodities and tariffs for the following objectives:

- protection of national production;
- impact on custom tariff earnings;
- other impacts on national economy.

The applicant country can obtain the required technical assistance either from the WTO secretariat or from some other member countries.

4. Accession Advantages and Disadvantages

In theory a country can achieve the following advantages depending on its ability to benefit from the opportunities provided by the accession:

1. new trade opportunities through easier market access in the areas of goods and services;
2. proper trade environment that facilitates predictability and, accordingly, marketing and export planning;
3. commitments and rights restricted to member countries;
4. transparency achieved through continuous review of trade policies of member countries;
5. dispute settlement system mechanism that ensures application of all the related rules;
6. agreements reached in the Uruguay round considered as a starting point for the multilateral trade system;
7. preferential treatment for developing countries.

Developing countries account for more than two thirds of the WTO members and it is expected that this group will play an increasingly important role due to its large number and its potential impact on the international economy. However, the WTO recognizes that these countries have special needs and treats them differently through the following methods:

- allowing special conditions within the agreements;
- monitoring the activities of developing countries through the Trade and Development Committee;
- providing technical assistance through the secretariat.

On the other hand, accession to WTO has the following disadvantages

- the loss of government independence in designing its own intervention policies;
- the significant costs of policy adjustments to ensure compatibility WTO; and

- the TRIPS agreement will increase the cost of copyrights for developing countries due to the fact that the companies holding these copyrights are usually located in countries that are members of the WTO and are committed to the rules of copyright protection;

5. Recent Accession Experiences Related to Agriculture and Possible Ways to Avoid Difficulties

1. the experience of newly acceding countries indicates that these countries are obliged to eliminate all non tariff trade barriers and quotas on sensitive commodities. Moreover, they should try to set replacement tariffs at the highest possible level and obtain special safeguard rights to protect their sensitive products.
2. Concerning export subsidies several observations can be made:
 - There has been strong pressure on the acceding country to commit to phase out agricultural export subsidies from the day of accession (except, in the case of developing countries, those which are permitted under Article 9.4 of the UR Agreement on Agriculture).
 - Export losses by State Trading Enterprises (STEs) incurred because the export sales price was lower than the domestic purchase price (appropriately adjusted for freight/insurance, storage and processing costs) will be regarded as an export subsidy. This means that, after accession, countries with domestic support prices set at above-export-parity levels may have to take steps to control exports, for those products whose production exceeds domestic needs
 - Consumer subsidies through the market place via price controls do not, per se, contravene WTO rules. However, there may be pressure for Syria to remove remaining export controls.

3- Regarding the SPS and TBT Agreements:

- Recently acceding countries didn't have many difficulties in ensuring conformity with these agreements;
- The main obligation appears to have been the revision of existing laws and regulations on issues such as standards, packaging, food control and hygiene, quarantine, etc., to make sure that their wording is consistent with the principles laid out in these two WTO Agreements.

4- Regarding the TRIPS Agreement:

- The two main agriculture-related elements of the TRIPs Agreement are those pertaining to Geographical Indications (GIs), which are at present mainly related to wine, and Plant Variety (PV) protection.
- Acceding countries seem to have had to write new legislation in either or both of these areas. Such legislation does not usually run counter to existing policies to a significant extent.

5- Regarding State Trading Enterprises (STEs):

- Newly acceding countries face strong pressure in the negotiations to remove any remaining legislated import or export monopoly power among state-owned enterprises. Other than that, state-owned enterprises engaging in trade should be able to remain after accession.

From the experience of the recently acceding countries, Syria can draw the following lessons:

- the accession negotiations are complex and cumbersome and require well prepared and qualified negotiators capable of balancing between the commitments offered and advantages gained;
- accession to WTO should not be regarded as an objective by itself, but as a means to benefit from the “opportunities” offered by market access in enhancing national exports both in terms of goods and services;
- empirical evidences indicate that newly acceding countries have been obliged to make bigger commitments than those made by the countries that acceded before the Uruguay round;
- to achieve a better deal it is recommended not to under estimate the amount of work and preparation needed. Of equal importance is securing the funds required for staff training and participation in related international meeting and conferences both from the state budget and external resources. Furthermore, actions should be taken to reform the related policies for more compatibility with the WTO regulations.

6. Work to be Done by Syria

In the framework of preparations needed, Syria should take the following actions to be adopted in its trade policies:

- 1- preparing for replacing all non tariff barriers (tariff quotas, import ban, and non automatic import licenses) with normal tariffs (tariffication) and implement it after the completion of the accession process;
- 2- setting upper limits for tariffs applied to agro food products and defining a gradual reduction plan;
- 3- considering the compatible subsidy forms and getting ready to justify any currently applied subsidy;
- 4- preparing a vision for the future activities of the state trading enterprises since pressures will be made to eliminate their marketing monopoly.

Desirable Outcome of the Agricultural Negotiations

- obtaining the developing country status that enables Syria to get the “preferential treatment” related to agriculture;
- trying to maintain export subsidy compatible with WTO regulations;
- keeping the largest possibility to protect the domestic products in general and for strategic products in particular;
- getting the highest possible tariff binding and replacing all non tariff barriers (tariff quotas, import ban, and non automatic import licenses) with normal tariffs (tariffication) ;
- obtaining the Special Safeguard Right for sensitive agricultural products, which allows, under special circumstances, to set “equivalent tariff” that has a similar effect of import ban or tariff quota.
- Maximizing the measurement of current domestic support (non-exempted subsidy - non trade distorting) in order to get a reasonable flexibility for the future, also achievable through selecting a base period that includes the highest subsidy offered to agricultural trade in order to have a reasonable reduction starting point.

Immediate Actions

- 1- start the preparation of the FTM according to the WTO standard format;

- 2- conduct simulations in order to select the most convenient base period and make the calculations related to “equivalent tariff”, “export subsidy” and “AMS”;
- 3- calculating the export subsidy (if not zero) and Aggregate Measurement of Support (if exceeds the minimum level) for gradual reduction according to the Uruguay Round limits;
- 4- prepare the related information in the area of SPS, TBT, TRIPS;
- 5- identify the required changes in the area of economic policies in general and agricultural policies in particular;
- 6- set the “minimum level” (red line) for the Syrian position concerning all the related issues including the custom tariff and market access;
- 7- define possible negotiation scenarios;

to achieve the above-mentioned goals, the following actions are needed:

- a. Early naming of negotiators, who should commence traveling to Geneva as observers and attend the WTO training courses (rather than junior officials);
- b. Establish a trade negotiations and agreements committee with representatives from all the bodies involved;
- c. Establish a full time agricultural unit, given the importance of agriculture in the national economy, composed of representatives of all the concerned ministries and the private sector and chaired by a senior officer;
- d. Become fully familiar with details of all relevant WTO agreements and WTO operating mechanisms as early as possible.
- e. The same regarding WTO accession requirements and procedures.
- f. The same regarding the experiences of other (particularly Arab) countries which have recently joined the WTO and the details of their commitments.

Conclusion

Despite the huge amount of work needed before, during and after the accession to WTO, related to preparing the overall trade regime memorandum, filling the standard formats, preparing the tariff schedule offers, and responding to the questions and requests of member countries; Syria's accession will help getting the following advantages:

- integration with the international economic system;
- benefits from the concessions given to developing countries;
- more market access opportunities for non oil exports;
- benefits from financial and technical support programmes of the WTO secretariat;
- more external support;
- benefits from the development dimension of the Doha declaration;
- reduction of input and other raw materials prices;
- on the longer term, accession to the WTO will expedite the economic reform and trade liberalization process, enhance agricultural and agricultural processing investments, and improve competitiveness.

It is worth highlighting that, as it was the case for other developing countries, it will be possible for Syria to make a satisfactory concession deal.