

# **Sustainability Impact Assessment of WTO negotiations in the major food crops sector**

## **Final Report**

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## EXECUTIVE SUMMARY

### Introduction

This final report for the *Sustainability Impact Assessment of WTO negotiations on major food crops* provides the completed Sustainability Impact Assessment (SIA) results for the scenarios selected by the Commission for this study. The main objective of this study is to apply SIA methodology in a sectoral assessment of liberalisation of the food crops sector in WTO negotiations. In this study the Stockholm Environment Institute (SEI) has applied SIA methodology in an assessment of 8 country case studies for two specific food crops (wheat and edible oils crops) in three different scenarios. In addition to the sectoral application of already developed SIA methodology, this study further develops the SIA methodology with specific consideration of additions supportive of more context specific sectoral SIAs.

This report consists of two parts. Part I begins with a description of the methodological additions developed for this study, and a description of the scenarios analysed. Three additional results are included in Part I: an overview of world trade in both the wheat and edible oils sub-sectors, predictions of future trade patterns in the sub-sectors given current market conditions, and an analysis of (strictly) economic modelling-based predictions on the effects of trade liberalisation on the food crops sector. The analysis in Part I of this report provides the economic assessment and world market related impact assessments, which act as initial drivers of change in the SIA methodological framework developed by SEI for this study.

Part II of the final report provides analyses of each of the country case studies selected by the Commission for this SIA study. For each country case study the report establishes the trade conditions and the sustainability conditions relevant to the agricultural sector in general and the food crop sub-sectors selected. Completed SIAs are presented at the end of each country case study. Finally, concluding remarks are made in regards to the country case studies, challenges encountered by the Consultant in applying SIA methodology in country specific sectoral analysis, further methodological suggestions, and advice on sector specific indicators for future studies.

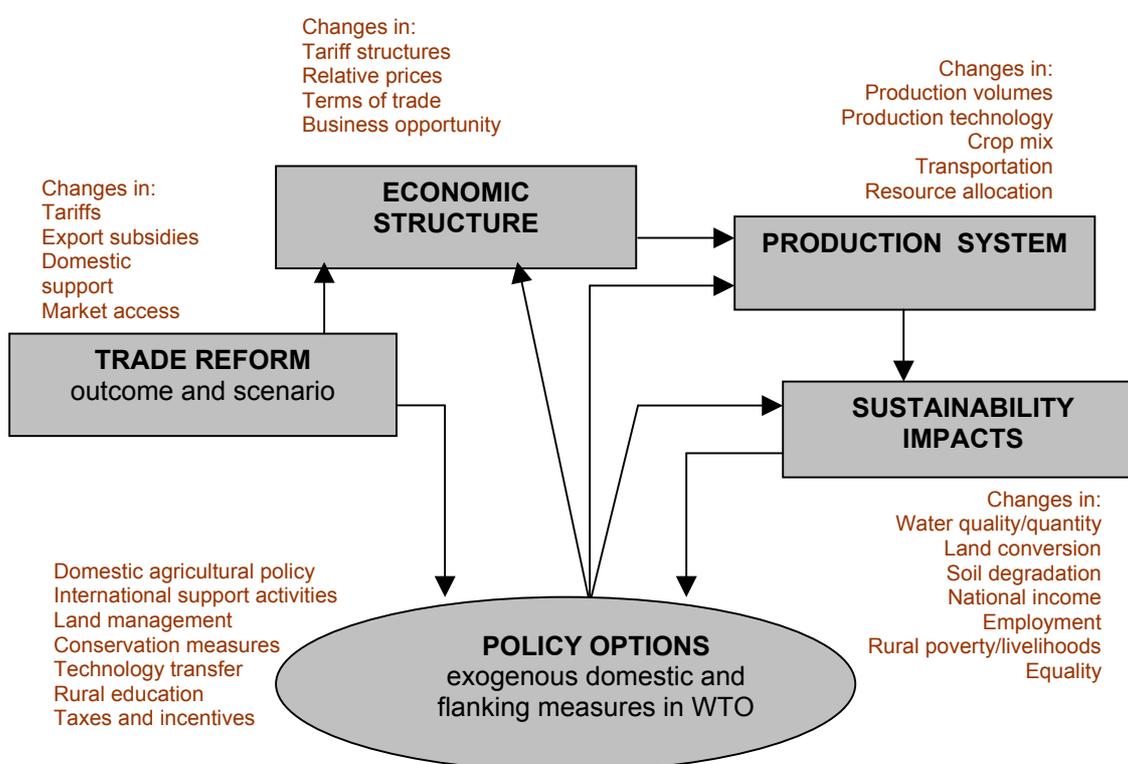
The reader should keep in mind the scope and purpose of this report as laid out in the Terms of Reference (see Appendix 1). In depth SIAs for each country case study would require partnerships with local experts and extensive consultations with local stakeholders. However, the resources dedicated to this study are limited and a main purpose of the study is to perform a pilot sectoral SIA to test and further develop the SIA methodology already developed for the Commission. As such this report is a desk study of the potential sustainability impacts and policy implications in each country case study. As is shown in this study, a more in-depth analysis is required in many cases in order to adequately establish the complex relationships entailed in SIA analysis. In particular, country case analyses will require local partnerships and participation in future more extensive studies.

## KEY RESULTS FROM PART I

### Methodology

The main methodological development in this study was the use of a conceptual framework (see Figure 1) to organize information and enhances our understanding of the generic cause-effect relationships as we go from the proposed changes in the trade policy scenario to its sustainability impacts. Following this conceptual framework the study deploys a transparent narrative of these sets of issues and linkages and how they fit together in each case, based on expert interpretation of existing country and sector studies from various sources, and supported to the extent available by empirical data and modelling results.

**Figure 1: Conceptual Framework for Sustainability Impact Assessment of Trade Negotiations in the Agricultural Sector**



The elements noted at each stage of the causal chain analysis are only examples and other issues may be significant in each case. In order to ensure that SIAs for each country capture important sustainability impacts, an overview of sustainability conditions in the sector including economic, social and environmental considerations is performed at the outset of each case study. Combining this approach with the original SIA methodology developed for the Commission by Colin Kirkpatrick and Norman Lee<sup>1</sup> and SEI's conceptual framework, a standardised layout for analysis was established for each country case.

<sup>1</sup> Kirkpatrick Colin, Lee Norman. *WTO New Round Sustainability Impact Assessment Study: Phase One*. Manchester: Institute for Development Policy and Management and Environmental Impact Assessment Centre, University of Manchester, 1999.

Each country case includes:

- **Significance of the case study**
- **Introduction of the country**
- **Trade Conditions**
- **Sustainability Conditions**
  - Economic Considerations
  - Social Considerations
  - Environmental Considerations
  - Key sustainability issues
  
- **Sustainability Impact Assessment**
  - **Structure of economic incentives and opportunities**
    - Baseline scenario
    - Liberalisation scenario
    - Intermediate scenario
  - **Production System Characteristics**
    - Baseline scenario
    - Liberalisation scenario
    - Intermediate scenario
  - **Impacts on sustainability aspects**
    - Baseline scenario
    - Liberalisation scenario
    - Intermediate scenario
  - **Policy response / implications**
- **Conclusions**

### **Scenarios for the SIA food crops study**

This study (as determined by the Commission) performs an SIA of liberalisation in the wheat/wheat flour and edible oil crops (oilseeds and tropical oils) through WTO negotiations. Specific country case studies were identified by the Commission and include:

- i. EU and US;
- ii. Australia / Argentina and Indonesia / Malaysia
- iii. Net Food Importer Developing countries; Egypt and Senegal;
- iv. India.

The Commission also determined the specific scenarios to be assessed in applying the SIA methodology. These scenarios are represented in Table 1.

**Table 1: Original Scenarios**

	Baseline UR	Scenario 1	Scenario 2	Scenario 3
Tariff	-36%	-10 %	-30%	-50%
Minimum (market) access	5%	+2.5%	+5%	+7.5%
Domestic support (AMS)	-20%	-10%	-20%	-30%
Exp. Subsidies	-21% volume	-10%	-20%	-30 %

-+/- % changes are related to the final UR agreement

Early on in the performance of this sectoral SIA it became apparent that it would not be possible to implement the more detailed scenarios developed by the Commission for this study. Current broad modelling efforts assessing the economic impacts of liberalisation do not provide accurate enough results to make meaningful distinctions between the percentage changes noted in the original scenario formulation. Nor do modelling exercises exist that are closely correlated to the selected food crop sub-sectors and country case parameters. As a result, the Consultant reverted back to the original scenario formulations established in the Phase Two SIA report, with some minor modifications:

- The *baseline scenario* entails no new agreement on agriculture but now assumes that the URAA is fully implemented.
- The *intermediate scenario* is interpreted as comprising a more gradual approach to liberalisation in the sector entailing less significant impacts than in the full liberalisation scenario, and as incorporating the EU negotiation objectives. The objectives include:
  - retention of blue and green boxes, possibly with some updating.
  - improvements in market access through ongoing process of reducing trade barriers, support for exports and for domestic agriculture subject to retention of boxes above.
  - support for various non-trade concerns including the multifunctional role of agriculture, food safety and quality, protection of the environment and animal welfare.
  - support for special and differential treatment of agriculture in developing countries, including increased (duty-free) market access for the least developed countries.<sup>2</sup>
- The *liberalisation scenario* assumes “general acceptance, within all country groups, of comprehensive trade liberalisation in agricultural products and the removal of discriminatory market practices in domestic markets. This would require elimination of all forms of export subsidies, domestic support measures and import duties”<sup>3</sup> and “that very limited, future changes are made to mitigate adverse environmental and social impacts.”<sup>4</sup>

<sup>2</sup> Kirkpatrick & Lee, 1999.

<sup>3</sup> Kirkpatrick & Lee, 1999.

<sup>4</sup> Kirkpatrick & Lee, 1999.

## **KEY RESULTS FROM PART II**

### **Case study results**

#### **Net food-importing developing countries**

In Senegal and Egypt we see similar sustainability impacts with negative economic and social impacts due to increasing wheat import bills. Food security problems for vulnerable groups, such as rural women in the agricultural sector, stand out most prominently as negative social impacts. Small-scale farmers are potentially impacted on several fronts including increased competition from international markets, an inability to adequately improve productivity in an increasingly competitive domestic market, and commodity price/food security impacts. These multiple stresses are better addressed in the Egypt case because domestic wheat production is an important feature of the country. As rice is not included in the scenarios the food security impacts are not as strongly causally linked in the Senegal case. In Senegal we see some negative environmental impacts due to increases of production in the groundnut sector, as there is no indication that currently unsustainable farming practices will be significantly affected by liberalisation. Conversely, negative environmental impacts are not causally linked in the Egyptian case.

#### **Net food-exporting developing countries**

In Indonesia and Argentina we see positive economic impacts for both liberalisation scenarios. For India the economic impacts are not conclusive. Importantly, economic impacts in India may depend on India's ability to meet domestic wheat demand in the future. The Indian case study shows that there is some debate on this issue and that it is not currently known if India will meet these domestic needs over the longer term.

Social impact results were somewhat more ambiguous for all net exporting developing countries. In Indonesia this result is due to clear conflicts between social groups associated with the palm oil sector. An ambiguous result is thus due to some social groups gaining while others, particularly forest dwelling indigenous groups, incur negative impacts. In all three cases it is also suggested that vulnerable groups especially small-scale farmers and the rural poor in general may be negatively affected by liberalisation. These negative impacts may be more severe in the liberalisation scenario due to problems in adjusting to more significant economic changes. Specific causal links were more difficult to establish in the Argentina and Indian cases. India in particular demonstrates a great deal of diversity between regions, although the potential for negative gender impacts is clear.

In terms of environmental impacts we see wide diversity in the results for these three country cases. Indonesia demonstrates clear negative impacts on forests, especially in the liberalisation scenario, that are directly causally linked in the assessment. Argentina shows no significant negative environmental impacts in the short term and only potential impacts in the longer term due to increases of input use. However, actual impacts will depend to a large extent on how domestic policy develops. In the Indian case the environmental impacts are poorly causally linked, resulting in more ambiguous results.

### **Net food exporting developed countries**

In Australia, the USA and the EU there are positive economic impacts for all country case studies in both liberalisation scenarios. In Australia positive impacts entail both positive overall welfare impacts and positive impacts on producers. In the US and EU cases there are more divergent economic impacts depending on context, as it noted below.

In Australia we see positive short-term social impacts due to positive economic impacts in the sub-sectors. However, over the long-term there are risks of potential negative social impacts associated with the adjustments needed to manage land degradation problems, particularly associated with dry-land salinity issues. As a result, social impacts in the long run are more dependent on emerging circumstances. Negative environmental impacts are associated with production increases and problems with dry-land salinity, and tend to also be more significant over the long run.

In the US, large farm households are expected to gain while intermediate farm households may face some adjustment problems in an increasingly competitive market. As a result social impacts are shown to be positive in the intermediate scenario and more ambiguous in the liberalisation scenario. The intermediate scenario entails more opportunities to use domestic support measure to mitigate negative impacts on intermediate farmers and to deal with environmental impacts of the sector.

In the EU we see similar impacts as in the US with positive economic impacts from liberalisation in terms of general welfare and budgetary expenses, but in the EU there are clear negative impacts on producers, particularly in the liberalisation scenario. This results in more context specific economic impacts. Social impacts are expected to be more positive in the intermediate scenario as there is some indication that the EU has a better-established agenda to address social and environmental impacts in the agricultural sector. Ambiguous environmental impacts are shown in the liberalisation scenario due to predictions of production decreases. As has been noted in the EU case study, there are environmental impacts associated with decreases in production and more regionally specific analysis is required to establish the environmental effects of these production decreases.

### **Challenges encountered in performance of the sectoral SIA**

In this sectoral application of SIA methodology some important difficulties were encountered that should be considered in future sectoral SIAs. Two types of issues seem most prevalent. First, issues associated with the specific parameters chosen for assessment, and second, methodological issues will be addressed.

The choice of two crop sub-sectors for analysis in this study made it difficult in some country case studies to adequately address key sustainability impacts effectively. For example, in both the Senegal and Indonesia cases an adequate assessment of food security would have to also include the rice sector. In order to appropriately address sustainability impacts in country case studies it may be more useful to examine the sector as a whole in a fewer number of cases than to only examine parts of a sector in a greater number of cases.

As well, already completed modelling studies of the economic impacts of liberalisation in the agricultural sector did not match the parameters and scenarios laid out by the Commission at the onset of this study. This is true not only for the differences between the various original scenarios, but in relation to the crop and country specific parameters. Unless significant resources are allocated to actually performing independent economic modelling efforts, SIAs will have to be responsive to existing research and this should be considered early on in the planning stage.

In general, the scope of sectoral SIAs needs to be carefully considered at the initial planning stages. The SIA methodology already developed for the Commission and used in this study acts well as a framework for incorporating a wide range of economic, social, and environmental issues. However, once sector and country-specific studies are attempted the data and analysis demands grow exponentially. This study has gone some way to develop further methodological tools within the SIA framework that can help to bridge the gap between macro-level policy analysis taking place in mainstream economic modelling exercises, and micro-level, field-type sustainability analysis at the local levels. Nonetheless, much more detailed analysis is required to perform complete SIAs than was possible in the scope of this study. Particularly for large countries/country groups with more complex relationships in the agricultural sector, such as the Indian, US and EU cases, the level of analysis possible in this study is not satisfactory.

### **Bridging the gap between macro-level and micro-level analysis**

At the methodological level, the key challenge for the next round of SIA assessments is to bridge the gap between macro-level policy analysis at the national and international levels that is taking place in mainstream economic modelling exercises, and the micro-level, field-type sustainability analysis at the local levels that is taking place in anthropological and ecological research and project impact studies.

This study has found that:

- Aggregated SIA studies tend to lose much critical information.
- Sustainability conditions and impacts are highly site-specific
- Economic assumptions underlying economic modelling of liberalisation impacts may not hold in reality.
- Macro-level modelling and aggregated prediction exercises can only provide a framework for discussion.
- There is a need for case-specific information to match with the production change estimates.
- Local and regional case studies could be used to represent certain type conditions in different parts of the world.
- A regional hot-spots analysis of areas of high value and risk may also be needed.

Given the level of detail required for country specific case studies the scope of SIAs and the resources allocated to such studies need to be well matched. Another option for consideration is to combine the more aggregated approach used in the Kirkpatrick and Lee SIA methodology with country specific cases. Agricultural SIAs could be performed on country groups aggregated to: LDCs, net food importing developing, net food exporting developing, net food importing developed (high and low domestic

support), and net food exporting developed (high and low domestic support). Type case studies could then be used to support, compare and assess the more theoretical results from aggregated country groupings. It also seems feasible to aggregate country groups in similar ways for other sector assessments.

## 1. Introduction

This final report for the *Sustainability Impact Assessment of WTO negotiations on major food crops* provides the completed Sustainability Impact Assessment (SIA) results for the scenarios selected by the Commission for this study. The main objective of this study is to apply SIA methodology in a sectoral assessment of liberalisation of the food crops sector in WTO negotiations. Colin Kirkpatrick and Norman Lee developed the SIA methodology used in this study in two earlier reports entitled *WTO New Round: Sustainability Impact Assessment Study - Phase One Report* and *WTO New Round: Sustainability Impact Assessment Study - Phase Two Report*.<sup>5</sup> The main purpose of this current study is to apply SIA methodology to the scenarios set out by the Commission in the food crops sector. The scenarios for this sectoral study entail an assessment of 8 country case studies for two specific food crops (wheat and edible oils crops) in three different scenarios (See section “3. Scenarios” below for a detailed description of the scenarios). In addition to the sectoral application of already developed SIA methodology, this study further develops the SIA methodology with specific consideration of additions supportive of more context specific sectoral SIAs.

This report consists of two parts. Part I begins with a description of the methodological additions developed for this study, and a description of the scenarios analysed. Three additional results are included in Part I: an overview of world trade in both the wheat and edible oils sub-sectors, predictions of future trade patterns in the sub-sectors given current market conditions, and an analysis of (strictly) economic modelling-based predictions on the effects of trade liberalisation on the food crops sector. First, basic information on trade in each sub-sector and trends affecting the sub-sectors in the post-war period are summarised. Second, baseline predictions for each of the sub-sectors are provided. These baseline predictions are founded on expected world market developments within the agricultural sector in general and the wheat and edible oil crops sub-sectors specifically, given that no new trade agreement on agricultural is reached by WTO members. Third, modelling studies on the economic effects of trade liberalisation on the agricultural sector are analysed and trends relevant to this study are identified. The purpose of Part I of the report is to set the scene in terms of aggregated world trade conditions, and to assess and identify expected economic and welfare impacts and world market trends in the agricultural sector if further agricultural trade liberalisation measures are implemented by WTO members. The analysis in Part I of this report provides the economic assessment and world market related impact assessments, which act as initial drivers of change in the SIA methodological framework developed for this study (See section “2. Methodology” below).

Part II of the final report provides analyses of each of the country case studies selected by the Commission for this SIA study. For each country case study the report establishes the trade conditions and the sustainability conditions relevant to the agricultural sector in general and the food crop sub-sectors selected for this study. These overviews can then fill the country specific SIAs that follow each case with factual contents that inform the assessment. Completed SIAs are presented at the end

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<sup>5</sup> Kirkpatrick & Lee, 1999.

of each country case study. Finally, concluding remarks are made in regards to the country case studies, challenges encountered by the Consultant in applying SIA methodology in country specific sectoral analysis, further methodological suggestions, and advice on sector specific indicators for future studies.

The reader should keep in mind the scope and purpose of this report as laid out in the Terms of Reference (see Appendix 1). In depth SIAs for each country case study would require partnerships with local experts and extensive consultations with local stakeholders. However, the resources dedicated to this study are limited and a main purpose of the study is to perform a pilot sectoral SIA to test and further develop the SIA methodology already developed for the Commission. As such this report is a desk study of the potential sustainability impacts and policy implications in each country case study. As is shown in this study, a more in-depth analysis is required in many cases in order to adequately establish the complex relationships entailed in SIA analysis. In particular, country case analyses will require local partnerships and participation in future more extensive studies.

## 2. Methodology

In this section additions to the SIA methodology already developed are discussed. These methodological additions are applied within the context of already developed SIA methodology and are designed to be complementary.

### 2.1. Theoretical basis

The approach taken to this SIA pilot study departs from a welfare economic perspective on trade liberalisation and combines this perspective with an impact assessment approach. The theoretical basis and framework partly builds upon the methodology developed in previous phases of DG Trade's SIA project, but further refines and clarifies the conceptual linkages. In this sense, this framework is more elaborate and has been applied more explicitly than has been done before.

#### 2.1.1. A welfare economic perspective

In a welfare economic perspective, trade liberalisation influences sustainability parameters through four major and interconnected channels. First, the countries restructure their production according to their comparative advantage, which induces a change in e.g. pollution, income, and employment. This we call the **composition effect**, which might be detrimental or positive to sustainability depending on the relative merits of the different production systems. Second, efficiency gains through better factor allocation are known to lead to more production and hence more economic welfare. This is called the **scale effect**. This might, however, also lead to increased environmental stress. Third, higher income and open markets create an introduction of new technologies, a **technology effect**. In addition, the higher income is often associated with higher demand for sustainability factors such as environment and democracy, what we might call the **political effect**. The net outcome of all these effects is however ambiguous, since they sometimes draw in different directions, and is therefore largely an empirical question. [Schulze, 2001 #1955]<sup>6</sup>

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<sup>6</sup> Most environmental policy debates can be attributed to one or several of these channels, such as the whole growth and environment debate that was put on the agenda by the Club of Rome in the 1970s, or the environmental policy and industrial competitiveness debate which is high on the agenda even today.

This perspective is operationalised through the application of macro-economic models of global trade that predict the economic structure of country, such as relative price changes, and as a result changes in the production system, such as production volumes and sectoral composition of production. This provides the basis for the impact assessment. To this data, sustainability functions, such as environmental damage functions are applied. These functions establish the connections between the production system and the sustainability impacts, such as employment, income, poverty and environmental quality. This is the theoretical ideal. It should be recognised that, there are a number of practical and conceptual problems with the approach. First, as is commonly agreed the core assumptions of economic theory that underlie the modelling rarely hold in reality, and in particular not in developing countries where markets function badly and price elasticities are ill known. Second, the functions that link the production systems to the sustainability impacts are very complex and ambiguous and rarely well understood.

### **2.1.2. Sustainability in the agricultural sector**

At a general level, an SIA should address to what extent the (trade) measures contribute to or work against the social, environmental and economic conditions through which demands for agricultural outputs are met. An environmentally sustainable development in the agricultural context contributes to the provision of landscapes, biodiversity, flood control, habitat protection, pollution control and efficient and sustainable use of water and land. In broader assessments, such as the SIA, this has to be viewed in the social context of meeting sufficient, safe and secure supplies of food and income for the populations, and in the economic context of efficient use of resources, contribution to employment, income and wealth generation and distribution.

The baseline conditions in the agricultural sector are often far from sustainable today, because of conditions of poverty and vulnerability, land scarcities, overgrazing, deforestation, excessive use of agrochemicals, and in other ways inappropriate agricultural practices. One of the biggest global threats, and at the centre of the sustainability concept, is the increasing rate of soil degradation. This has serious negative effects on agricultural productivity and preservation of natural resources and undermines the productive potential of land. Agriculture is a dominant part of economic activities in many developing countries and it typically constitutes an important share of GDP, employment and export. In industrial countries it is of lesser economic importance but still constitutes a critical sector in both government policy and public opinion. Agricultural activities make direct use of natural resources and shape the natural and cultural landscapes and they have both harmful and beneficial impacts on the environment. To meet increasing food demands from increasing populations and from global markets, the sector has in many places undergone rapid technological development, including new crop varieties, agrochemical use, and varying degrees of mechanisation, with a wide range of environmental and social implications. In other places, development has been slow, and traditional practices prevail, also with its particular set of sustainability implications.

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Schulze, G. G. and H. W. Ursprung, Eds. (2001). *International environmental economics: A survey of the issues*. Oxford, Oxford University Press.

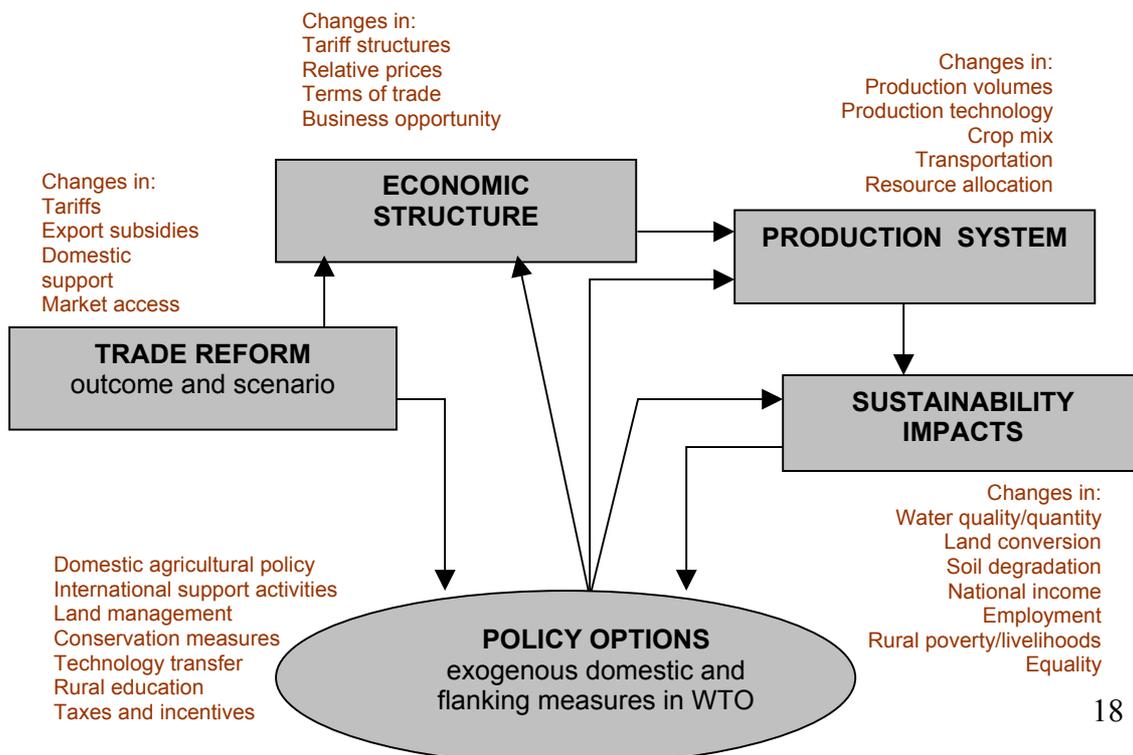
## 2.2. Conceptual framework

Trade liberalisation will affect sustainable development by affecting a country's economic life, social situation and environmental performance, incentive structures and production systems through a great number of complex interactions and linkages. It should be clear from the outset that it is not possible to fully understand or empirically validate these linkages. Massive research resources are being spent to understand one particular linkage in one particular context, through for instance macro-economic modelling or impact assessments. When it comes to sustainability impacts, experience has shown that it is not possible to provide generalised relationships. While quantitative results are in demand in these types of assessments, data gaps and lack of methods in many areas are prohibiting. As there is clearly a lack of data on the relevant linkages (which has been firmly demonstrated by e.g. OECD, SIA Phase Two and many other sources), it is not possible to model the impacts quantitatively in the frames of this study.

Nevertheless, the conceptual framework organises the information and enhances our understanding of the generic cause-effect relationships as we go from the proposed changes in the trade policy scenario to its sustainability impacts. The study therefore deploys a transparent narrative of these sets of issues and linkages and how they fit together in each case, based on expert interpretation of existing country and sector studies from various sources, and supported to the extent available by empirical data and modelling results.

The framework is generically applicable for the agricultural sector in any country and should be tailored and adapted to each case study. In each case/country context, different features in each of the modules will be of key relevance. But this exercise of structuring the problem will allow us to select the best methods, indicators and data sets to make it possible to say something about the sustainability implications. The different elements of the framework, and examples of potentially important factors within each element, are shown in Figure 2.

**Figure 2: Conceptual Framework for Sustainability Impact Assessment of Trade Negotiations in the Agricultural Sector**



A necessary departure point for the assessment as a whole is to establish the baseline sustainability conditions and issues for the sector in each country, and to identify what the conceptual cause-effect relationships look like. The baseline conditions are accounted for throughout all modules of the conceptual framework, current economic structures, production systems, trade conditions, policy environment and sustainability “performance”. This defines the analytical focus and information needs of the assessment and hence informs the choice of methods, measures and indicators needed for the assessment.

We will now describe each of the elements of the conceptual framework and describe some of the theoretical linkages that provide the basis for the SIA.

### **2.2.1. Trade reform**

How does the global trade liberalisation scenario play out in each country? Here, the scenarios, i.e. the simulated outcome of the negotiations, are interpreted in a specific country context. This is done not only domestically but also in relation to measures for better access to trade partner countries. The basic content of this in the current study is given through the three agreed scenarios (baseline, liberalisation and intermediate scenario), for each trade policy area (export subsidies, tariffs, domestic support, and measures of market access).

To do this, we need to account for the current policy conditions in the country. Trade barriers in agriculture today can generally be said to be higher in industrialised than in developing countries. Analysts estimate that trade barriers in agricultural products are on average ten times as high as in manufactured goods. Reduction of agricultural trade barriers will influence the overall scale of agricultural activities as well as the structure of the sector, and choices on crops and production technology. This in turn will have ramifications on social, economic and environmental parameters; directly through welfare and efficiency gains in the economy as well as indirectly through environmental pressures associated with such changed production and consumption patterns. This is what the following elements of the framework analyse.

### **2.2.2. Economic structure**

How does trade liberalisation affect the economic structure of a country? This module analyses the implications in economic terms from the trade liberalisation in a particular country, such as (the change in) incentive structures and opportunities for farmers, consumers and traders domestically and in import and export markets. This type of data is often the basis in computer-generated general equilibrium (CGE) models used by economists to calculate production outcomes of policy change. The current study does not carry out this type of modelling exercise but draws upon existing work and results from such research. The results depend on the overall characteristics of the country economy, domestic agricultural and economic policy, the relative production and resource allocation, and import/export patterns (the net trade balance).

Liberalisation of trade policies will generally lead to higher world *market* prices.<sup>7</sup> This is since the duties have distorted the market equilibrium by suppressing demand. But for an importing country, a global tariff reduction will decrease the price that the domestic producers can charge. For an exporting country, a global tariff reduction will

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<sup>7</sup> See, for instance, “A forward looking analysis of export subsidies in Agriculture” Paris: OECD, 2000

increase the price the producers can charge. Some industrialised countries would benefit through better resource allocation, increased consumer surplus, and budgetary control. Some developing countries have a comparative advantage in agricultural products and would benefit even more profoundly and particularly on the producer side. The poorest countries on the other hand are often net-food importers and they may suffer deteriorating terms-of-trade. A lowering of tariffs for a certain crop at the global level will change the terms-of-trade (the price of a country's exports divided by the prices of its imports) which in turn will affect a country's income (a rise in the Terms of trade will normally increase income and welfare).<sup>8</sup>

### **2.2.3. Production system**

How does the change in the economic structure, in turn, affect the production system? The production system is here taken to mean the scale and structure of activities, technology and resource allocation for production purposes. These changes take place both between countries and within countries. Changes in farming practices result from farmer's production decisions that are taken in the light of changes in revenue and cost structures. The change in production patterns as a result of these changes depend on the set of defining features in the production, trade and consumption of agricultural products. The change in the production system will have important sustainability implications.

Generally speaking, trade liberalisation would lead to increasing activity globally and increasing world market prices. But at the national level, it depends largely on whether the country has been a high-protection or low-protection country and whether, of course, the country is importer or exporter. In a high-protection country, liberalisation would lead to falling producer prices in relation to production input prices. This leads to a reduction in production and high-protection producers will suffer (whereas the consumers will benefit due to lower prices). The opposite occurs in low-protection countries, where production is likely to increase, because of the higher world market prices. Low-protection country producers will clearly benefit, whereas the consumers might suffer if world market prices get higher than the previous domestic price. For an importing country, decreasing prices that the domestic producers can charge would mean a loss to producers and decreased domestic production. For an exporting country, increasing the price the producers can charge, the producers will benefit. Exporting countries and producers will produce more.

Up to this point, the assessment method relies on economic models and commodity market policy analysis that can predict changes in overall activities and production patterns for each product in different countries as a result of the liberalisation scenario. Ideally, the SIA would access scenario modelling runs for this study's specific scenarios. However, this has not been possible within the frames of this study. Instead we rely on existing scenario runs, the conditions for which differ to some extent from the study's established parameters.

### **2.2.4. Sustainability impacts**

How does the production system impact on various sustainability parameters? A change in the production systems will lead to a change in associated environmental

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<sup>8</sup> Krugman, P. R. and M. Obstfeld (1991). International economics. New York, Harper Collins Publishers.

and social stresses. The prediction of impacts, e.g. income distribution, food security, land use, agrochemical use, and water use, on the resulting production system, i.e. the resource allocation, structure and scale of production, and technology, becomes the key consideration in the continued assessment. There are also other key determinants of these impacts, such as the state of the environment/social situation and the policies, regulations and institutions in place today to safeguard sustainability issues. Again, the analysis of the baseline conditions becomes critical for the assessor to be able to say something about the impacts. Potentially relevant impact factors in the agricultural sector are listed in the indicators section below.

**A key environmental issue: land and agrochemical use**

Environmental implications that might be positive or negative include changes in land use, use of agrochemicals and water use. Increasing production might be associated with environmental stress. The environmental implications can depend on the relative "erosiveness" and resource requirements (water, agrochemicals) of the different crops. In theory, the increased production would lead to intensified use of production input and emissions. For instance, an intensified use of agrochemicals or water might lead to water table depletion and pollution. In reality, the countries that would likely experience the highest production increases as a result of agricultural trade liberalisation would typically be the developing countries, where the use of inputs today is very low, so the carrying capacity to cope with more input and stress can be quite high and hence leading to relatively lower environmental impact. Modest and uneven reductions in environmental stresses would then typically be the case as liberalisation increases. Agrochemical use per ha is an important baseline data to inform such as discussion. In fact there is empirical evidence of the connection between agricultural support and fertiliser use (although no causality).

A more in-depth analysis that the current study, should examine the issue of technological change as a result of liberalisation. An in depth technological assessment would go beyond a generalised assessment of agricultural input trajectories, as causal linkages are likely highly complex. In general, increasing emissions and environmental stress follow from increasing production unless there is technological change as a result of liberalisation.<sup>9</sup>

Most likely, trade liberalisation will lead to a conversion of land to expand agricultural activities in developing countries. Similarly, one might expect a decrease in agricultural land in high-protection developed countries such as those in the European Union. An analytical problem is that agriculture is as much a part of the environment as it is imposing on it. Agricultural lands fill environmental functions such as biodiversity, protection against soil erosion, and cultural landscape. Most people in Europe consider idle lands as an environmental cost rather than a benefit, and the preservation of the open agricultural landscape is an important environmental policy objective in Europe. On the other hand, marginal land, mostly affected when production goes up or down, have often proven to be quite valuable for ecosystem services, recreation, and wildlife buffer zones. Idle lands have been shown to develop into highly valuable areas. In these cases, agricultural expansion works against environmental values. Risks relate to issues such as forests, wildlife, and ecosystems functions. Most developing countries have rather weak policies and institutions to preserve these values which means that flanking measures again becomes key to the

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<sup>9</sup> WTO, *Trade and Environment*, WTO, Geneva, 1999

assessment and as a result of the assessment. Similarly, at the European level, policy measures to preserve the cultural landscape without trade barriers should be developed.<sup>10</sup>

**A key social issue: impacts on poverty**

Social implications might also be positive or negative depending on who reaps the benefits of production before and after the reform, who holds property rights and employment, who gets to participate in the market activities. New production and trade patterns might lead to the further marginalisation and impoverishment of already poor rural groups who are not equipped to reap the economic benefits of the market expansion. Liberalisation might be good in the aggregate, but some areas or social groups might not be well suited to deal with rapid changes in agricultural trade and will incur significant short-term costs attempting to adjust.<sup>11</sup>

There is no simple relationship between trade and poverty. Poverty is a multidimensional problem with roots in lack of education, health care, unequal distribution of assets, poor infrastructure, lack of institutions and poor policies. Trade linkages are not as direct, but have indirect, diffuse and sometimes contradictory impacts on the poor. The most direct linkage is the price effect. Price changes that can result from trade reforms affect households immediately, depending on what they buy and what they sell. Whether a particular trade reform is pro-poor or anti-poor in a particular setting depends on how the poor households spend and earn their income. But even more important is the existence of markets. Trade reforms can both destroy and create markets. Another important linkage is how trade reform affects factor prices, and the wages of unskilled labour come into focus in a poverty perspective. Production that shifts towards labour intensive production tends to increase these salaries. It is often understood that world markets are more stable than domestic markets. Trade reform would therefore decrease vulnerability. However, moving from subsistence to market systems have in many cases shown the opposite, an increased vulnerability and poverty as a result. Temporary adverse shocks are likely, as the country adjusts its economic structure.<sup>12</sup>

**A key economic issue: the welfare effect**

Income changes as a result of liberalisation that CGE models predict directly should be considered as sustainability impacts in themselves, since income and overall welfare generation are important sustainability parameters. There will be economic welfare impacts both on behalf of the producers and consumers. Global welfare gains from liberalisation in the agricultural sector have been estimated to be high. Welfare gains are often discussed as producer surplus and consumer surplus (although we will not go into the theory here). According to economic theory, the overall welfare gains from an overall liberalisation in agricultural trade will be positive in almost every specific country case. In relation to this well-known finding, it is worth noting the apparently irrational and mercantilistic approach towards trade negotiations, where trade is seen as a zero-sum game. The domestic costs of our own barriers, in the form

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<sup>10</sup> OECD, *Improving the environmental performance of agriculture: policy options and market approaches*, OECD, Paris, 2001

<sup>11</sup> *Approaches to Linking Trade and Poverty*. L. Alan Winters and Neil McCulloch, Paper Prepared for the Workshop on Trade, Poverty and the Environment: Methodologies for Sustainability Impact Assessment of Trade Policy, 7 November 2000, University of Sussex and Institute of Development Studies

<sup>12</sup> WTO "Trade, Income Disparity and Poverty," World Trade Organization, 1999

of consumer welfare, is rarely accounted for. Such domestic costs today in Europe have been estimated at 7% of total EU production. Yet, giving up our own barriers is seen as a sacrifice. Of course, the distributional implications are important. The benefits of liberalisation are thinly and broadly distributed over all consumers, whereas the adjustment costs will hit certain regions, sectors or firms.

### **2.2.5. Policy options**

In a welfare economic perspective, a liberalised trade and policy that internalises sustainability impacts through appropriate and non-distorting measures will lead to the best outcome for all countries. The sustainability concept implies that we use policy to overcome the perceived goal conflicts between environmental sustainability, economic welfare gains and social concerns. The policies are put in place to off-set unsustainable incentive structures and impacts and improve the sustainability performance in the sector. Accounting for domestic policies or accompanying policy measures is therefore highly relevant in an SIA.

The baseline conditions are again important as a crucial determinant of the current economic structures, production systems and current sustainability performance of the sector. In fact, empirical evidence suggests that the general economic development and policy is far more important than trade reform for sustainability impacts. In the environmental field, economic models have shown that even very modest economic instruments, such as pollution taxes or input taxes, can be very effective in reducing environmental stress.<sup>13</sup>

The need for accompanying policy responses in conjunction with trade policy reform, sometimes referred to as *flanking measures*, has been widely recognised, particularly in developing countries where policies in sustainability areas are reputedly weak. Not necessarily directly trade-related, these measures can be discussed as part of the negotiation process within the process, and might involve support measures from development banks and other international or bilateral agencies.

As explained earlier, the short-term adjustment costs of liberalisation can be severe. It is imperative to have safety nets for unemployment and complementary structural adjustment policies for supporting firms and individuals to adapt. The room for manoeuvre in domestic policy might, however, be restricted by WTO rules. WTO-led trade reform measures can impact the parameters within which other policy options can operate (i.e. domestic policy, bilateral agreements, or international agreements). In other words, domestic policy options are affected by new trade agreements and the policy parameters available to address sustainability impacts will be altered. Exceptions such as the green box, the blue box and the proposed development box can be key to the country's ability to soften the structural adjustment shocks, if applied appropriately to address these problems.

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<sup>13</sup> OECD *Environmental performance reviews: Mexico*. Paris: OECD, 1998.

The development of specific policy proposals for each country is beyond the scope of this study. However, a principal discussion on policy measures is a very important part of sustainability assessments that frequently is not given the attention it deserves. Policies could include:

- integrated land and resource management and conservation measures, and water management;
- sustainable agriculture technologies, such as integrated pest management;
- institutional capacity building, such as legal provisions to maintain rights;
- training to farmers, officials higher education, research, extension, and dissemination of resource-conservation techniques.

The policy module of the analytical framework is not discussed separately for each scenario but held together in a general policy discussion for each country case study.

### 3. Scenarios

#### 3.1. Initial scenarios for the SIA food crops study

This study (as determined by the Commission) performs an SIA of liberalisation in the wheat/wheat flour and edible oil crops (oilseeds and tropical oils) through WTO negotiations. Specific country case studies were identified by the Commission and include:

- v. EU and US;
- vi. Australia / Argentina and Indonesia / Malaysia
- vii. Net Food Importer Developing countries; Egypt and Senegal;
- viii. India.

The Commission also determined the specific scenarios to be assessed in applying the SIA methodology. These scenarios are represented in Table 2.

**Table 2: Original Scenarios**

	Baseline UR	Scenario 1	Scenario 2	Scenario 3
Tariff	-36%	-10 %	-30%	-50%
Minimum (market) access	5%	+2.5%	+5%	+7.5%
Domestic support (AMS)	-20%	-10%	-20%	-30%
Exp. Subsidies	-21% volume	-10%	-20%	-30 %

-+/- % changes are related to the final UR agreement

These scenarios differ from the scenarios established in the Phase One and Phase Two SIA methodology<sup>14</sup> both in the treatment of the baseline and the scenarios for assessment. In the Phase Two report Kirkpatrick and Lee argued that full implementation of the Uruguay Round Agreement on Agriculture (URAA) had not

<sup>14</sup> Kirkpatrick Colin, Lee Norman. *WTO New Round Sustainability Impact Assessment Study: Phase Two*. Manchester: Institute for Development Policy and Management and Environmental Impact Assessment Centre, University of Manchester, 1999.

occurred, making the current state different from the baseline.<sup>15</sup> In the scenario formulations above the full implementation of the URAA is held to have occurred. The three scenarios provide specific percentage changes for four different elements, while the SIA methodology developed for the Commission makes qualitative distinctions between a baseline, intermediate and liberalisation scenarios. For the agricultural sector the SIA methodology describes the baseline scenario as no new agreement on agriculture but full implementation of the URAA. The intermediate scenario is described as taking into consideration the EU's negotiating objectives within the context of a new agreement on agriculture via the WTO.<sup>16</sup> Lee and Kirkpatrick note that the intermediate scenario includes:

- retention of blue and green boxes, possibly with some updating.
- improvements in market access through ongoing process of reducing trade barriers, support for exports and for domestic agriculture subject to retention of boxes above.
- support for various non-trade concerns including the multifunctional role of agriculture, food safety and quality, protection of the environment and animal welfare.
- support for special and differential treatment of agriculture in developing countries, including increased (duty-free) market access for the least developed countries.<sup>17</sup>

In general the intermediate scenario is characterised as entailing gradual liberalisation of agricultural trade. Kirkpatrick and Lee describe the liberalisation scenario as assuming “general acceptance, within all country groups, of comprehensive trade liberalisation in agricultural products and the removal of discriminatory market practices in domestic markets. This would require elimination of all forms of export subsidies, domestic support measures and import duties.”<sup>18</sup> Kirkpatrick and Lee also note that in general the liberalisation scenario entails “that very limited, future changes are made to mitigate adverse environmental and social impacts.”<sup>19</sup>

### **3.2. Scenarios applied in the SIA food crops study**

Early on in the performance of this sectoral SIA it became apparent that it would not be possible to implement the more detailed scenarios developed by the Commission for this study. As will be discussed in the section entitled “Economic assessments of liberalisation” below, current broad modelling efforts assessing the economic impacts of liberalisation do not provide accurate enough results to make meaningful distinctions between the percentage changes noted in the original scenario formulation. Nor do modelling exercises exist that are closely correlated to the selected food crop sub-sectors and country case parameters. In order to effectively interpret the original scenarios and the resulting economic changes acting as drivers of change in an SIA-based causal chain analysis, new modelling runs for the original scenarios and respective case studies would have to be developed. Such an analysis is well beyond the constraints of this current study. Further, an intensive economic

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<sup>15</sup>Kirkpatrick & Lee, 1999.

<sup>16</sup>Kirkpatrick & Lee, 1999.

<sup>17</sup> Kirkpatrick & Lee, 1999.

<sup>18</sup> Kirkpatrick & Lee, 1999.

<sup>19</sup> Kirkpatrick & Lee, 1999.

modelling effort of this kind may detract resources from a SIA methodology designed to assess an extensive range of sustainability conditions.

Due to difficulties in implementing the scenarios set out by the Commission for this sectoral SIA, the Consultant has reverted back to the original scenario formulations established in the Phase Two SIA report, with some minor modifications. As has been noted the baseline scenario now assumes the URAA is fully implemented. The intermediate scenario is interpreted as comprising a more gradual approach to liberalisation in the sector entailing less significant impacts than in the full liberalisation scenario, and as incorporating the EU negotiation objectives. Because the intermediate scenario is interpreted as partly distinct from the liberalisation scenario in extent, the order of the scenario presentation has been changed with the baseline and liberalisation scenarios appearing first and the intermediate scenario appearing last. The liberalisation scenario assumes extensive to full liberalisation.

### 3.3. Additional scenario issues

Under the baseline scenario we predict the impacts *on a go forward basis only* of no new WTO based agreement on agriculture. This means that the baseline scenario results do not try to present the current state, but rather the future impacts of no new agreement. Likewise, the intermediate scenario and the liberalisation scenario provide impacts on the current state from further liberalisation. The baseline and liberalisation scenarios are carried out in this way due to the SIA methodology, which focuses on future impacts on the current state.

One problem with this formulation is that baseline scenarios predictably demonstrate little or no impacts, as there is no WTO led change in trade regimes. With no change in WTO rules there is of course little room for change in outcomes that can be associated with WTO rules. Thus, for example, a current state that demonstrates positive economic circumstances from current trade structures and negative environmental circumstances may show no impact in a baseline scenario. No impact in the baseline scenario means that business as usual will not impact significantly on the positive economic conditions and will not impact significantly on the negative environmental conditions. Another way to describe this is to say the baseline does not impact on current economic or environmental **trajectories**. Thus, although the environmental circumstances may change over time no impact is noted because the environmental trajectory is already established and no change to that trajectory can be causally linked in the baseline.

The previous SIAs performed for the Commission assumed that the URAA was not fully implemented and the baseline scenario represented, to some degree, impacts of the full implementation of the URAA in relation to the current state. The baseline for this study, as determined by the Commission, already assumes full implementation of the URAA, and for this reason the baseline scenario will not demonstrate significant *change* impacts. Given this new formulation of scenarios the Consultant suggests that the usefulness of the baseline scenario as it is currently formulated must be addressed in future methodological work. The original formulation of the baseline as set out by the Commission in this study did attempt to address this problem by not including a baseline scenario for analysis but rather three different liberalisation scenarios of different degrees.

One method for assessing the baseline impacts is to look at the baseline line predictions of major organizations like ESA/USAD, OECD, and IFPRI on *future* trends in the agricultural sector given no new WTO based trade agreement. In this study we use the Directorate-General for Agriculture’s report *Prospects for Agriculture Markets 2001-2008*. The demand, price, production and trade predictions are used in our study as initial drivers for change in the causal chain framework developed for this study (See section “2. Methodology” above).

## 4. World Wheat Trade

In this section we provide an overview of trade in the wheat sector in order to establish a setting that can inform the country specific SIAs. As well, projections of world trade in wheat over the next 10 years given no new agreement on agriculture in the WTO are summarised. These projections are used to help interpret the baseline scenario in each country case SIA.

### 4.1. Overview

The world’s major wheat producers in 2001 where: China, the European Union (EU), India, the United States (US), Russia, Canada, Australia, Pakistan, Argentina and Turkey. These producers accounted for 78% of World wheat production in 2001 (Table 3).

**Table 3: World wheat production in 2001**

<i>Wheat Production</i>	<b>2001 (Mt)</b>
<b>World</b>	566 842 633
<b>China</b>	93 920 100
<b>European Union (15)</b>	92 922 200
<b>India</b>	68 500 000
<b>United States of America</b>	53 719 500
<b>Russian Federation</b>	39 360 000
<b>Canada</b>	20 695 300
<b>Australia</b>	20 000 000
<b>Pakistan</b>	18 954 500
<b>Argentina</b>	18 000 000
<b>Turkey</b>	16 000 000

Source: FAO, *FAOSTAT Agriculture Database*. Accessed November 2001.

Wheat is produced throughout the world, but the concentration of major wheat production results in considerable global wheat trade. In 2000, 127 million tons of wheat was trade accounting for 21% of wheat produced in that year. Wheat trade is dominated by a small number of countries. The EU, the US, Australia, Argentina and Canada conduct 80% of the world’s wheat trade and account for 70% of wheat exports on the world market.<sup>20</sup> Table 4 below provides the percentage of wheat exports attributable to each of the world’s major exporters in this sub-sector.

<sup>20</sup> Koo, Won W. and Taylor, Richard D., *2001 Outlook of the U.S. and World Wheat Industries, 2000-2010*. North Dakota: Center for Agricultural Policy and Trade Studies, September 2001.

**Table 4: Wheat exports 2000**

<b>Top Wheat Exporters</b>	<b>Wheat+Flour,Wheat Equiv Exports - 2000</b>	<b>Share of Total World Exports</b>
	<i>Metric Tonnes</i>	
United States of America	28 890 058	22,4%
Canada	19 008 255	14,7%
Australia	18 016 354	13,9%
EU (15) Excl.Intra-Trade	15 385 255	11,9%
Argentina	11 548 682	8,9%
<b>Total World Exports</b>	<b>129 247 459</b>	

Source: FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

Some of the most important wheat importers are middle-income developing countries. The past several decades have seen significant competition among exporting countries over some of these middle-income developing country markets, particularly between the US and the EU. Table 5 lists the top wheat importers in 1999.

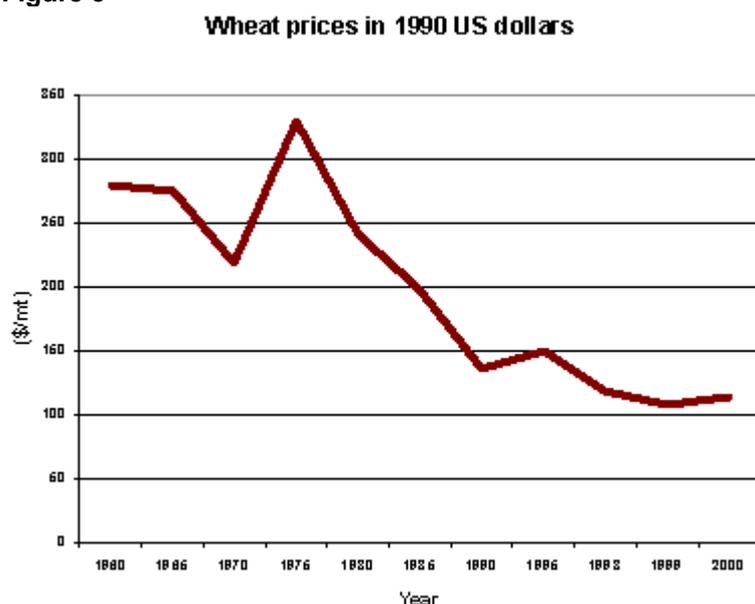
**Table 5: Top wheat importers, 1999.**

<b>Top Wheat Importers</b>	<b>Wheat+Flour,Wheat Equiv. Imports - 2000</b>
	<i>Qty (Mt)</i>
<b>Brazil</b>	7 819 977
<b>Iran, Islamic Rep of</b>	6 577 912
<b>Japan</b>	5 855 095
<b>Algeria</b>	5 372 792
<b>Egypt</b>	4 972 824
<b>Indonesia</b>	4 226 491
<b>EU (15) Excl.Intra-Trade</b>	3 958 612

Source: FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

Indicators from the World Bank show the declining trend in world market wheat prices over the past four decades (Figure 3).

Figure 3



Source: World Bank. *World Development Indicators*, 2001.

The historical trend in international wheat trade coincides with the general downward trend in most commodity prices that has occurred in international agricultural trade over the past several decades. Agricultural policies, particularly trade distorting measures, have been one important factor affecting the international agriculture trading regime and contributing to declining commodity prices.<sup>21</sup> Agricultural trade remained largely undisciplined under the GATT until the conclusion of the Uruguay Round and implementation of the Agreement of Agriculture (URAA). During the 1970s and 1980s increasing domestic support for producers and border protection, particularly in OECD countries, caused surpluses of production that required export subsidisation in order to be sold on the world market.<sup>22</sup> Most notable was the EU's shift from a net importer of agricultural commodities, including wheat trade to a net export during this period.

EU, US, and other OECD countries export subsidies and domestic support policies tended to depress world market prices for agricultural commodities and to make them unstable. In some developing countries, where the agricultural sector represents a major share of employment, market distortions tended to undermine livelihoods and increase dependence on depressed food imports. Instability in world market prices caused many developed country exporters to protect their domestic markets from this instability with further trade distorting policies such as variable import levies in the EU or state trading enterprises' variable mark-ups on imports in other countries.<sup>23</sup>

During the 1980's there was increasing escalation of export subsidy use by the EU and the US to facilitate market share competition in the wheat sector.<sup>24</sup> In 1985 the US implemented the Export Enhancement Program (EEP) in order to assist its

<sup>21</sup> Increased productivity in the agricultural sector, especially in high-income countries, is another key factor.

<sup>22</sup> Sharma R., "Agriculture in the GATT: A Historical Account" in *Multilateral Trade Negotiations On Agriculture* FAO Rome, 2000

<sup>23</sup> Sharma, 2000.

<sup>24</sup> McNally, 1995.

agricultural sector meet declining world prices, and recapture market share lost to the EU as a result of the EU's extensive use of export restitutions for wheat surpluses. Competition in wheat trade was particularly intense over North African markets.<sup>25</sup> Importantly, since implementation of export subsidy constraints in the URAA market share competition has subsided.

The Uruguay Round Agreement on Agriculture was an important step towards reforming world agricultural trade, establishing a rules-based trading regime for agriculture within the context of the GATT/WTO, and addressing the trade distortions that characterised agricultural trade in the preceding decades. The key areas of reform where the conversion of non-tariff measures into bound tariffs, reductions of export subsidies, reductions of domestic support, and codification of domestic support measures based on their degree of trade distortion. Table 6 below summarises the reduction commitments of the URAA.

**Table 6: Numerical targets for cutting subsidies and protection**

	Developed countries 6 years: 1995-2000	Developing countries* 10 years: 1995-2004
<b>Tariffs</b>		
average cut for all agricultural products	-36%	-24%
minimum cut per product	-15%	-10%
<b>Domestic support</b>		
total AMS cuts for sector (base period: 1986-88)	-20%	-13%
<b>Exports</b>		
value of subsidies	-36%	-24%
Subsidized quantities (base period: 1986-90)	-21%	-14%

\*Least developed countries are not required to make commitments to reduce tariffs or subsidies

Source: WTO, *Trading Into The Future*. [http://www.wto.org/english/thewto\\_e/whatis\\_e/tif\\_e/agrm3\\_e.htm](http://www.wto.org/english/thewto_e/whatis_e/tif_e/agrm3_e.htm)

Although the URAA marked a significant shift in the rules governing agricultural trade, world agricultural trade is still highly distorted. Tariffs on agricultural goods are on average three times higher than on manufactured goods and this ratio jumps to nearly ten to one for industrial countries.<sup>26</sup> Table 7 summarises tariff, export subsidy, and domestic support rates for wheat and oil crops (note that country specific data is presented in each country case study).

<sup>25</sup> Kallio, Panu, K.S. *Export Subsidies in an Imperfectly Competitive Market When Market Share Matters: The Case of International Wheat Trade* Agricultural Economics Research Institute, Helsinki Finland. 1998.

McNally, 1995.

<sup>26</sup> Josling, Tim "The Uruguay Round Agreement on Agriculture: A Forward-Looking Assessment" paper prepared for a seminar at the Organisation for Economic Cooperation and Development (OECD), Paris, October 26-27, 1998.

**Table 7****Summary of agricultural supports and protection in 1997**

	Rate of tariffs	Rate of export subsidies <i>percentage</i>	Rate of domestic supports
<b>World sectoral average</b>			
Wheat	22.75	2.78	
Oil and oilseeds	12.57	0.00	
<b>Developed country group</b>			
Wheat	68.18	2.99	31.55
Oil and oilseeds	9.50	0.00	9.94
<b>Developing country group</b>			
Wheat	8.60	0.00	
Oil and oilseeds	15.67	0.01	

Rates of tariffs for sector, country, region, and the world are weighted average rates and the weights are values of sectoral or country's imports.

Both tariff rates and import data are for 1997.

Rates of export subsidies for sector, country, region, and the world are weighted average rates and the weights are values of sectoral or country's exports.

Both subsidy rates and export data are for 1997.

Rates of domestic supports for sector, country, region, and the world are weighted average rates and the weights are values of sectoral or country's outputs.

The domestic support data are for 1998, while the output data are for 1997.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

## 4.2. Projections under the current trade regime - Baseline

Projections for world wheat trade based on no new agriculture trade agreement within the context of the WTO are reviewed to establish the economic impacts in the baseline scenario of this report. The main source for these projections is the European Commission, Directorate-General for Agriculture's report *Prospects for Agriculture Markets 2001-2008*. DG Agriculture's report summarizes the findings from key organizations analysing future trends in wheat trade over the next decade including USDA, FAPRI, OECD and FAO projections. The report also corresponds to the baseline scenario of this report and assumes full implementation of the Uruguay Round Agreement on Agriculture, as well as incorporating policy changes resulting from the Agenda 2000 CAP reform.

The overall agricultural outlook is for recovery from the prolonged decline in commodity prices. An improved macro-economic environment, increasing population, and changing dietary patterns in developing countries are predicted to contribute to a situation where food demand increases more rapidly than production. World trade is expected to increase with special attention to increasing demand in developing countries in part due to estimates of limited production potential in some regions, and tightening of stock-to-use ratios resulting in higher commodity prices.<sup>27</sup>

For wheat, increased demand is expected due to increasing food demand in developing countries and increasing feed demand in developed countries. Projected per year production increases of 1.4% to 2.0% globally are noted to be largely due to production increases in developing countries. At the same time, global demand is expected to increase 1.1% to 1.5% with most of the projected increases occurring in developing countries. Short-term increases in wheat demand are expected in Asian

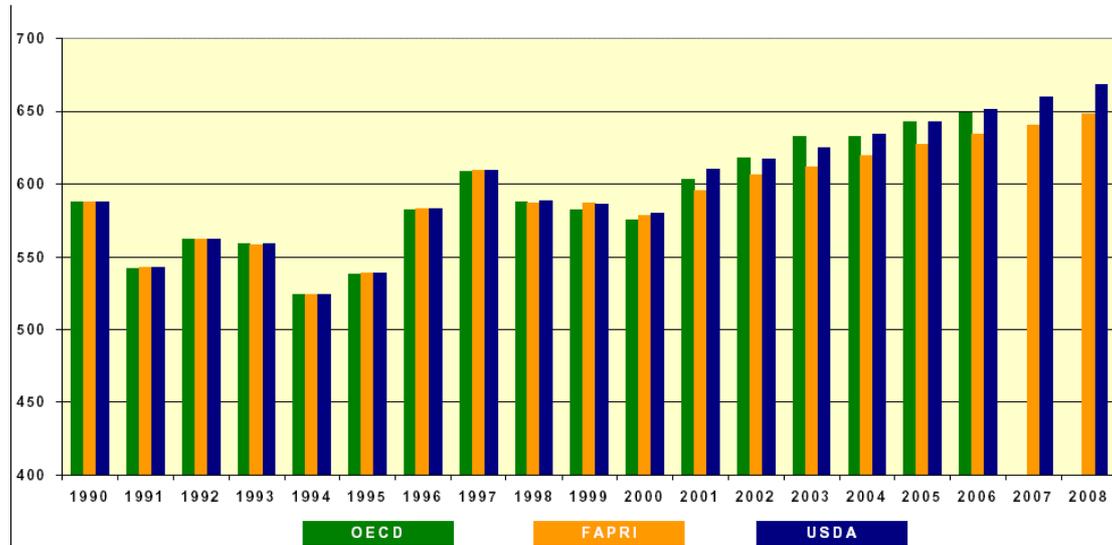
<sup>27</sup> European Commission: DG Agriculture. "Prospects for world agricultural markets" Brussels: EC, July 2001.

markets, particularly in China and Indonesia. Over the longer term, China, Latin America, North Africa, the Middle East, and transition economies will display significant increases in demand, due to improving economic performance, significant population growth, and limited production potential. The Figure 4 shows the general trend in production increases, while Figure 5 depicts the predicted magnitude of the price recovery expected over the next decade.<sup>28</sup>

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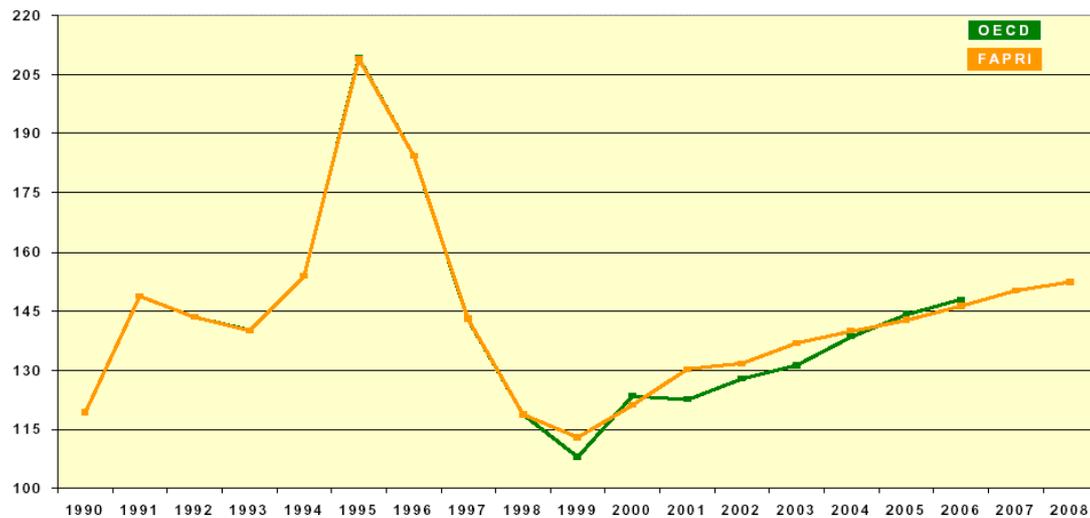
<sup>28</sup> Note that USDA projections indicate that nominal wheat prices are expected to rise, while real prices are expected to decline. ERS/USDA *USDA Agricultural Baseline Projections to 2010*. 2001

**Figure 4**  
**Outlook for world wheat production, 1990 – 2008 (mio t)**



Source: EC, DG Agriculture. *Prospects for Agriculture Markets 2001-2008*

**Figure 5**  
**Outlook for world wheat prices, 1990 – 2008 (\$/t)**



Ref.: US FOB Gulf, HRW.

Source: EC, DG Agriculture. *Prospects for Agriculture Markets 2001-2008*

Despite production increases in developing countries, the benefits from increasing world trade and world commodity prices will be experienced by countries that currently dominate wheat exports. According to the “2001 Outlook of the U.S and World Wheat Industries, 2000-2001” report from the Center for Agricultural Policy and Trade Studies at North Dakota State University, the following increases in exports per major exporting country can be expected (Table 8).

**Table 8: % Change in wheat exports 2000-2010**

	% Change (2000-2010)
<b>United States</b>	
Common	9.8
Durum	4.2
<b>Canada</b>	
WRS	17.5
WAD	7.6
<b>European Union</b>	
Common	8.9
Durum	25.6
<b>Australia</b>	13.3
<b>Argentina</b>	22.2

Source: Center for Agricultural Policy and Trade Studies, North Dakota State University “2001 Outlook of the U.S and World Wheat Industries, 2000-2001”

The EU stands to gain most in terms of percent change, but for Durum Wheat it must be kept in mind that the high percentage change occurs only because the EU had relatively low levels of production in 2000, 850 metric tonnes, which is expected to rise to just over 1000 metric tonnes by 2010. EU gains in exports due to increasing world prices, the cut in cereal support prices from the Agenda 2000 CAP reform, predictions of appreciation of the Euro against the US dollar, and predictions of cereal production increases and abundance of supply to meet rising global demand. The EC predicts a significant shift in the competitiveness of its wheat sub-sector to the extent that its producers can “export large quantities of soft wheat without subsidies, thus removing any WTO constraints on the levels of its soft wheat exports...A similar situation would occur for durum wheat, the exports of which would take place without any export refunds over the whole projection period, ” which runs to 2008/09.<sup>29</sup> In general the sector indicates moderate recovery over the forecast period.

## 5. World Edible Oil Crops Trade

In this section we provide an overview of trade in the edible oil crops sector in order to establish a setting that can inform the country specific SIAs. As well, projections of world trade in edible oil crops over the next 10 years given no new agreement on agriculture in the WTO are summarised. These projections are used to help interpret the baseline scenario in each country case SIA.

### 5.1. Overview

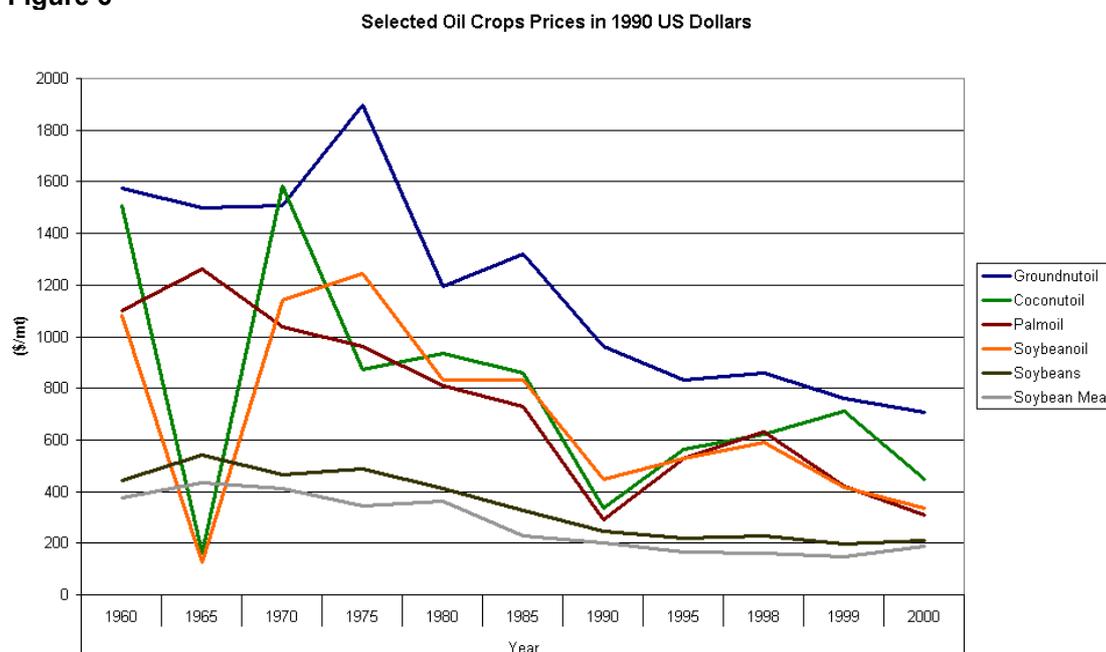
The US, China, Brazil, India, Argentina, the EU, and Canada produce 70% of world oilseeds output, and Malaysia and Indonesia are the world’s two major producers and exporters of palm oil. Together, Malaysia and Indonesia produce nearly 80% of the world’s palm oil and account for over 80% of world exports. For oilseeds, the United States, Brazil, Argentina, and the EU account for 80% of world exports.<sup>30</sup>

<sup>29</sup> EC – DG Agriculture July, 2001.

<sup>30</sup> ERS/USDA *Oil Crops Situation and Outlook/OCS-1999* October 1999

Oil crops trade has followed a similar pattern to wheat both in terms of the general trends in agricultural over the past several decades and the specific characteristic of significant US and EU importance on world markets. Figure 6 shows the downward trend of selected oil crop commodity prices coinciding with the general historical trends in agricultural trade noted above.

**Figure 6**



Source: World Bank. *World Development Indicators*, 2001

The United States has dominated exports of oilseeds in the world market and currently has just below 50% of the market share for all oilseeds. This market share has decreased somewhat from the US 70% market share of the late 1970s, with Brazil and Argentina gaining market share over the same period.<sup>31</sup> Soybean accounts for two thirds of all oilseed trade, soybean cake represents 80% of all oil cake trade, and soybean production accounts for 90% of US oilseed output. Soybean oil is second only to palm oil in global oil trade. Soybean dominates world oilseed trade due to high protein demands particularly in the EU, which accounts for nearly half of total world soybeans and soybean cake imports. The EU also accounts for nearly a quarter of world palm oil imports.<sup>32</sup>

Like with wheat trade, trade-distorting policies have played an important role in the character of world oil crops markets in the past several decades. Trade in oil crops has been less restricted by tariffs than other commodities. For example, the EU, US, Japan and Canada have no tariffs on the import of soybeans. Still, subsidisation and domestic support in oil crops has been a key issue. In the 1980s the EU introduced production support policies to increase self-sufficiency in oil seed products. Oilseed production under these mechanisms nearly tripled and contributed to the US decline in market share. The US reacted to EU subsidies with its own supportive measures

<sup>31</sup> ERS/USDA *Oil Crops Situation and Outlook/OCS-1999* October 1999

<sup>32</sup> ERS/USDA *Oil Crops Situation and Outlook/OCS-1999* October 1999

Fold, Niles "Oiling the Palms: Restructuring of Settlement Schemes in Malaysia and the New International Trade Regulations" in *World Development* March 2000, 473-486

including soybean's inclusion in the Export Enhancement Program. The trade disputes between the US and the EU in the oil crops sector was a major issue in the negotiations leading the URAA, and resulted in the 1992 "Blair House Memorandum of Understanding on Oilseeds". Under the agreement the EU agreed to limit the oilseeds production area. As well, under the 2000 CAP reform compensatory payments for oilseeds will be reduced, and foresees elimination of the crop specific payments for oilseeds.

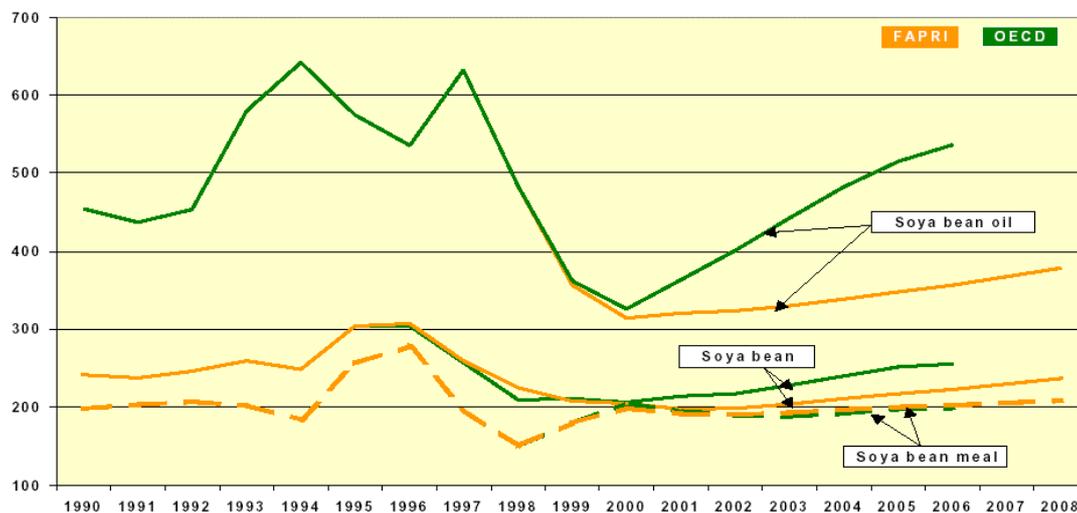
For Malaysia and Indonesia, the effects of support measures for oil crops on the world market, especially soybean oil, is increased competition in a market characterized by surpluses. As well, some key developing countries have also used support policies to increase self-sufficiency in oil crops. India, for example, imported one billion tons of palm oil in 1987, but after implementing domestic support and self-sufficiency policies India only imported 125,000 tons in 1992.<sup>33</sup> Notably, India reduced its vegetable oil tariffs by 15% in 1998 resulting in recovering import levels of palm oil.<sup>34</sup>

## 5.2. Projections under the current trade regime - Baseline

DG Agriculture in *Prospects for Agricultural Markets 2001-2008* forecasts modest recovery in the oil crops sector. Figure 7 indicates gradual soybean complex price increases with the possibility of more rapid increases for soybean oil.

**Figure 7**

Outlook for world prices in the soya bean complex, 1990 – 2008 (\$/t)



Ref.: US Soya bean CIF Rotterdam; Soya bean meal CIF Rotterdam; Soya bean oil CIF Rotterdam.

Like soybean oil, palm oil is also forecast to have relatively stronger price increases in relation to other oil crop products.<sup>35</sup> In general the oil crops market will be characterized by surpluses and low-prices in the short term, with demand growth, especially from developing countries, stimulating recovery. Improving economic

<sup>33</sup> Lindland, 1997.

<sup>34</sup> ERS/USDA *Oil Crops Situation and Outlook/OCS-1999* October 1999

<sup>35</sup> EC - DG Agriculture, 2001.

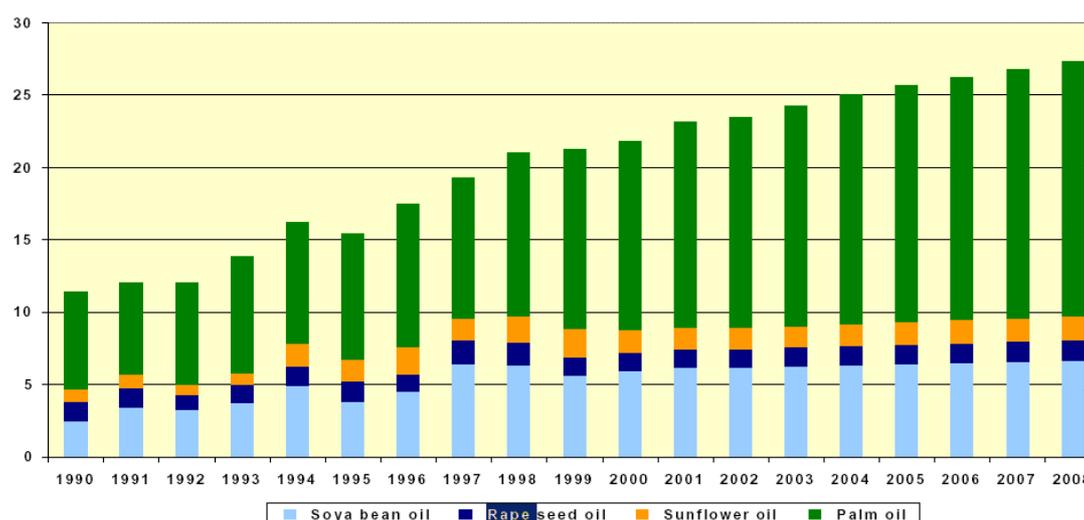
conditions and changing dietary patterns contribute to the demand increase in developing countries.

Oilseed production is forecast to increase between 1.6 % and 1.9 % per year, and most of the increase in oilseed production is foreseen to take place in the US, Brazil, Argentina, China and India. Area expansion and yield improvement both contribute to increased production, except in the US where oilseed area is anticipated to remain static. Estimates of increases in oilseed area between 7.1 million ha and 3 million ha, are expected to occur largely in the low-cost exporting countries of South America (Argentina and Brazil).<sup>36</sup> Importantly, it should be noted that the US has expanded its domestic support of the soybean sector from 8% of the value of production in 1986-88 to 20% of the value of production in 1998-00.<sup>37</sup>

Malaysia and Indonesia account for 75% of world palm oil production and 95 % of World trade. Production is predicted to increase 34% in these two countries during the 2001 to 2009 forecast period. Trade is also expected to increase at 3.9% per year, due to income growth and increasing imports in China, India and Pakistan.<sup>38</sup> Figure 8 below shows trade trends in vegetable oil trade.

**Figure 8**

**Outlook for world oilseed oil and palm oil trade, 1990 – 2008 (mio t)**



Source: FAPRI.

Overall, the sector is predicted to have modest price recovery over the forecast period with continuing growth in demand.

## 6. Economic assessments of liberalisation

Results from economic assessments of liberalisation are used in this study as initial drivers of change within a causal chain analysis that looks at the full range of sustainability impacts. The SIA methodology already developed for the Commission and the new conceptual framework developed for this study, are designed to examine the impacts of liberalisation on a go forward basis. As a result, they rely to a certain

<sup>36</sup> EC - DG Agriculture, 2001.

<sup>37</sup> ABARE "Rising US agricultural support" ABARE Current Issues 01-7, October 2001.

<sup>38</sup> EC - DG Agriculture, 2001.

degree on predictions of economic and trade-pattern liberalisation impacts such as: welfare impacts, crop price changes, terms of trade changes, and volume of trade changes. The following section is a review of strictly economic assessments. The full sustainability assessments are located in each country case study.

### **6.1. Challenges in incorporating economic models into SIA methodology**

Through a survey of recent modelling efforts addressing the impacts of liberalisation in the agricultural sector, it has become apparent that there are no modelling efforts that match precisely with the original scenarios selected by the Commission for this study. Many modelling efforts model the effects of full liberalisation in the sector instead of partial liberalisation as set out in this study. An exception to this tendency is a study by (Thomas W.) Hertel *et al.* entitled “Agriculture and Non-agricultural Liberalisation in the Millennium Round,” which was originally prepared for the 1999 World Bank conference on agricultural liberalisation and development.<sup>39</sup> These authors model a 40% reduction in tariffs, export subsidies, and domestic support. The Hertel *et al.* study also provides results that are disaggregated to a regional level, thus supporting the country analysis of this study. Another recent and comprehensive study has also been published by ERS/USD entitled “Agricultural Policy Reforms in the WTO – The Road Ahead”.<sup>40</sup> The ERS/USDA report models liberalisation of tariffs, export subsidies and domestic support independently and full liberalisation of all three. The report provides regional analysis, commodity specific analysis, and an evaluation of the effects of liberalisation of LDCs. Although this report does not provide a partial liberalisation scenario across tariffs, export subsidies and domestic support, it has commodity specific analysis that complements the Hertel *et al.* study, and an analysis of the effects of liberalisation in the agricultural sector on LDCs. A summary of the findings of these two studies will provide the core of the evaluation on the effects of liberalisation in the agricultural sector. No studies were found that modelled a 10% reduction in tariffs, export subsidies, and domestic support.

In order to provide well-supported argumentation for the significance of economic impacts due to liberalisation in the wheat and edible oils sub-sectors we will summarize the findings from the studies noted above, and present (qualitative) findings of the significance of impacts as directed by the SIA methodology. Currently the SIA methodology expresses impacts only in terms of positive vs. negative trends and significant vs. less-significant impacts. This approach is favourable given the disparate quantitative results of all the modelling studies reviewed for this project. For example, Hertel *et al.* model a 40% reduction in tariffs, export subsidies and domestic support and find that global welfare gains in 2005 would be approximately 70 billion US\$.<sup>41</sup> Diao, Somwaru, and Roe in the ERS/USDA study model full liberalisation and predict static annual welfare gains of 31.1 billion US\$ and dynamic gains<sup>42</sup> of 56.4

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<sup>39</sup> Hertel, Thomas W., Kym Anderson, Joseph F. Francois, and Will Martin, "Agriculture and Non-agricultural Liberalization in the Millennium Round", March 2000. (Forthcoming in *Agriculture and the New Trade Agenda From a Development Perspective*, edited by M. D. Ingco and L. A. Winters, Cambridge and New York: Cambridge University Press, 2002.)

<sup>40</sup> ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*. Washington DC: ERS/USDA, May 2001

<sup>41</sup> Hertel *et al.*, 2000.

<sup>42</sup> Dynamic gains include effects related to cumulative increases in savings, investment and productivity over a 15-year post-reform period.

US\$.<sup>43</sup> Thus, the partial liberalisation study actually predicts greater welfare impacts than the full liberalisation study.<sup>44</sup> Differences in results may be due to differences in model structures, parameters, base year, level of aggregation, macroeconomic assumptions, and interpretation of liberalisation measures.<sup>45</sup> As Hertel *et al.* and the ERS/USDA study use the same GTAP model, differences seem to be associated with difference in base year and treatment of some liberalisation scenarios. In particular it appears that the Hertel *et al.* study does not distinguish between distorting domestic support and “de-coupled” payments, while the ERS/USDA study does not include many domestic support payments not covered by the WTO AMS definition.<sup>46</sup>

It is beyond the scope of this study to evaluate various model structures and economic assumptions in a wide range of studies. The intentions for this study it to use the assessments noted above to indicate predicted significance of impacts and directions of trends rather than to establish quantitative indicators. Reviews of modelling efforts used to predict the effects of the URAA and future WTO agriculture measures have shown significant disparity in modelling results, a tendency for models to be generally effective in predicting trends but somewhat less effective in predicting significance of impacts quantitatively, and a distinct need for further research in developing appropriate models and improving results.<sup>47</sup>

The SIA methodology already developed for the Commission, and the new conceptual framework developed for this study, are designed to examine the impacts of liberalisation on a go forward basis. As a result they rely to a certain degree on predictions of economic and trade-pattern liberalisation impacts (such as: welfare impacts, price changes, terms of trade, volume of trade) as the initial drivers of change in a causal chain analysis. Both the economic assessments of future trade liberalisation in the agricultural sector used in this study are based on the GTAP model, which is a Computable General Equilibrium Model (CGE). CGE models are useful because they provide an analysis with quantitative results. The results are “rigorously derived from economic theory, assuming that markets respond to prices in the expected manner....Changes in one market affect other markets as well.”<sup>48</sup> These results can then be used in a causal chain analysis to examine other sustainability impacts related to economic and trade-pattern changes. However, there are difficulties associated with using these types of modelling results within the SIA methodology.

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<sup>43</sup> Diao, X., A. Somwaru, and Terry Roe (2001). “A Global Analysis of Agricultural Reform in WTO Member Countries,” *Background for Agricultural Policy Reform in the WTO: The Road Ahead*. USDA, Economic Research Service, ERS-E01-001.

<sup>44</sup> Another modelling effort from ABARE entitled *Developing Countries: Impact of Agricultural Liberalisation* models 50% agricultural liberalisation and estimates US\$53 billion a year in global gross domestic product.

<sup>45</sup> Carpentier, Chantal Line, “Trade Liberalization Impacts of Agriculture: Predicted vs. realized” Working Paper, December 20, 2001 *North American Commission for Environmental Cooperation*

<sup>46</sup> Hertel *et al.*, 2000.

ERS/USDA, May 2001

<sup>47</sup> Anania Giovanni “Modelling Agricultural Trade Liberalization. A review.” *Department of Economics and Statistics, University of Calabria, Rende (Cs), Italy* Prepared to be presented at the annual meeting of the American Agricultural Economics Association, August 5-8, 2001, Chicago. Carpentier, 2001.

<sup>48</sup> Gallagher, Ackerman, Ney, “Environmental Reviews of Trade Agreements: Assessing the North American Experience” Working Paper, December 20, 2001 *North American Commission for Environmental Cooperation*

As has been noted, no modelling efforts were identified that closely matched the original scenarios set out for this study. In order to perform such detailed scenario analysis it may be necessary to perform independent CGE model runs of such scenarios. In a recent study examining environmental reviews of trade agreements and the use of CGE models in this field, the authors argued that using a “CGE model is a cumbersome and expensive task, requiring a great deal of time, substantial effort from a team of specialists, and considerable resources, especially with respect to data.”<sup>49</sup> As a result, unless a large amount of resources is allocated to actually performing CGE based assessments, SIA studies will have to be responsive to already available assessments when choosing scenarios and case studies.

Other difficulties are associated with some of the methods and assumptions inherent in CGE assessments. CGE models use comparative-static analysis, which compares a base year to some point in time in the future. The difference between these two points in time is essentially the impact in the assessment. From the perspective of a sustainability assessment we would like to be able to assess the adjustment periods in-between a base and final year, and CGE models are not well suited for this task.<sup>50</sup> Other problems include assumptions of “perfect competition”, which is particularly of concern when examining impacts in LDCs, and lack of ability to address non-trade aspects of liberalisation<sup>51</sup>, which is increasingly important in a EU context.

Despite the difficulties, economic modelling will be important for any SIA assessment. As such, it must be decided to what extent SIA assessments should be based on modelling results. If SIA’s are to be heavily based on these types of assessments then not only economic but also environmental and social modelling efforts can be increasingly incorporated into the SIA methodology. If modelling efforts are to play a more proportional role, then SIA scenarios will have to be responsive to existing modelling assessments. This has particular implications on the planning stages for SIAs.

## **6.2. Regional Economic Analysis**

Hertel *et al.* predict that a 40% reduction in border protection and producer support would result in \$US 70 billion in welfare gains. Regional trade balance impacts of reductions in market price support and producer support of 40% are shown in Figure 9.

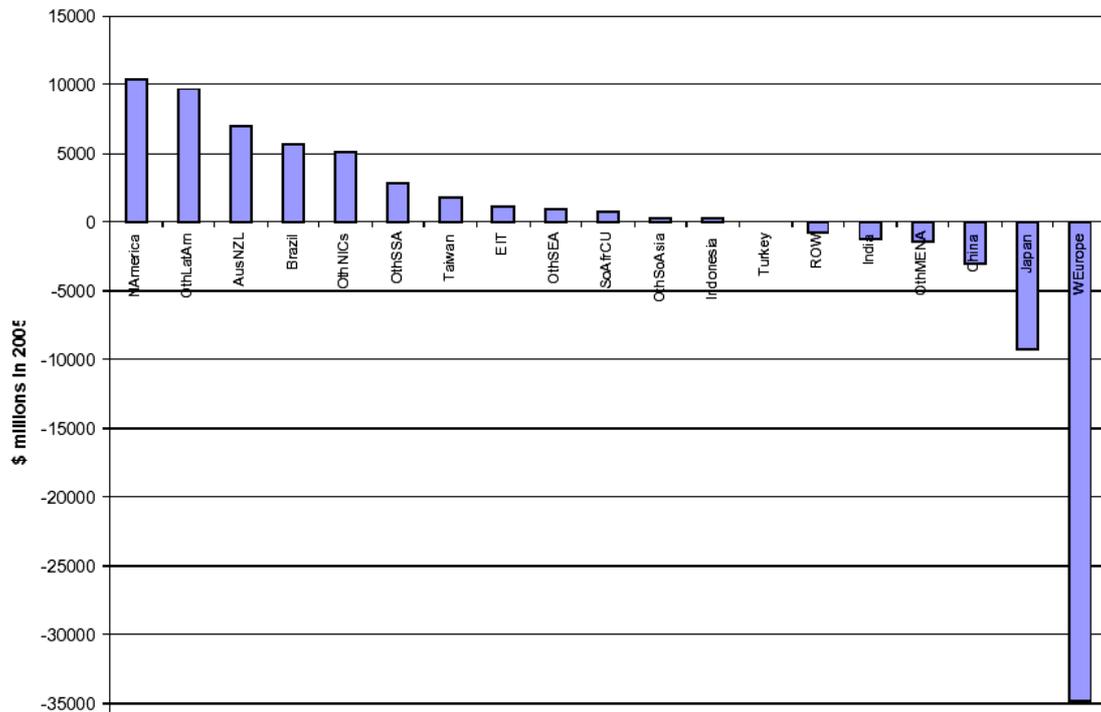
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<sup>49</sup> Ibid

<sup>50</sup> Ibid

<sup>51</sup> Ibid

**Figure 9: Changes in trade balance due to 40% Agr liberalisation, 2005.**



Source: Hertel, *et al.* "Agriculture and Non-Agriculture Liberalisation in the Millennium Round." 2000.

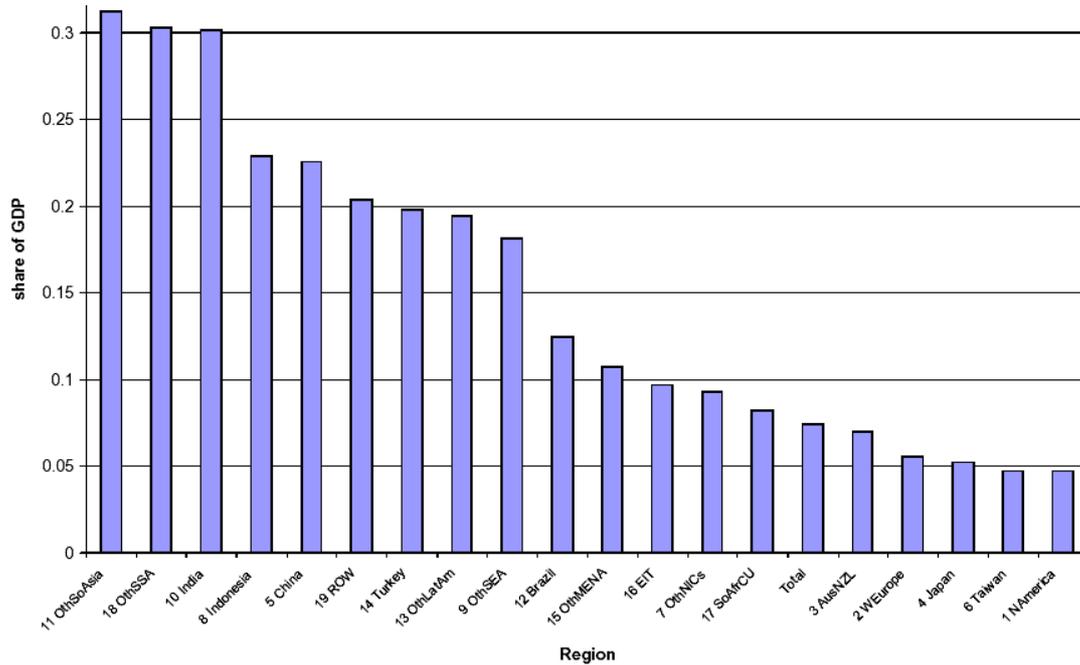
Western Europe is predicted to have the most significant impact with \$35 billion in increased imports, and Japan, China, and "Other Middle East and North Africa" (OthMENA) countries also experience increasing imports due to liberalisation measures. North America (NAmerica), "Other Latin American" (OthLatAm)<sup>52</sup> countries and Australia/New Zealand (Aus/NZL) are natural agriculture exports and correspondingly are predicted to have the most significant increases in food trade balances. India demonstrates slight negative food trade balance impacts while Indonesia and "Other South East Asian" (OthSEA)<sup>53</sup> countries show slight positive impacts. The "Other Sub-Saharan Africa" (OthSSA) region is predicted to have relatively intermediate positive impacts.

Hertel *et al.* compare real income gains as a percent of the entire food sector's value-added resulting from liberalisation with the relative size of the agricultural sectors in each region's economy. The resulting analysis translates efficiency gains into regional income. Figure 10 shows the significance of agriculture in the overall economies of the region and Figure 11 shows the real income gains as a percent of value-added dollars in food and agriculture.

<sup>52</sup> Argentina is grouped in the OthLatAm category

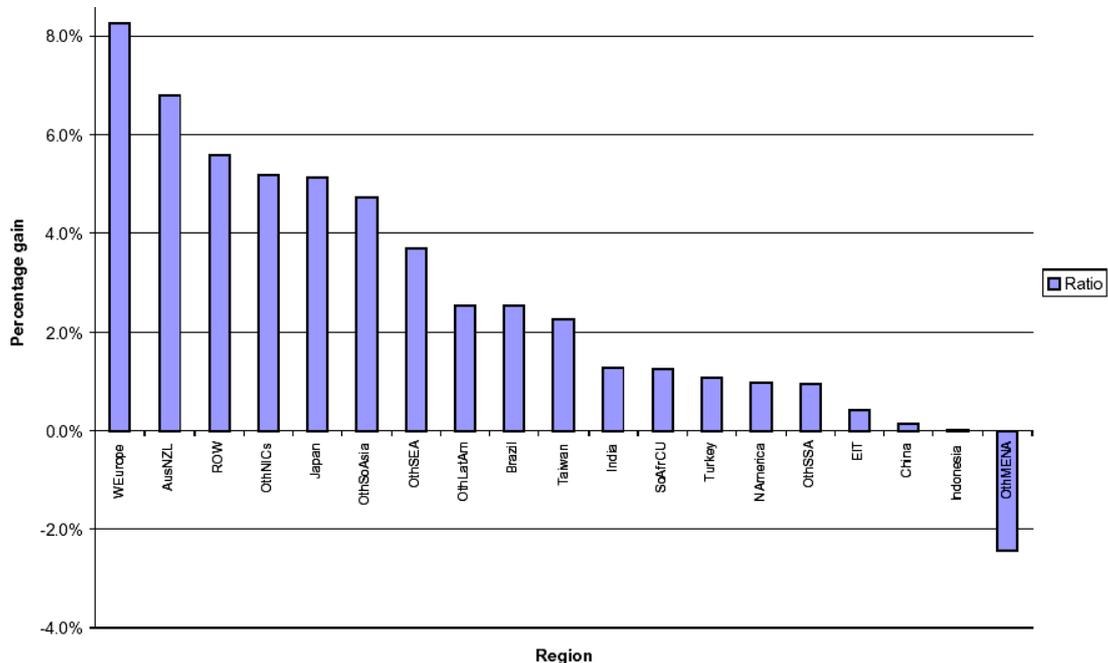
<sup>53</sup> Malaysia is grouped in the OthSEA category

**Figure 10: Share of food and agriculture value-added in economy**



Source: Hertel, *et al.* "Agriculture and Non-Agriculture Liberalisation in the Millennium Round." 2000.

**Figure 11: Real income gain per \$VA in food agriculture: AGR40**

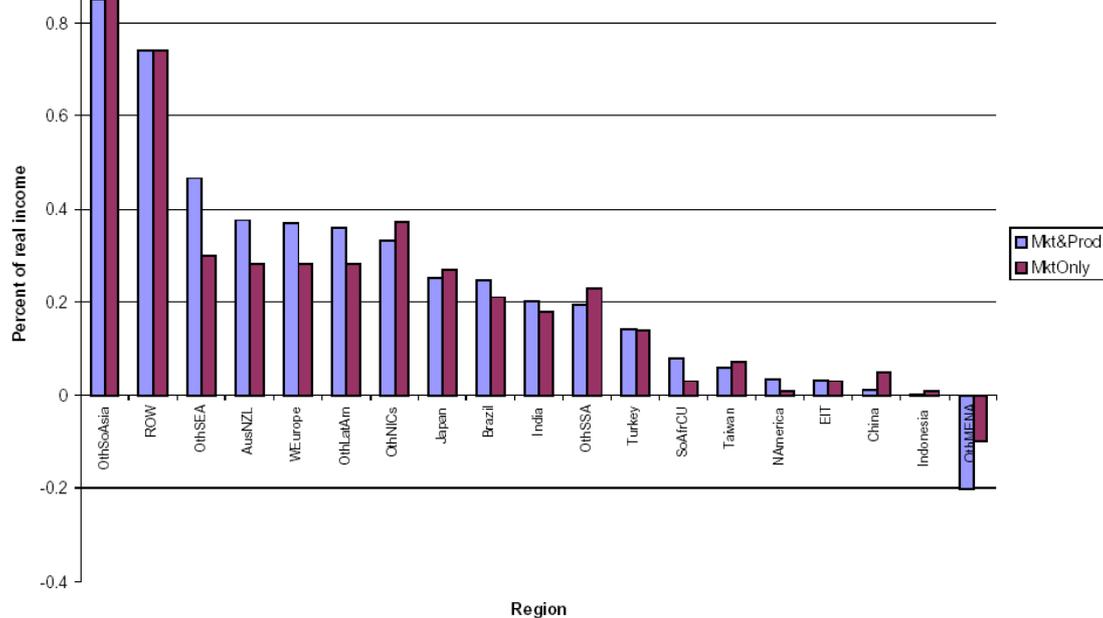


Source: Hertel, *et al.* "Agriculture and Non-Agriculture Liberalisation in the Millennium Round." 2000.

Large real gains as a percent of value-added in agriculture are found in WEurope, Aus/NZL, and OthSEA. Intermediate gains are predicted for OthLatAm countries, India, NAmerica, and OthSSA. No gains are predicted for Indonesia, and OthMENA indicates intermediate loses. The share of agriculture in GDP is greatest in OthSoAsia and significant in OthSSA, India, Indonesia, OthLatAm, and OthSEA. In OthMENA, AusNZL, WEurope and NAmerica agriculture is less significant in terms of total GDP.

Comparing efficiency gains with regional significance of agriculture in GDP, Hertel *et al.* are able to convert efficiency gains into gains in regional income. Figure 12 below compares these regional real income gains for liberalisation if only market price support (MktOnly) is reduced by 40%, and when both market price support and producer subsidies (Mkt & Prod) are reduced 40%.

**Figure 12: Real income gains by region**



Source: Hertel, *et al.* "Agriculture and Non-Agriculture Liberalisation in the Millennium Round." 2000.

OthSoAsia has the largest gain, and OthSEA, Aus/NZL, WEurope, OthLatAm have intermediate gains. India and OthSSA have moderate gains and NAmerica and Indonesia have non-significant gains. OthMENA have intermediate loses.

Hertel *et al.* conclude that because developed countries have the highest rates of protection they attain the majority of the predicted \$70 billion in welfare gains. However, when compared with the percentage the agricultural sector represents in total GDP, some developing countries also gain, while the welfare benefits in developed countries tend to have less significant impacts due to agriculture's lesser significance in total GDP. The result for the ERD/USDA report *Agricultural Policy Reform in the WTO—The Road Ahead*, show similar trends in terms of welfare distribution between developed and developing countries. Table 9 summarises the results for the ERS/USDA study.

**Table 9****-Welfare impacts from elimination of global agricultural tariffs and subsidies**

	Static	Static plus dynamic	
	Resource allocation gains	Investment growth gains	Investment growth plus productivity gains
		<i>US\$ billion</i>	
<b>World</b>	<b>31.1</b>	<b>36.3</b>	<b>56.4</b>
<b>Developed country group</b>	<b>28.5</b>	<b>29.7</b>	<b>35.1</b>
Australia and New Zealand	1.6	3.4	3.5
Canada	0.8	1.2	1.4
EFTA	1.7	0.1	0.2
European Union	9.3	8.2	10.6
Japan and Korea	8.6	5.1	6.2
United States	6.6	11.8	13.3
<b>Emerging and developing country group</b>	<b>2.6</b>	<b>6.5</b>	<b>21.3</b>
China	0.4	1.8	2.23
Latin America	3.7	4.7	6.1
Mexico	-0.2	0.1	1.6
Other Asian countries	1.5	0.3	5.11
Southern African countries	0.3	0.5	0.8
Rest of world	-3.1	-0.4	5.4

Static gains refer to the annual gains due to removing distortions to production and consumption decisions in 1997 \$US billion. Dynamic gains include effects related to cumulative increases in savings, investment, and productivity over a 15-year post-reform period. Dynamic welfare impacts are the annual level about 15 years after reform. China is not assumed to reform its policies because it is not a WTO member.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

In total monetary terms, the EU is expected to have the greatest gains with significant gains for the United States, Japan and Korea also expected. Latin America is also expected to have significant welfare gains, while Australia and New Zealand, and “Other Asian countries” (not including China) are expected to have moderate gains. The terms of trade pattern is also important in understanding the economic impacts of liberalisation and ERS/USDA’s predictions are outlined in Table 10.

**Table 10****Decomposition of terms of trade effects of global agricultural liberalization in the model—  
Percentage change in terms of trade from the base year**

	EXP-1	EXP-2	EXP-3	EXP-4
<b>Developed country group</b>	<b>0.08</b>	<b>-0.02</b>	<b>0.03</b>	<b>0.06</b>
Australia and New Zealand	1.82	1.40	0.37	0.03
Canada	0.35	0.16	0.22	-0.02
EFTA	0.12	-0.27	-0.21	0.56
European Union	0.24	0.02	0.01	0.16
Japan and Korea	-1.36	-0.84	-0.32	-0.14
United States	0.86	0.54	0.29	0.00
<b>Developing country group</b>	<b>-0.15</b>	<b>0.03</b>	<b>-0.07</b>	<b>-0.11</b>
China	0.26	0.36	-0.04	-0.06
Latin American countries	1.41	1.10	0.32	-0.03
Mexico	-0.43	-0.20	-0.15	-0.07
Other Asian countries	0.00	-0.02	0.05	-0.04
Southern African countries	-0.35	0.13	-0.20	-0.22
Rest of the world	-0.98	-0.43	-0.28	-0.23

Experiment 1: Removing all agricultural supports and protections, worldwide  
 Experiment-2: Removing tariffs, worldwide  
 Experiment-3: Removing domestic supports in the developed countries  
 Experiment-4: Removing export subsidies, worldwide  
 Source: Economic Research Service, USDA.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

The trend here is for positive impacts in developed countries and negative in developing countries. Australia/New Zealand and Latin American countries can be expected to gain most in terms of trade.

### 6.3. Crop Specific Economic Analysis

The ERS/USDA study provides commodity price and production predictions, and predict that world wheat prices will rise 18% over the base year. Oil and oilseeds prices are expected to rise 11.2%. For both wheat and oil crops the greatest effect on prices is the elimination of OECD countries' domestic support. Table 11 depicts ERS/USDA's predictions of price changes in percent change from the base year.

**Table 11**

**Effects on world agricultural prices of eliminating all agricultural policy distortions, by commodity and policy**

Commodity	Full policy elimination	Global tariff removal	OECD domestic subsidy removal	Global export subsidy removal
<i>Percent change from base</i>				
Wheat	18.1	3.4	12.0	2.0
Rice	10.1	5.9	2.4	1.5
Other grains	15.2	1.4	12.2	0.6
Vegetables and fruits	8.2	4.9	-0.1	3.0
Oil and oilseeds	11.2	3.1	7.8	0.1
Sugar	16.4	10.9	1.6	3.3
Other crops	5.6	4.2	1.2	0.1
Livestock and products	22.3	12.2	5.5	3.1
Processed foods	7.6	4.8	1.8	1.0

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

Corresponding to reduced trade distortions and higher commodity prices ERS/USDA predicts growing agricultural commodity trade. The volume of wheat traded under the full liberalisation scenario is expected to increase approximately 13%, and this increase is due exclusively to removal of tariffs, as removal of OECD domestic support and worldwide export subsidies is predicted to put some downward pressure on trade volume. For oil crops an 11% increase in trade volumes over the base year is predicted (Table 12).

**Table 12**

**Decomposition of world agricultural trade effects of global agricultural liberalization—Percentage change in world agricultural trade by sector from the base year**

	EXP-1		EXP-2		EXP-3		EXP-4	
	Value	Volume	Value	Volume	Value	Volume	Value	Volume
Wheat	37.64	13.41	17.71	12.62	7.40	-3.56	-0.69	-2.16
Rice	78.12	47.21	76.70	52.72	1.66	-0.69	-0.68	-2.02
Other grains	24.19	3.87	7.24	4.80	9.02	-3.02	0.17	-0.40
Vegetable and fruits	14.15	8.23	15.27	9.60	-0.62	-0.56	-0.37	-0.68
Oil and oilseeds	23.50	11.38	11.66	8.05	11.11	3.45	0.00	-0.05
Sugar	44.43	23.24	43.57	27.72	1.72	0.10	-1.50	-4.12
Other crops	14.08	7.59	13.26	8.25	0.87	0.29	-0.13	-0.20
Livestock and products	61.42	28.96	56.62	35.75	3.76	-1.45	-1.60	-4.35
Processed food	18.27	9.61	18.59	12.80	0.45	-1.25	-0.61	-1.55

Experiment-1: Removing all agricultural supports and protections, worldwide

Experiment-2: Removing only tariffs, worldwide

Experiment-3: Removing only domestic supports in the developed countries

Experiment-4: Removing only export subsidies, worldwide

Source: Economic Research Service, USDA.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

As Table 13 below shows, output of wheat is expected to increase approximately 2% with LDCs showing greater increases in production. For oil crops, production is only expected to increase 0.70%, but production will shift significantly from DCs to LDCs.

In general liberalisation is predicted to cause only marginal production increases for wheat and oil crops.

**Table 13**  
Decomposition of agricultural production effects of global agricultural liberalization in the model—Percentage change in output of selected agricultural goods from the base year

	EXP-1			EXP-2			EXP-3			EXP-4		
	World	DCs	LDCs	World	DCs	LDCs	World	DCs	LDCs	World	DCs	LDCs
Wheat	2.12	1.23	2.70	1.20	5.02	-1.04	-0.04	-5.07	2.92	0.07	-1.03	0.71
Rice	-1.65	-8.42	0.91	-1.18	-6.05	0.59	-0.21	-1.19	0.15	-0.03	-0.34	0.09
Other grains	1.83	1.07	2.48	2.19	4.71	-0.27	-0.49	-3.18	2.13	-0.11	-0.43	0.20
Vegetable and fruits	0.25	0.60	0.10	0.39	0.56	0.28	-0.10	0.04	-0.20	0.02	-0.03	0.06
Oil and oilseeds	0.70	-5.28	4.84	1.04	2.02	0.32	-0.49	-6.99	4.28	-0.03	-0.03	-0.02
Sugar	-1.01	-10.09	3.21	-0.26	-6.18	2.32	-0.64	-2.72	0.27	-0.16	-1.68	0.50
Other crops	-0.28	-2.78	1.47	0.16	-1.37	1.22	-0.44	-1.44	0.27	-0.03	-0.04	-0.02
Livestock and products	-1.04	-2.53	1.38	1.28	1.96	0.17	-1.90	-3.47	0.67	-0.24	-0.61	0.36
Processed food	-0.09	-0.33	0.46	1.00	1.46	-0.02	-0.96	-1.51	0.26	-0.11	-0.23	0.16

Experiment-1: Removing all agricultural supports and protections, worldwide

Experiment-2: Removing tariffs, worldwide

Experiment-3: Removing domestic supports in the developed countries

Experiment-4: Removing export subsidies, worldwide

Source: Economic Research Service, USDA.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

## 6.4. Food Security Analysis

The ERS/USDA report also examines the effects of trade liberalisation on the 67 least developed countries. Egypt, India, Indonesia, and Senegal are included in the analysis, while net exporting Argentina is not. The first scenario of the Food Security Assessment (FAS) model used in the report looks at the effects on food security of an average global price increase of 12% on agricultural commodities. The results are slightly increasing food gaps in North Africa, no change in Asia, and slightly decreasing food gaps in Sub-Saharan Africa. The second scenario models a 30% increase in agricultural exports in nominal terms over a 10-year period. Again similar patterns pertain with slight decreases in food gaps (Table 14). These results are attributed to weak price responsiveness due to low investment in the agriculture sector of LDCs and low productivity in LDCs, a declining share of agriculture as a percent of GDP or worsening terms of trade, and that fact that food imports often account for a small share of food availability in LDCs. The report notes that domestic production accounts for 90% of food availability in LDCs.<sup>54</sup>

<sup>54</sup> ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

**Table 14: Summary of food gaps in 67 low-income countries under different modelling scenarios (million tons)**

Region	Baseline	Scenario 1	Scenario 2
North Africa			
Production	32.01	32.35	32.33
Commercial imports	24.04	23.10	23.30
Status quo food gap	0.72	1.12	1.03
Nutritional food gap	0.91	1.31	1.22
Sub-Saharan Africa			
Production	145.51	148.15	148.06
Commercial imports	12.06	11.63	12.49
Status quo food gap	8.30	7.79	7.38
Nutritional food gap	16.57	15.63	15.07
Asia			
Production	405.69	409.24	409.21
Commercial imports	22.70	21.05	21.56
Status quo food gap	3.22	3.16	3.14
Nutritional food gap	3.45	3.44	3.42
Latin America			
Production	16.19	16.61	16.53
Commercial imports	16.17	15.39	16.85
Status quo food gap	0.47	0.51	0.44
Nutritional food gap	0.89	0.91	0.82
NIS			
Production	5.96	6.04	6.03
Commercial imports	1.93	1.82	1.87
Status quo food gap	0.02	0.05	0.00
Nutritional food gap	0.07	0.10	0.00
Total, 67 countries			
Production	605.36	612.39	612.16
Commercial imports	76.89	72.99	76.07
Status quo food gap	12.73	12.63	11.99
Nutritional food gap	21.89	21.39	20.53

<sup>1</sup> This scenario considers only the price effects of agricultural trade liberalization.

<sup>2</sup> In addition to the price effects in the first scenario, this scenario also considers changes in exchange earnings.

Source: ERS/USDA *Agricultural Policy Reform in the WTO—The Road Ahead*, May 2001

The main conclusion from the analysis is that liberalisation of the agriculture sector will not significantly improve food security and will have varying effects on developing countries. According to USDA's *Food Security Assessment: Situation and Outlook Report, 2000* India and Indonesia show increasing food availability and no food gaps. Egypt also shows no food gaps, but liberalisation will negatively affect Egypt, as Egypt will continue to be a net wheat importer. In Senegal food gaps exist for all but the wealthiest segments of the population and are expected to increase as production increases and import increases will be outstripped by population growth.<sup>55</sup> It should however be remembered that USDA food gap assessments provide average estimates of food availability. As a result food insecurity problems in segments of the society are not identified. India, for example, is characterised by wide disparity in wealth between urban and rural areas and between different rural areas, and 21 % of the population is classed as undernourished by the UNDP.<sup>56</sup>

<sup>55</sup> ERS/USDA *Food Security Assessment: Situation and Outlook Report*, Washington DC: ERS/USDA, December 2000

<sup>56</sup> UNDP *Human Development Report 2001*. New York: Oxford University Press 2001.

## **PART II**

## 7. Introduction to Part II

Part II of the mid-term report provides a full analysis of each of the country case studies selected by the Commission for this SIA study. For each country case study the mid-term report establishes the trade and sustainability conditions relevant to the agricultural sector in general and the food crop sub-sectors selected for this study. The case studies characterise the full range of country specific sustainability issues that are relevant to the agricultural sector. The purpose of these country case study analyses is to first provide an overview of key trade and sustainability conditions in each country. These overviews can then fill the following SIAs with factual contents that inform the assessment. Any SIA methodology must first identify and characterize key sustainability issues prior to an examination of trade specific impacts on a country's sustainability in the sector in order to be effective and well supported by evidence. Note that our SIAs for each country incorporate the conceptual framework developed for this study in the presentation of results.

It is important to note that the SIA methodology developed for the commission identifies nine broad sustainability issues that are to be addressed in SIAs. Each of these sustainability issues will be relevant to all or most of the country case studies chosen by the Commission to some degree. However, sustainability and trade in the agricultural sector is an extremely complex issue with a wide range of factors to consider. This current SIA study has a very broad scope (eight country cases), and addresses a wide range of both global and country specific issues. As well, a sectoral analysis is more context and data driven than the highly aggregated SIAs that have been performed for the Commission earlier. Thus, with very little time dedicated to this current sectoral SIA study, it is not possible to do an in-depth analysis of all possible sustainability impacts in each country setting, while both modifying and applying SIA methodology and assessing liberalisation of the agricultural sector on a global scale. In order to meet the objectives of this study a limited number of key sustainability issues are identified in each case, while it should be remembered that other sustainability issues are likely relevant as well. The case studies taken as a whole will then address the broader range of sustainability issues identified in the SIA methodology.

Also note that no case study has been provided for Malaysia. Although the Malaysian case demonstrates very similar sustainability issues to the Indonesian case, the Consultant deemed their current available sources for Malaysia insufficient.

## 8. Senegal Case Study Analysis

### 8.1. Significance of the Senegal case study

Senegal is selected as a case study to represent least developed and net food importing developing countries. Senegal's dependence on cereal imports, problems with food security and development makes it a good representative case study for this SIA study. The Senegal case will point to key impacts with regards to the world's poorest nations that are dependent on world markets for both food and commodity based export earnings.

### 8.2. Introduction

Senegal, a medium sized country (196,700 square kilometres) located at the westernmost point of the African continent and in the Sahel region, is characterised by a low and flat landscape and an arid climate. The natural landscape, consisting of open deciduous forest, savannah and steppe, has naturally a rather low productivity.<sup>57</sup> The population of 9.5 million people is concentrated in the less arid western part of the country, especially in the central groundnut basin and parts of Casamance.<sup>58</sup>

Looking at some basic statistics for Senegal (see Table 15) suggests that the economy is relatively weak, with negative growth per capita in the long run and a low availability of credit. Regarding social conditions, education and health is poor and urbanisation is significant. Deforestation does not appear to be a major problem but water pollution is relatively serious.

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<sup>57</sup> World Bank. *Senegal Country Environmental Strategy Paper, June 30 1994*. World Bank, 1994

<sup>58</sup> World Bank (1994) and Instituto del Tercer Mundo (ITeM). *The World Guide 1999/2000*. Oxford: New Internationalist Publications, 1999

**Table 15: Economic, social and environmental indicators**

Indicator	Senegal	Sub-Saharan Africa
Population 1999, million	9	643
Population density 1999, people per sq. km	48	27
Population growth, annual average 1965-99	2.8%	2.7%
GNI per capita 1999	\$500 (rank 156)	\$490
GDP per capita, average annual growth 1965-99	-0.4%	-0.2%
Gross fixed capital formation, average annual growth 1965-99	3.3%	0.1%
Exports of goods and services, average annual growth 1965-99	1.6%	2.4%
Trade (% of GDP) 1999	72% (56% in 1970)	60% (47% in 1970)
Net barter terms of trade (1995=100) 1998	108	...
Food imports (% of total merchandise imports) 1999	29%	11%
Present value of debt (% of exports of goods and services) 1999	169%	...
Domestic credit to private sector (% of GDP) 1999	16.4%	66.2%
Unemployment 1996-98	...	...
Income distribution - Gini index	41.3 (1995)	...
Urban population of total 1999	47% (33% in 1970)	34% (19% in 1970)
Prevalence of child malnutrition 1993-99	22%	...
Infant mortality rate 1999	67 per 1,000 live births	92 per 1,000 live births
Life expectancy at birth 1999, years	52	47
Access to an improved water source 2000	78%	55%
Net primary enrolment ratio 1997	65% male, 55% female	..., ...
Female labor force of total 1999	42.6%	42.2%
Children 10-14 years in the labor force (% of age group) 1999	28% (43% in 1980)	29% (35% in 1970)
Public expenditure on health (% of GDP)	2.6% (1998)	1.8%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	450	52,963
Nationally protected areas (% of total land area) 1999	11.3%	10.8%
Emissions of organic water pollutants (kg per day per worker) 1998	0.31	...
Carbon dioxide emissions (per capita metric tons) 1997	0.4	0.8
Genuine domestic savings (% of GDP) 1999	7.8%	3.9%

Source: World Bank (2001) *World Development Indicators 2001*.

### 8.3. Trade Conditions

Senegal is a net food importing developing country (NFIDC) and on the United Nations list of least developed countries (LDC). Senegal's largest food imports consist of rice (622 000 metric tonnes in 1999) and wheat (246 000 metric tonnes). Total cereal production in Senegal was 883 000 metric tonnes in 1999.<sup>59</sup> Food imports have been rising steadily in Senegal over the past 15 years. Total food imports were US\$199 million in 1985 and the average value from 1995-1998 rose to US \$419 million. Average net food imports from 1995-1998 were US \$365million and 57 percent higher than in 1990-94.<sup>60</sup> Average net wheat imports from 1995-2000 were US \$46 million per year?<sup>61</sup> Senegal receives the bulk of its wheat imports from the EU.<sup>62</sup>

Groundnuts and groundnut products are the second largest agricultural export commodity in Senegal, after fish. In 1960 groundnut's share of GDP was approximately 7% and accounted for 80% of exports, while today the sub-sector accounts for 2% of GDP and 8.9% of exports. Despite the declining significance of groundnuts in GDP, the sub-sector is very significant in the agricultural sector, which employs 70% of the population and 86% of women workers. Between 1985 and 1998

<sup>59</sup> Millet production was 506 000 metric tonnes and rice production was 160 000 metric tonnes in 1999.

<sup>60</sup> FAO. *Agriculture, trade and food security issues and options in the WTO negotiations from the perspectives of developing, Volume II: Country case studies*. FAO, 2000

<sup>61</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

<sup>62</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

groundnuts accounted for 63% of agricultural exports, and 75% of groundnut exports were in the form of groundnut oil.<sup>63</sup>

Senegal produced 580,000 metric tonnes of groundnuts (Shld Eq.) and 106,411 metric tonnes of groundnut oil, in 1999. EU countries represent the largest importers of Senegalese groundnut products. The IMF estimates that the world demand for groundnut oil is 300 000 tons<sup>64</sup> and that this demand appears to be inelastic to price changes above the world prices for other vegetable oils. They state that the inelasticity is due to groundnut oil now being largely a luxury/speciality product that sold at US\$ 900 per ton in 1998 and US\$ 684 per ton in June of 2001, which is much higher than the US\$ 300-400 per metric ton price for other vegetable oils (e.g. soybean oil and palm oil). They note that above the average world prices price for vegetable oils the groundnut sector “remains segmented for the market for other vegetable oils.”<sup>65</sup>

### 8.3.1. Market Access

Senegal’s applied rates of tariffs in the agricultural sector tend to be somewhat lower than their bound rates. As a result the URAA does not seem to significantly limit border control options for Senegal.

#### WTO bound tariffs and applied rates for selected agricultural products, 1995-97 (annual average, percent)

{PRIVATE} Category	Product	Bound rate		Applied rate		
		Bound rate of duty	Other duties or charges	Tariff rate	Surtax	Total
Cereals	Wheat Millet, sorghum, corn,	30	150	20.5		20.5
Oils & fats		30	150			27

Source: WTO Schedule and Statistiques douanières, Direction Générale des Douanes Sénégalaises.

Senegal opted for ceiling binding in the UR and is thus not eligible to use the special safeguard (SSG) provision of the URAA.

Other trade agreements and the structural adjustment programs undertaken by Senegal have had a greater effect on trade openness. Senegal is a member of the West African Economic and Monetary Union (UEMOA), which implemented a Common External Tariff (CET) structure. Under this agreement most agricultural products have a maximum tariff of either 10% or 20%.<sup>66</sup> This regional trade agreement is thus much more strict than Senegal’s commitments under the URAA.

### 8.3.2. Domestic support

Despite a lack of notification documentation from Senegal to the WTO, the FAO notes that Senegal has since 1995 mostly eliminated support to the agricultural sector.

<sup>63</sup> FAO, 2000

<sup>64</sup> Imperial tons

<sup>65</sup> IMF, *Senegal: Selected Issues*. IMF Country Report No. 01/188. Washington D.C.: IMF, 2001

<sup>66</sup> FAO, 2000.

Some examples noted are the removal of the fertilizer subsidy, privatisation of the fertilizer market, privatisation moves in the peanut sector and in agricultural credit.<sup>67</sup>

### **8.3.3. Export Subsidies**

Like many LDCs, Senegal has not historically provided export subsidies but instead has tended to tax exports. Agricultural export taxes were abolished in 1984, and prior to the UR the few existing export subsidies were removed.<sup>68</sup>

## **8.4. Sustainability Conditions**

### **8.4.1. Economic Considerations**

In 1999 Senegal's GNI per capita rank was 156<sup>th</sup>, accordingly Senegal is amongst the world's poorest countries.<sup>69</sup> The poverty in combination with the fragile, Sahelian environment makes agriculture a critical sector for overall sustainability. However, the situation is complex and reliable and up-to-date time trend data are missing, making it difficult to accurately describe the baseline sustainability conditions.

Senegal is a net cereals importer, and in 1999 imports were larger than the domestic cereal production (which consists mainly of millet and to a lesser extent rice and sorghum). Thus, Senegal is sensitive to developments in the world wheat market.<sup>70</sup> Concerning oil crops, Senegal is a big groundnut producer (580,000 metric tonnes in 1999). The bulk of the production goes to further processing and there are several segments in this industry. Thus, potential trade impacts and altered incentives may differ along the production chain.<sup>71</sup>

In 2000 the agricultural sector made up 18.2% of GDP, which is dominated by the service sector (54.9%) (Table 16). However, the agriculture sector is the most important employer. In 1980, 90% of the female labour force and 74% of the male labour force were engaged in this sector.<sup>72</sup> Family income from agriculture is low, only 3.2% according to Ly et al (1998), and this is the case even for families in rural areas. These statistics thus suggest that a majority of the population is involved in agriculture to satisfy family food needs.<sup>73</sup>

Basic statistics show that growth in the agricultural sector has slowed in the last decade and that production per capita is low. At the same time employment in the sector is high. Fertilizer use is very low even relative to regional levels.

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<sup>67</sup> FAO, 2000.

<sup>68</sup> FAO, 2000.

<sup>69</sup> World Bank. *World Development Indicators 2001*. World Bank, 2001a

<sup>70</sup> FAO, *FAOSTAT Database Food Balance Sheet 1999*. Accessed November, 2001.

<sup>71</sup> FAO. *Database Food Balance Sheet 1999*.

<sup>72</sup> World Bank, 2001a.

<sup>73</sup> Ly, M.E.H., L. Kane, A. *2020 vision network for West Africa: Country Note for Senegal*. Accra: International Food Policy Research Institute, 1998

**Table 16: Basic facts about the agriculture sector**

Indicator	Senegal	Sub-Saharan Africa
Land use (% of total land area) 1998	Arable 11.6%, Permanent cropland 0.2%, Other 88.2%	Arable 5.2%, Permanent cropland 0.7%, Other 93.9%
Arable land, hectares per capita 1996-98	0.25	0.20
Agriculture average annual growth 1990-99	1.4% (2.8% in 1980-90)	2.6% (5.6% in 1980-90)
Index of agricultural production per capita (1989-91=100) 1996-98	85 (107 in 1986-88)	...
Agriculture value added (% of GDP) 1999	18% (24% in 1970)	14% (15% in 1970)
Producer price on wheat (\$ per metric ton) 1998	...	...
Employment in agriculture (% of total labor force) 1998	... (81% in 1980)	... (42% in 1980)
Female labor force in agriculture of total female labor force 1996-98	... (90% in 1980)	... (46% in 1980)
Irrigated land (% of cropland) 1996-98	3.1%	36.2%
Average annual fertilizer use (kg per hectare cropland) 1995-97	12	59
Pesticide use (kg per hectare cropland) 1996	183	...
Tractors per 1,000 agricultural workers 1996-98	2	24
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	92%	89%

Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

Food produced for domestic needs is insufficient, as the country is a net food importer. The resulting pressure on the agriculture sector is therefore significant. According to Ly *et al.* (1998) the agricultural sector faces several constraints in its development, such as soil degradation, climatic risks, political and institutional barriers, poor access to basic services (credits, technologies, agricultural inputs and water) and markets, and imbalances in investments in agriculture.

The pressure on the agriculture sector caused by the chronic food deficit combined with an average annual population growth rate of 2.7% in 1994-2000 has been seen as leading to a potential environmental crisis.<sup>74</sup> While cereals make up the bulk of the agricultural production, there has been a rapid expansion in groundnut farming. The environmental stress arising from cultivating this type of crop is far more serious than desertification, which has previously been on the agenda, according to the World Bank (1994:1). The cereal deficit will be difficult to eliminate even if maximum expansion of the agricultural domain takes place, production is intensified, and cash crops are replaced with food crops.

The policy response to the problems with food security and agricultural production has included strategies for poverty reduction, sector investment and income generation for vulnerable groups in the Ninth Economic and Social Plan (1996-2001). The agricultural sector is a priority in this programme, with strengthened capacity among local communities and farming organisations as an important objective. Research and extension services are seen as necessary means to diversify the local production and make it more competitive. Furthermore, recognition that animal and forestry production is important in ensuring food security along with traditional plant production is needed.<sup>75</sup>

<sup>74</sup> World Bank (1994) and Ministry of Agriculture, Republic of Senegal. *Agricultural export promotion project: environmental assessment*. September 1997.

<sup>75</sup> Ly *et al.*, 1998.

A market reform programme was initiated in 1985 by the government. However, since the state-owned groundnut processing mills have been protected from this programme, only partial liberalisation has occurred. The outcome is that there are now two market systems, one for unshelled groundnuts that is officially controlled and one for shelled groundnuts that is controlled by private traders. Thus, the price structure is not uniform and it is seasonally variable.<sup>76</sup>

In January 1994 there was a devaluation of Senegal's currency (CFA franc), with the hopes to increase farm incomes by increasing producer prices of export crops, primarily peanuts and cotton. Diagana and Kelly (1996) modelled the effects of this devaluation and found that the profitability of peanuts did increase and that incentives to switch crops to peanuts increased<sup>77</sup>. However, the protection of soil fertility in the long run did not become the most optimal option for farmers. Rather, the response was to not introduce fertiliser use and instead use higher-than-recommended seeding rates. Analysis has shown that in the short-term unsustainable soil-mining practices related to peanut farming are considered to be the best option for farmers in the sub-sector. With hindsight it is also clear that the devaluation did not cause an increase in exports as expected.<sup>78</sup> It has been suggested that one reason for this result is that price changes are poorly transmitted between central and regional markets in rural Africa.<sup>79</sup> Therefore, an optimal response to a changed incentives structure cannot be assumed.

Groundnut products have been considered the “engine of the economy”, but this sector has been burdened with difficulties since the 1970s. Declining demand coupled with reforms such as privatisation and elimination of import bans on groundnut oil has led to production levels well below capacity and at high cost. Furthermore, yields have fallen due to low-quality seeds, climate, decreasing soil fertility and unattractive producer prices. The increase in output between 1995-98 was mainly due to extensification instead.<sup>80</sup>

#### **8.4.2. Social Considerations**

Economic conditions point to the key social impact of food insecurity in Senegal. The ERS/USDA assessment of food gaps in Senegal states,

Production and import growth will be outstripped by population growth that is projected at 2.5 percent per year through the next decade. As a result, per capita consumption will fall 1.5 percent per year, and consumption in only the top income group will exceed minimum nutritional requirements in 2010.<sup>81</sup>

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<sup>76</sup> Badiane, O. “Marketing Policy Reform and Competitiveness: Why Integration and Arbitrage Costs Matter”. *MSSD Discussion Paper no. 22*. Washington DC: International Food Policy Research Institute, 1998

<sup>77</sup> Diagana, B. and V. Kelly “Will the CFA franc devaluation enhance sustainable agricultural intensification in the Senegalese peanut basin?” *Policy Synthesis for USAID*, Bureau for Africa, February 1996

<sup>78</sup> FAO. *Agriculture, trade and food security issues and options in the WTO negotiations from the perspectives of developing, Volume II: Country case studies*. FAO, 2000

<sup>79</sup> Badiane, 1998.

<sup>80</sup> FAO, 2000.

<sup>81</sup> ERS/USDA *Food Security Assessment: Situation and Outlook Report*, Washington DC: ERS/USDA, December 2000.

With pressures on the agriculture sector, there have also arisen conflicts over land use. Although the rate of deforestation seems negligible (see Table 15), World Bank field observations confirm that expansion of the agricultural land has encroached on pastures and forests.<sup>82</sup> However, this expansion has occurred unevenly, since there are relatively large areas of potentially suitable agricultural lands in some parts. The World Bank suggests a number of reasons why this expansion has not occurred: rural exodus, a shift from cash crops to food crops, and unavailability of water has limited settlement. Another explanation concerns the tenurial arrangements, which acted to disfavour outsiders and population movements.<sup>83</sup> However, the main reason behind these trends is urbanization (3.8% per year), which also contributes to an increased demand for food and fiber.<sup>84</sup> The encroachment of agricultural land into communal pasturelands also has a political dimension, since pastoralists have generally wielded little political power.<sup>85</sup>

Conflicts also arise within the agricultural group. While agricultural expansion has been contained outside of the groundnut basin, the internal pressure in this basin is increasing due to the population concentration and the degrading soil and water. Furthermore, the World Bank predicts that despite the urbanisation trend, the rural population will increase by nearly 75% over the next 25 years and that this will induce more agricultural expansion.<sup>86</sup>

Data on social issues such as gender equality and education, particularly in relation to the agricultural sector, is more difficult to find. It is however clear that women carry a heavy burden in the agricultural sector; it is the main source of employment for women (see Table 16), women constitute 75% of the rural population and the average working day for these women is 12 to 15 hours.<sup>87</sup> Thus, changes in the agricultural production system induced by trade reforms are likely to affect women more than men. Furthermore, the access for women to land and agricultural services is restricted, and the only credit available is from saving schemes created by women themselves.<sup>88</sup> However, a significant body of government policy is directed towards improving the situation for women.<sup>89</sup>

Regarding education, as many as 91.3% of Senegalese farmers have below the primary level of education, explaining the concern that this may have implications in terms of inappropriate farming methods.<sup>90</sup>

Lastly, there are several ethnic groups in Senegal. According to Galvan, the withdrawal of the state from the agricultural market as a result of structural adjustment programmes has revived long institutionalised, ethnically embedded

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<sup>82</sup> World Bank, 1994.

<sup>83</sup> Labonne 1991, in World Bank, 1994.

<sup>84</sup> Diagona and Kelly, 1996.

<sup>85</sup> World Bank, 1994.

<sup>86</sup> World Bank, 1994.

<sup>87</sup> Ndiaye, O.K. *Gender and Participation in Agricultural Development Planning: Lessons from Senegal*. 1997. Downloaded January 23, 2002 from <http://www.fao.org/Gender/Static/CaseSt/Sen/sentoc-e.htm>.

<sup>88</sup> Ly *et al.*, 1998

<sup>89</sup> Ndiaye, 1997.

<sup>90</sup> Ly *et al.*, 1998.

division of labour, rather than led to efficient, productivity-enhancing market institutions. This may foster ethnic resentment and violence.<sup>91</sup>

#### **8.4.3. Environmental Considerations**

The dilemma between food security and other sustainability concerns is illustrated in the environmental assessment of an agricultural export promotion project in Senegal.<sup>92</sup> The negative environmental impacts are described as serious, including loss of vegetation cover, soil degradation, water contamination and habitat destruction. However, the potential positive impacts such as increased employment in rural areas and a better quality of life also contribute to the overall sustainability conditions.

The most important negative environmental impacts from agriculture, and especially groundnut farming which is seen as a particularly unsustainable as currently practiced, are soil degradation and water pollution. These impacts are especially important because they affect the long-term productivity of the land and the possibilities for reducing the food deficit. As mentioned above, soil mining is sometimes the most optimal solution for the farmer under current economic conditions. Soil salinization, due to inadequate drainage of irrigated perimeters, has also been identified by the World Bank as an important impact in Senegal. As for water resources, although Senegal sits on relatively large reserves of groundwater, the distribution does not match the need. Therefore, the issue of water quantity has arisen in some areas. Also water quality is a problem in some areas, with saline intrusions in the coastal areas and pollution from chemical products, particularly pesticides.<sup>93</sup>

In Senegal, many of the most serious environmental problems are related to agriculture. However, as a consequence of the sustained migration from rural to urban areas some observers expect that urban, or “brown”, environmental problems will become more significant in the future.<sup>94</sup>

#### **8.5. Key sustainability issues**

Based on the description of sustainability conditions above the following key sustainability issues are highlighted for assessment in our application of SIA methodology:

- Economic performance of the groundnut sector
- Poverty and rural livelihoods
- Food security (relating to wheat imports and cultivation of groundnut as a cash crop)
- Gender issues in agriculture
- Soil fertility, water pollution, and salinization

These sustainability issues are selected in response to the economic, social and environmental consideration captured in the SIA framework already developed for the

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<sup>91</sup> Galvan, D. “Market Liberalization as a Catalyst for Ethnic Conflict in Senegal and Central Java, Indonesia”. Paper presented at the 97<sup>th</sup> Annual Meeting of the American Political Science Association, San Francisco, September 2001.

<sup>92</sup> Ministry of Agriculture, 1997.

<sup>93</sup> World Bank, 1994.

<sup>94</sup> World Bank, 1994.

Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for Senegal is based on national government reviews, academic analysis, donor reviews, FAO studies, other International Organization (IO) reviews (e.g. FAPRI, UN, etc...), and NGO assessments.

## **8.6. Senegal Sustainability Impact Assessment**

Following through the conceptual framework established in the methodological development for this sectoral SIA study, each scenario is assessed based on the general SIA methodology already developed for the Commission.

### **8.6.1. Structure of economic incentives and opportunities**

#### ***Baseline scenario***

DG Agriculture's report provides projections for the oil crops sub-sector but does not give specific projections for groundnuts. However, a key report used for DG Agriculture's projections, FAPRI's *U.S. and World Agricultural Outlook 2001*, does provide production and trade volume projections. Unlike all other oil crops presented in the FAPRI report, no price projections are provided for world peanut trade. The FAPRI report projects that significant yield improvements in China result in a 22% increase in Chinese peanut production. At the same time, the report indicates over a three-fold increase in peanut oil imports over the coming decade mostly from increases in Chinese demand, which surpasses the EU as the largest peanut oil importer. EU imports are not projected to increase significantly.<sup>95</sup> Senegal's most significant groundnut related export is peanut oil, and export destinations have traditionally been EU countries. FAPRI's report indicates that China in the coming decade will be largest peanut oil importer, but it is not clear which countries will tend to meet China groundnut oil demand increase.<sup>96</sup> It is also not clear what the price effects of China's increased peanut oil import demands will be from the studies identified in this report. The FAPRI predictions are thus inconclusive for Senegal, and for this reason we cautiously predict only a modest recovery in the peanut oil sector, which corresponds to the overall predictions for oil crops noted in this study's analysis of baseline conditions for the edible oil crops sector.

A more positive recovery is predicted for the wheat sub-sector. As Senegal is a wheat importer and not a wheat producer, the significance of recovery in the wheat sub-sector is directly associated with rises in food import bills. In a historical context the price increases are not significant, and represent instead a reversal of the recent downward trends in world market wheat prices, stabilization and gradual price increases.

#### ***Liberalisation scenario***

Analysis of economic modelling has demonstrated that under a liberalisation scenario we can expect a relatively significant increase in wheat prices and moderate increases in oil crops prices. As a result, the terms of trade impact is negative for Senegal based on liberalisation in these two products. Prices can be expected to rise in the oil crops sector supporting growth, but the rise in food import costs will be more significant

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<sup>95</sup> FAPRI in their report *U.S. and World Agricultural Outlook 2001*

<sup>96</sup> FAPRI projections can be interpreted as suggesting that increased peanut oil import demand will be met by the "Rest of the World" category and not by the leading peanut exporters China, US and India.

and the impacts more pronounced. As this study only examines the wheat and oil crops sub-sectors it is not able to indicate how liberalisation will impact the economy in general, or even how the overall agricultural sector overall will be impacted. In the case of Senegal we see that rice is the main cereal import and that there is also domestic production of rice. A full assessment of food security impacts on Senegal would thus require an inclusion of the rice sub-sector in the assessment. The Senegal case shows one of the difficulties in attempting global SIAs based on specific commodity sub-sectors. An alternative approach in the future could be to select various representative countries and do full SIAs that look at liberalisation impacts in an entire sector or all sectors in a small set of representative case studies.

It is important to note that Senegal specialises in groundnut oil exports. In IMF assessments it is indicated that groundnut oil is a luxury/specialised product, and that above world prices for other vegetable oils (e.g. soybean oil and palm oil) the demand is inelastic. It is not clear that a moderate price increase in vegetable oils would be sufficient enough to bring groundnut oil prices inline with other vegetable oil prices. As a result, the price impact of liberalisation of oil crops is somewhat ambiguous, as a positive price impact for groundnuts specifically is not clearly supported by evidence that suggests that demand in the groundnut sector is inelastic above world prices for other vegetable oils. At the same time however, FAPRI analysis suggests that there will be significant increases in global demand for peanut oil, due to changes in China's import demands. These assessments of the sub-sector appear contradictory, and indicate a high degree of complexity in analysing impacts in this country specific cases based on aggregated modelling results.

A final consideration in relation to Senegal's groundnut sector has been its weak production responses to price changes after devaluation<sup>97</sup> indicating that optimal response to a changed in incentives structure cannot be assumed in the Senegal case.

### ***Intermediate scenario***

Similar but less significant results pertain in the intermediate scenario. As has been noted Senegal does not currently provide any significant payments that could be reduced in a liberalisation scenario but allowed in the intermediate scenario. As well, given Senegal's economic standing it is not reasonable to expect future large budgetary outlays in the sector. As a result the economic incentive characteristics of the intermediate scenario are only different in magnitude.

## **8.6.2. Production System Characteristics**

### ***Baseline scenario***

With only modest impacts on oil crop prices predicted and due to the analysis by the IMF that suggests that groundnut oil is a luxury/specialty product with little elasticity above world market prices for other vegetable oils, no significant impact/change can be predicted for the production system in the groundnut sector. However, given the significant population increases noted in the assessment of Senegal's sustainability conditions above, both increasing wheat demand and food import costs can be expected. Overall it appears that the projected recovery of the wheat sub-sector will have a more significant impact than that of the groundnut sector.

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<sup>97</sup> Badiane, 1998.

### ***Liberalisation scenario***

Senegal has no measured wheat production, so no direct production changes are predicted. Instead a significant rise in food import costs is expected. World edible oil crop prices are expected to rise moderately, and we can make a cautious prediction of expanded production due to improving incentives. Given the current domestic policy environment in Senegal noted in the case study background above, it can be expected that increased production in the groundnut sector would be due to area expansion and soil mining and not to significant yield increases. As has been noted, the low level of agricultural inputs is not associated with trade barriers on inputs. Instead it is liberalisation measures in the agricultural sector that have been associated with lower input use. A USAID report notes that,

The elimination of credit and fertilizer subsidies and a switch from government to private-sector distribution (reducing the area served) reduced fertilizer use in the study countries. In Senegal, fertilizer use on peanuts went from 38,000 t in 1976 to 3,000 t in 1988. Overall consumption of fertilizer went from 75,000 tons in 1980/81 (roughly its average in the 1970s) to 27,100 tons in 1985/86, 19,900 in 1986/87, and 22,400 in 1987/88.<sup>98</sup> Groundnut production is overwhelmingly the most significant crop in terms of land use and only 3% of this crop area is fertilized according to the FAO.<sup>99</sup>

### ***Intermediate scenario***

In the Intermediate scenario increased groundnut production by means of expansion and soil mining can be expected, but to a lesser extent than in the liberalisation. As has been noted no major changes in the production system can be expected from reductions in domestic support and export subsidies, as Senegal does not employ these measures. As a result there is no difference between the liberalisation scenario and intermediate scenario in terms of these types of production incentives. However, Senegal may benefit from global reductions of tariffs in the intermediate scenario without having to significantly alter its current applied tariff rates, which are considerably lower than its bound rates. At the same time tariffication may have a negative impact. A FAO study on Senegal notes,

Given the high dependency on food imports and the large fluctuations in domestic food production, safeguarding domestic food markets from fluctuations in world prices is considered crucial. A tariff only regime...may not be sufficient to achieve the desired stability in food prices.<sup>100</sup>

Importantly then, the intermediate scenario may correspond to needs for Senegal to possibly provide strategic protection of its domestic markets for food security purposes and to support to the groundnut sector by, for example, promoting fertilizer use to ensure both a more productive and sustainable production system.<sup>101</sup>

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<sup>98</sup> Thomas Reardon, Valerie Kelly, Eric Crawford, Thomas Jayne, Kimseyinga Savadogo, and Daniel Clay. "Determinants Of Farm Productivity In Africa: A Synthesis Of Four Case Studies" *Policy Synthesis for Cooperating USAID Offices and Country Mission*. Number 22. Washington DC: U.S. Agency for International Development, 1996.

<sup>99</sup> FAO *Fertilizer use by crop, 4<sup>th</sup> Edition*. Rome: FAO, 1999.

<sup>100</sup> FAO, 2000

<sup>101</sup> FAO, 2000.

Differential treatment for developing countries to support development and food security concerns figure highly in Senegal's positions submitted to the WTO on agricultural trade negotiations.<sup>102</sup>

Again the negative economic and social impacts of rising wheat prices are expected to be more significant than the positive impacts of rising edible oil crop prices. Like in the liberalisation scenario there is no evidence that WTO liberalisation will have direct positive impacts on the environmental aspects of the production system in the groundnuts sector. However, there may be expanded opportunity for Senegal to address some of sustainability concerns in the sector under an intermediate scenario.

### **8.6.3. Impacts on sustainability aspects**

#### ***Baseline scenario***

Given the assessment above a slightly negative economic impact is predicted due to increasing import costs that are not fully compensated by increased export revenue in the groundnut sector. Correspondingly, in terms of social circumstances, the impacts of modestly higher wheat prices indicate a slight negative impact on food security. Negative food security impacts tend to affect those at the lowest strata of society and in Senegal rural poor will be impacted by food security changes most. As has been shown, 86% of female employment is in the agricultural sector and women account for 75% the rural population. Food security impacts will thus be expected to affect women disproportionately.

As no significant agricultural production changes are predicted for the groundnut sector and wheat is not a significant crop in Senegal, no direct environmental impacts on current environmental trajectories are predicted.

#### ***Liberalisation scenario***

Like in the base scenario, it can be expected that rising global wheat prices will result in negative terms of trade impacts, and food security impacts. These impacts will be much more pronounced in the full liberalisation scenario as an 18% rise in world market wheat prices is expected.<sup>103</sup> As a net food importing and least developed country, a prediction of deteriorating food security is significant and requires special attention from policy makers. The sustainability assessment for Senegal shows that the food security trajectory is today negative, and liberalisation in the wheat sector will intensify this negative trajectory.

The negative food security impacts will be mitigated to some degree by projections of rising world prices and demand for oil crops. As has been noted, the negative impacts of increasing world wheat prices and increasing food demand in Senegal are expected

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USAID, 1996

Diagana Bocar N., Kelly Valerie A., Crawford Eric W., "Dynamic Analysis of Soil Fertility Improvement: A Bioeconomic Model for Senegal" *Policy Synthesis for Cooperating USAID Offices and Country Mission*. Number 58. Washington D.C.: USAID, 2001

IMF, 2001

<sup>102</sup> Government of Senegal "Agricultural Trade Negotiations in the WTO – Preliminary Positions of Senegal" World Trade Organization, 19 March 2001.

<sup>103</sup> ERS/USDA, May 2001.

to be more significant than the benefits associated with increased groundnut prices. In addition, the Senegal case study has shown that some structural problems, especially domestic problems, in the groundnut sector have tended to limit growth in the sub-sector despite liberalisation efforts.

Current production systems in the groundnut sector are considered environmentally degrading and unsustainable. As was noted above, there is no indication that further reductions on tariffs, domestic support and export subsidies, as part of a WTO based liberalisation will impact on the current structure of the production system.

Negative impacts are predicted for the economic and social sustainability aspects due to rising wheat prices and food security impacts. Negative environmental impacts are predicted due to predictions of expansion of unsustainable agricultural practices in the groundnut sector.

### ***Intermediate scenario***

Like in the liberalisation scenario, negative economic and food security impacts can be expected to be more significant than positive economic and social impacts in the groundnut sector. Similarly there is no direct effect expected on the sustainability characteristics of production systems, and a negative environmental impact can be expected from groundnut production expansion in response to world price incentives. These challenges faced by Senegal may be better addressed in an intermediate scenario, but this depends heavily on the actual implementation of flanking measures. Without additional policy measures the intermediate scenario represents only a less negative impact than the full liberalisation scenario.

## SIA matrix of results

In Senegal we see negative economic and social impacts due to increasing wheat import bills. Food security problems for vulnerable groups, such as rural women in the agricultural sector, stand out most prominently as negative social impacts. Small-scale farmers are potentially impacted on several fronts including increased competition from international markets, an inability to adequately improve productivity in an increasingly competitive domestic market, and commodity price/food security impacts. As rice is not included in the scenarios the food security impacts are not as strongly causally linked in the Senegal case. There are some negative environmental impacts due to increases of production in the groundnut sector, as there is no indication that currently unsustainable farming practices will be significantly affected by liberalisation.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
Senegal	0/-1	0/-1	0	-1	-1	0/-1	-2	-2	-1

### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

## 8.7. Policy response / implications

Policy responses in the Senegal case should focus on food security, and establishment of economically viable and environmentally sustainable agricultural practices. Addressing food security demands both international and domestic policy responses. This reality is well expressed by Senegal's own submission to the WTO on agricultural trade negotiations. Senegal calls for better implementation of the Marrakesh Decision on Measures Concerning the Possible Negative Effects of the Reform Programme on Least-Developed and Net-Food Importing Developing Countries. As well, Senegal's submission calls for reforms to food aid management to prevent distortions, and the establishment of a fund to support LDCs in creating the infrastructure needed for improvement domestic agriculture.<sup>104</sup> Senegal also calls for ensuring that LDCs have the availability of domestic support and domestic protection options to ensure food security, and help reduce poverty. The Senegal submission thus calls for differential treatment of LDCs in relation to developed countries in market access, and domestic support.<sup>105</sup>

<sup>104</sup> GOS "Agricultural Trade Negotiations in the WTO – Preliminary Positions of Senegal," WTO: 19 March 2001. [http://www.wto.org/english/tratop\\_e/agric\\_e/ngw137\\_e.doc](http://www.wto.org/english/tratop_e/agric_e/ngw137_e.doc)

<sup>105</sup> Ibid

An FAO study suggests that given Senegal's dependence on food imports and sensitivity to world markets one policy option with a WTO context may be to allow Senegal the right to use the special safeguard (SSG) provisions under the URAA, which it does not currently have. Effective implementation of Marrakesh decision is also identified as crucial given low levels of food aid, and lack of current implementation of the agreement.<sup>106</sup> This is particularly evident in this case study, which focuses on the negative impacts associated with increasing world prices for wheat.

Policies intended to impact directly on Senegal's domestic circumstances should address the disproportionate impacts on women due to high levels of female employment occurring in the sector and their vulnerability to food security impacts. As well, creating better incentives for more sustainable agricultural practices is crucial to the long-term viability of the groundnut sector. The sustainability assessment above identifies the possible need to subsidise fertilizer use to prevent soil mining and improve productivity as one policy option. Domestic food security policy options cannot be fully assessed in this study because other more important food crops such as rice are not analysed.

## **8.8. Conclusions**

Liberalisation of the agricultural sector will tend to have negative impacts on economic and social aspects in Senegal due to its status as a net food importer and its problems with food security and development. The significance of world wheat price increases are overall more significant than recovering world markets for groundnut products. Further, evidence does not support a strong link between liberalisation measures and improvements in the Senegalese groundnut sector in terms of economic and environmental performance. Overall, the assessment shows that the base scenario is the least negative scenario. It is important to note however that this assessment does not address the agricultural sector as a whole or liberalisation of other sectors. The intermediate liberalisation scenario is the least negative liberalisation scenario, and there appears to be significant opportunity to implement mitigating measures in this scenario, which are crucial to achieving sustainability in the case of Senegal.

## **9. Egypt**

### **9.1. Significance of the Egypt case**

Egypt is a net food importing developing country, with significant wheat consumption, production and imports. Egypt imports roughly as much wheat as it produces each year, and wheat is the most significant cereal in terms of food use in Egypt. As a result, Egypt is sensitive to world markets in the sub-sector and food security impacts pertain in the case study. Egypt produces most of the edible oil crops it uses and does not export a significant amount. At the same time it imports most of its vegetable oils (palm oil, soybean oil, and sunflower seed oil). Thus trade impacts will tend to have some affect in the vegetable oils sector, but less effect in oilseeds.

### **9.2. Introduction**

Although the population density in Egypt is relatively low in an international comparison, 99% of the population lives in the Nile valley and delta, which

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<sup>106</sup> FAO, 2000

correspond to only 30% of the total land area. These areas are suitable for cultivation, especially since major dams have facilitated irrigation schemes, whilst the rest of the country is covered by deserts.<sup>107</sup> Thus, a pressure on land resources for various uses characterises Egypt's agricultural sector, as well as concerns over food security.

Basic statistics displayed in Table 17 suggest that the economic conditions are relatively good, but that the income levels are lower than in other countries in the oil-rich region. The large and growing population is a cause of concern, as well as the significant food import dependency. The social situation is also better than in many African countries, judging by the education indicator, the infant mortality rate, and the relatively long life expectancy. Deforestation and some other environmental problems do not seem to be significant, whereas carbon dioxide emissions are higher than in other African countries.

**Table 17: Economic, social and environmental indicators**

Indicator	Egypt	Middle East and North Africa
Population 1999, million	63	290
Population density 1999, people per sq. km	63	26
Population growth, annual average 1965-99	2.2%	2.8%
GNI per capita 1999	\$1,380 (rank 122)	\$2,060
GDP per capita, average annual growth 1965-99	3.3%	0.1%
Gross fixed capital formation, average annual growth 1965-99	5.8%	...
Exports of goods and services, average annual growth 1965-99	5.4%	...
Trade (% of GDP) 1999	40% (33% in 1970)	57% (... in 1970)
Net barter terms of trade (1995=100) 1998	84	...
Food imports (% of total merchandise imports) 1999	23%	...
Present value of debt (% of exports of goods and services) 1999	127%	...
Domestic credit to private sector (% of GDP) 1999	59.7%	47.2%
Unemployment 1996-98	...	...
Income distribution - Gini index	28.9 (1995)	...
Urban population of total 1999	45% (42% in 1970)	58% (41% in 1970)
Prevalence of child malnutrition 1993-99	11%	...
Infant mortality rate 1999	47 per 1,000 live births	44 per 1,000 live births
Life expectancy at birth 1999, years	67	68
Access to an improved water source 2000	95%	89%
Net primary enrolment ratio 1997	98% male, 88% female	90% male, 83% female
Female labor force of total 1999	30.1%	27.3%
Children 10-14 years in the labor force (% of age group) 1999	10% (18% in 1980)	5% (14% in 1970)
Public expenditure on health (% of GDP)	1.8% (1997)	2.5%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	-20	-239
Nationally protected areas (% of total land area) 1999	0.8%	2.2%
Emissions of organic water pollutants (kg per day per worker) 1998	0.18	...
Carbon dioxide emissions (per capita metric tons) 1997	2.0	4.0
Genuine domestic savings (% of GDP) 1999	7.0%	-1.3%

<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 9.3. Trade Conditions

Egypt's imports of wheat were over 6 million metric tonnes in 1999, while domestic production was also over 6 million metric tonnes in 1999. Egypt does not export wheat. Wheat is also the main cereal used for food in Egypt. Edible oil crops imports

<sup>107</sup> Instituto del Tercer Mundo (IteM). *The World Guide 1999/2000: A View From the South*. New Internationalist Publications, 1999.

were just over 200 000 metric tonnes in 1999, and vegetable oils imports were nearly one million metric tonnes in 1999.<sup>108</sup>

### **9.3.1. Market Access**

**Table 18** below shows Egypt's bound tariff rates for selected commodities under the URAA.

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<sup>108</sup> FAO. *Database Food Balance Sheet 1999*.

**Table 18: Bound tariffs on selected agricultural products**

Selected products	Bound rate (%)
Wheat	5
Rice	20
Barley	10
Olive oil	20
Other vegetable oils	20

Source: FAO. *Agriculture, Trade and Food Security: Issues and Options in the WTO Negotiations from the Perspective of Developing Countries, Volume II Country Case Studies*. FAO, 2000

Applied rates on wheat were 3% in 1999, 1% for soybean, palm, sunflower, maize oils, and 5% on groundnut, olive, coconut and rape oils.<sup>109</sup> An FAO study notes that Egypt has relatively low bound tariff rates compared to other developing countries, making it more sensitive to world market prices and suggesting; “Egypt may need to review its structure of bound tariffs in order to rationalize it from the standpoint of food security ‘sensitivity’.”<sup>110</sup>

### 9.3.2. Domestic Support

According to Egypt’s WTO reporting, all domestic support in the agricultural sector is exempted from reduction commitments under the URAA. Egypt provided details of domestic support in 1999 for its green box and Special and Differential Treatment (SDT) outlays. Table 19 and Table 20 Below show the support levels under these categories.

**Table 19: Green box outlays, 1995-98, in US\$`000**

Type of measure	1995	1996	1997	1998
General services	85	85	85	85
Pest relief	67 031	74 516	37 518	35
Relief from irrigation difficulties	1 177	1 177	1 177	1 177
<b>Total</b>	<b>68 293</b>	<b>75 778</b>	<b>38 780</b>	<b>1 297<sup>1</sup></b>

Source: FAO. *Agriculture, Trade and Food Security: Issues and Options in the WTO Negotiations from the Perspective of Developing Countries, Volume II Country Case Studies*. FAO, 2000

<sup>1</sup> The 1998 outlay on pest relief seems to be unusually low and could be an error.

**Table 20: Outlays in the Special and Differential category, 1995-98, in US\$ `000**

Type of measure	1995	1996	1997	1998
Input subsidy available to low-income producers:				
Fertilizer	5 216	1 219	1 210	1 194
Seeds	1 917	1 227	1 227	1 218
<b>Total</b>	<b>7 133</b>	<b>2 446</b>	<b>2 437</b>	<b>2 412</b>

Source: FAO. *Agriculture, Trade and Food Security: Issues and Options in the WTO Negotiations from the Perspective of Developing Countries, Volume II Country Case Studies*. FAO, 2000

<sup>109</sup> FAO. *Agriculture, Trade and Food Security: Issues and Options in the WTO Negotiations from the Perspective of Developing Countries, Volume II Country Case Studies*. FAO, 2000

<sup>110</sup> FAO, 2000

Current levels of support are low and would not be limited even if classified as non-product specific AMS payments.<sup>111</sup> An FAO assessment however notes that if Egypt wants to raise its wheat self-sufficiency from the current 48% to 60%, the support required may exceed the *de minimis* level. The study notes “Limited land and water resources require that additional production of crops such as wheat must come from improvements in productivity. In the short run, this may require increasing support for farm prices so as to encourage the adoption of new technology.”<sup>112</sup>

### 9.3.3. Export subsidies

Egypt did not declare any export subsidies in its WTO schedule and is not eligible to use them, except for internal transport and marketing costs and external freight costs. Some export promotion measures do exist such as selective reduction of customs duties or credits to finance inputs into export-oriented industries. In Egypt it seems that processed agricultural products benefit most from these measures.<sup>113</sup>

## 9.4. Sustainability conditions in Egypt

### 9.4.1. Economic considerations

Like Senegal, Egypt belongs to the category of net importers of food. In light of the fact that Egypt is a lower middle-income country, this situation makes agricultural trade a critical issue for the welfare of the population. Egypt imported more than half of its own cereal production in 1999. The bulk of these imports consist of wheat (6 million metric tons) and this volume nearly equals the volume produced domestically. Wheat is mainly used for food and to a lesser extent feed and waste. The second most important cereal (both in terms of domestic production and imports) is maize, which is used for feed and food in roughly equal portions. Oil crops are not as significant to the Egyptian economy. There is some production of cottonseed, olives and groundnuts, but very little is exported and production is mainly used for processing (cottonseed) and food (olives).<sup>114</sup> The main agricultural export products are cotton, rice, fresh oranges, potatoes and fresh onions. The principal agricultural imports are wheat and wheat flour, maize, frozen meat, dairy products, refined sugar and vegetable oils.<sup>115</sup>

According to the World Bank’s country assistance strategy for Egypt, the structural adjustments made to the economy in the early 1990s have resulted in sustained economic growth during the last decade (annual average growth rate of 5.5% in 1996-2000).<sup>116</sup> In their analysis, extended trade and less ‘inward-looking’ economic policies are needed to maintain and improve the economic performance. However, there is also considerable unemployment. In order to strengthen the economy to manage this

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<sup>111</sup> FAO, 2000

<sup>112</sup> FAO, 2000

<sup>113</sup> FAO, 2000

<sup>114</sup> FAO. *Database Food Balance Sheet 1999*.

<sup>115</sup> FAO, 2000

<sup>116</sup> World Bank. *Memorandum of the President of the International Bank for Reconstruction and Development and the International Finance Corporation to the Executive Directors on a Country Assistance Strategy for the Arab Republic of Egypt*. World Bank, June 2001(a)

problem, the internal adjustments need to be accompanied by less reliance on external resources that are vulnerable to shocks, e.g. oil and gas exports and foreign aid.<sup>117</sup>

The agriculture sector is critical to the Egyptian economy, as it contributes about 17% to GDP, employs 39% of the labour force and accounts for about 14% of total merchandise exports in 1996.<sup>118</sup> As can be seen in Table 21, the sector is characterised by a certain degree of land scarcity. The government has initiated land reclamation efforts in some areas, but the costs and benefits of such investments need to be carefully assessed, according to the World Bank.<sup>119</sup>

**Table 21: Basic facts about the agriculture sector**

Indicator	Egypt	Middle East and North Africa
Land use (% of total land area) 1998	Arable 2.8%, Permanent cropland 0.5%, Other 96.7%	Arable 5.2%, Permanent cropland 0.7%, Other 93.9%
Arable land, hectares per capita 1996-98	0.05	0.20
Agriculture average annual growth 1990-99	3.1% (2.7% in 1980-90)	2.6% (5.6% in 1980-90)
Index of agricultural production per capita (1989-91=100) 1996-98	121 (98 in 1986-88)	...
Agriculture value added (% of GDP) 1999	17% (29% in 1970)	14% (13% in 1970)
Producer price on wheat (\$ per metric ton) 1998	189	...
Employment in agriculture (% of total labor force) 1998	... (42% in 1980)	... (42% in 1980)
Female labor force in agriculture of total female labor force 1996-98	... (10% in 1980)	... (46% in 1980)
Irrigated land (% of cropland) 1996-98	99.8%	36.2%
Average annual fertilizer use (kg per hectare cropland) 1995-97	343	...
Pesticide use (kg per hectare cropland) 1996	1,293	...
Tractors per 1,000 agricultural workers 1996-98	11	24
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	86%	89%

Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

Wheat is one of Egypt's main crops. In a survey of wheat farming in Egypt, Kherallah *et al.* mapped the most important characteristics. Both low- and high-income households are involved in wheat farming, but the vast majority of wheat farms are small, irrigated and owner-operated. About 50-70% of the yield is sold, indicating a relatively high degree of commercialisation, but in poor households the major part is used for subsistence. Concerning inputs, nearly all farmers use inorganic fertilizer and tractors to a large extent. Production is labour-intensive and in total about 49% of the work is done by hired labour. Access to credit varies with household wealth and it is relatively low.<sup>120</sup>

<sup>117</sup> World Bank. "Egypt in Brief. World Bank, October 2001(b)". Downloaded from <http://lnweb18.worldbank.org/mna/mena.nsf/Countries/Egypt/B8067E939F944E03852569510053594F?OpenDocument> 2002-01-29.

<sup>118</sup> FAO, 2000-

<sup>119</sup> World Bank, 2001a.

<sup>120</sup> Kherallah, M., H. Löfgren, P. Gruhn and M. Reeder. *Wheat Policy Reform in Egypt: Adjustment of Local Markets and Options for Future Reforms*. IFPRI research report no. 115. Washington, International Food Policy Research Institute, 2000

Considerable price liberalisation in the agriculture sector has been achieved in Egypt during the last two decades and policies for raising agricultural productivity have been implemented. These are the main reasons why production increased at a rate of 3.0% in the 1990s compared with 2.8% in the 1980s.<sup>121</sup> However, while the market-oriented policy reforms undertaken in Egypt may have been a success for macroeconomic stability and growth, the outcome for the agriculture sector is seen as more negative. Net farm incomes, particularly for small farmers, were reduced because output prices did not rise enough to offset the increased farm input costs, in part due to reduced subsidies.<sup>122</sup>

Despite major improvements in the agriculture sector during the last decade, some problems remain. According to the World Bank, more efforts, particularly in research and extension, and better access to financial services and water management, are needed to improve the livelihoods of small-scale farmers.<sup>123</sup> A reallocation of water within the agriculture sector, shifting away from water-intensive crops such as rice and sugarcane, may be necessary.<sup>124</sup> Marketing of agricultural products has not always worked well, with problems of inadequate infrastructure, lack of storage facilities, and inadequate transport systems.<sup>125</sup> Some distortions remain, for example the production and distribution of *baladi* wheat flour is under state control.<sup>126</sup> Lastly, it is argued that future efficiency gains are also dependent on export markets. Greater openness in the main importing market, the EU, is seen as necessary.<sup>127</sup>

#### 9.4.2. Social Considerations

A thorough poverty assessment is missing for Egypt, but it is clear that poverty is concentrated in the rural areas, especially in Upper Egypt, and in urban female-headed households. In 1998 a poverty survey conducted by IFPRI found that 63% of the poor and 74% of the ultra-poor live in rural areas. The World Bank argues that policies for labour-intensive growth are particularly important to improve the situation.<sup>128</sup>

During the 1990s significant progress was made to enhance social conditions, including increased life expectancy (from 63 years in 1990 to 67 years in 1998), reduced infant mortality rate (from 69 per 1,000 live births in 1990 to 49 in 1998), and population growth just under 2% compared to 2.5% 20 years ago. However, despite a high primary enrolment ratio, there are remaining problems with illiteracy. Furthermore, these improvements vary geographically and between the urban and rural populations.<sup>129</sup>

There are two major reasons why trade developments within the agriculture sector are critical to poverty alleviation and food security in Egypt. First, the majority of the working population in agriculture consists of small family farmers. Thus, trade impacts can have a direct effect on family incomes. Second, Egypt is a large food importer, as described above. This is a special cause of concern since a large part of

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<sup>121</sup> World Bank, 2001a.

<sup>122</sup> FAO, 2000.

<sup>123</sup> World Bank, 2001a.

<sup>124</sup> World Bank, 2001a.

<sup>125</sup> World Bank. *Arab Republic of Egypt: An Agricultural Strategy for the 1990s*. World Bank, 1993

<sup>126</sup> Kherallah et al (2000)

<sup>127</sup> FAO, 2000 and World Bank, 2001a.

<sup>128</sup> World Bank, 2001a.

<sup>129</sup> World Bank, 2001a.

the imports consists of the main staples and the imports are financed by export earnings from a single and high-risk product group, petroleum products.<sup>130</sup> Furthermore, food security issues are also linked to political stability in Egypt.<sup>131</sup>

Wheat self-sufficiency has been a policy objective in relation to food security in Egypt, but achieving this objective would be costly and inefficient according to Kherallah *et al.* After the reforms, the producer prices on wheat increased and higher-yielding varieties were introduced, causing a change in relative profitability among crops. As a result, the wheat self-sufficiency rate increased from 21% in 1986 to 47% in 1996. However, the return from expanding wheat production further would now be lower than the cost, suggesting wheat will remain an important import product.<sup>132</sup>

Since wheat provides more than one-third of the daily caloric intake and is such a critical food product, Egypt has a government-run food subsidization scheme. This scheme is thus an important link between wheat trade and food security. The main share of the subsidised products comes from wheat imports, whereas domestically produced wheat tends to be consumed in the rural areas. According to Ahmed *et al.*, the subsidy scheme could be improved in terms of better targeting towards the poorest households. The current set-up benefits the urban population, even though rural poverty is perhaps a more serious problem.<sup>133</sup>

In an agricultural strategy for Egypt, some social measures are acknowledged as important supplements to the liberalisation programme. Rural women must be better involved in the development process, rural activities need to be diversified, programmes for health and education must be provided, and social safety nets are needed to absorb some of the potential dislocations.<sup>134</sup>

Female unemployment is twice or three times that of men, and especially young women in rural areas are at risk. Regarding female occupation in the agricultural sector, it represents about 40% of all female employment. This makes agricultural reforms with implications for labour-intensity and type of labour more critical for women than for men.<sup>135</sup> Currently, rural women are often involved in fertilization, harvesting and marketing, and also devote considerable time to animal husbandry. However, it is suggested that this contribution is not reflected in participation in household decision-making to a large extent. The work burden on women is further increased by the male migration to urban areas. Concerning land ownership, men comprised 76% of landowners in 1989.<sup>136</sup>

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<sup>130</sup> FAO, 2000.

<sup>131</sup> Ahmed, A., H. Bouis, T. Gutner and H. Löfgren. *The Egyptian Food Subsidy System: Structure, Performance, and Options for Reform*. IFPRI research report no. 119. Washington, International Food Policy Research Institute, 2001

<sup>132</sup> Kherallah *et al.* 2000.

<sup>133</sup> Ahmed *et al.*, 2001.

<sup>134</sup> World Bank, 1993.

<sup>135</sup> World Bank, 2001a.

<sup>136</sup> FAO. "Fact sheet: Egypt – Women, agriculture and rural development". Downloaded from <http://www.fao.org/docrep/V9104e/V9104e00.htm> 2002-01-29.

### 9.4.3. Environmental Considerations

The main environmental issues in contemporary Egypt are acute water scarcity and declining water quality, land degradation, increasing pollution, untreated urban and hazardous waste disposal, and poorly protected cultural and natural heritage.<sup>137</sup> Agricultural practices are crucial to the first two of these problem areas, which are also the limiting factors for a sustainable agricultural production.<sup>138</sup>

Concerning water scarcity and declining water quality, the pressure is strong in rural areas. The agricultural sector is characterised by an extremely strong reliance on irrigation (see Table 21) and a large part of freshwater withdrawals are attributable to agricultural uses. Since there is no effective rainfall at all, except in the northern coastal areas, agricultural development is closely linked to the management of the Nile River.<sup>139</sup> Intensive fertilizer and pesticides use contributes to the declining quality of freshwater. Because access to sanitation is particularly low in rural areas (5%), water-borne diseases are a bigger problem than in urban areas.<sup>140</sup> The problem of salinization has been exacerbated by poor drainage and the poor quality of the irrigated water.<sup>141</sup> Improved maintenance of the irrigation systems is a prerequisite for sustainable agriculture.

Regarding land scarcity and degradation, about 6,300 to 12,600 hectares of agricultural land is lost to urban expansion annually, and per capita area of cultivable land is already among the lowest in the world. Land degradation is caused by several factors: poor irrigation drainage, soil salinization, inadequate crop rotation and selection, fragmented land tenure and soil erosion.<sup>142</sup> Due to these limitations in water and land resources, additional production of crops such as wheat must result from intensification rather than extensification.<sup>143</sup>

## 9.5. Key sustainability issues

Based on the description of sustainability conditions above, a clear set of sustainability issues relevant for the Egyptian case can be identified. We have selected the following key sustainability issues for assessment in our application of SIA methodology:

- Food security is an overriding concern in Egypt and wheat has traditionally been a key crop in addressing this problem.
- Agriculture is a critical sector to the Egyptian economy, in terms of self-subsistence and export earnings.
- Poverty is most severe in rural areas where agriculture is a main source of income.

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<sup>137</sup> World Bank, 2001a.

<sup>138</sup> World Bank, 1993.

<sup>139</sup> World Bank, 1993.

<sup>140</sup> World Bank, 2001a.

<sup>141</sup> Centre for Environment and Development for the Arab Region and Europe (CEDARE). Alternative Policy Study: Land and Water Resources in Arab African Countries. Report prepared for UNEP's GEO-2000 report. Downloaded from <http://www.unep.org/geo2000/aps-africa-arab/index.htm> 2002-01-29.

<sup>142</sup> World Bank, 2001a and 1993.

<sup>143</sup> FAO, 2000 and World Bank, 1993.

- Social conditions are worse in rural areas.
- Land scarcity is a limiting factor in agriculture, and intensification rather than extensification is the main option for farmers.
- Water management in relation to irrigation is crucial since it is a scarce resource and because water quality is declining.
- Women are more sensitive to changes within the agriculture sector since they are heavily involved in the sector but only participates in decision making to a limited extent.

These sustainability issues are selected in response to the economic, social and environmental consideration captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for Egypt is based on national government reviews, World Bank and FAO assessments, academic analysis, other International Organization (IO) reviews, and NGO studies.

## **9.6. Egypt sustainability impact assessment**

### **9.6.1. Structure of economic incentives and opportunities**

#### ***Baseline scenario***

Under the baseline scenario, recovering world market prices for wheat will impact on Egypt. Given Egypt's dependence on wheat imports and sensitivity to international markets in the wheat sector, modestly increasing wheat import bills can be expected. In the edible oil crops sector the import of oilseed oils seems to be the only significant trade concern. Given low levels of import in Egypt, only modest price recovery in the long term, and continued low world prices in the short term, no significant impacts are expected throughout the causal chain.

#### ***Liberalisation scenario***

Large price increases in the wheat sector will result in significant import bill increases. Furthermore, it has been shown in the sustainability assessment above that further production increases in Egypt's wheat sector are not likely to be economically viable and can only be achieved with high levels of public spending. Thus, price increases under a liberalisation scenario (i.e. low domestic support options) cannot be expected to result in incentives for increases in domestic production. As edible oil crops are somewhat less significant in the Egyptian economy no significant impacts are predicted throughout the causal chain. Overall, Hertel *et al.* predict that trade balance impacts will be modestly negative if agriculture is extensively liberalised. This trade balance result may be due to greater incentives for the export of fruits and vegetables from Egypt under a liberalisation scenario.<sup>144</sup>

Egypt currently has support measures for irrigation and low-income producers. Removal of current support in the wheat sub-sector aimed at irrigation support will decrease opportunities for production, and some reductions of these payments may be required under an extensive liberalisation scenario. Support to low income producers are classified as SDT payments and are not included in the liberalisation scenario for

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<sup>144</sup> FAO, 2000.

this study. As has been noted in the sustainability assessment recent liberalisation efforts in Egypt including reduction in some subsidies resulted in reduction of net farm incomes (especially small farmers) as output prices benefits were less than input price cost increases.<sup>145</sup> As well, it is noted that this process resulted in the profitability of wheat, rice, and cotton crops losing ground to export oriented fruit and vegetable crops.<sup>146</sup> Given full liberalisation then, these sectoral adjustment impacts on small farmers and shifts away from wheat production can also be expected.

### ***Intermediate scenario***

Similar but less significant incentive and economic impacts can be predicted in the intermediate scenario, increasing import bills and no significant improvement in incentives for production. However, it has been shown that Egypt does have some level of agricultural support in the sector that has helped to increase its wheat self-sufficiency to nearly 50%. Furthermore, Egypt's land and water conditions demand that further production increases be achieved through intensification. Thus, an intermediate scenario may result in some incentives for production expansion given both world market price increase and domestic support to help improve technology and productivity in the wheat sub-sector. Egypt views the wheat sector as strategically important particularly in terms of food security and the intermediate scenario may provide more opportunities for addressing these strategic aims.

## **9.6.2. Production System Characteristics**

### ***Baseline scenario***

Given moderate price changes no changes to the production system can be expected.

### ***Liberalisation scenario***

Under the liberalisation scenario it is predicted that the current levels of self-sufficiency in the wheat sector will remain constant or moderately lower. Current levels of self-sufficiency in the wheat sector were associated in the sustainability assessment above with liberalisation reforms improving the prices obtained by producers and technological advancement, particularly higher yielding varieties. However, further expansion in the sector is not viewed to be economically viable in a liberalisation scenario, but rather to require high levels of domestic support. The magnitude of risk of declining wheat production under the liberalisation scenario due to decreases in its profitability in relation to other crops is not well established in the Egyptian case.

### ***Intermediate scenario***

In the intermediate scenario similar but less significant impacts pertain, although there may be production increase if policies aiming at increasing food self-sufficiency are implemented. These production changes however would not be causally linked to world market impacts from liberalisation, but only to domestic policy choices. Furthermore current support levels are low. Any production increases will require more intensive and commercial agricultural practices.

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<sup>145</sup> FAO, 2000.

<sup>146</sup> FAO, 2000.

### **9.6.3. Impacts on sustainability aspects**

#### ***Baseline scenario***

Some very modest negative economic impacts and social impacts can be expected due to increasing food costs. However, given low levels of price recovery these impacts are not expected to significantly impact on current economic and social sustainability trajectories and no impacts on environmental trajectories are found.

#### ***Liberalisation scenario***

The Hertel *et al.*, analysis of regional impacts from liberalisation shows that North African countries will have negative terms of trade impacts, negative sectoral value-added impacts, and negative general real income impacts. All negative impacts can be associated with increasing costs of food imports. The impacts are thus negative in terms of the overall economy. As well, there will be negative food security impacts, which can be expected to impact on the poor, especially small rural farmers adjusting to structural changes associated with liberalisation. The sustainability assessment above shows that poverty is concentrated in rural areas and that rural women are most sensitive to food security impacts. Rural women will thus be impacted disproportionately, particularly since their rate of unemployment is two to three times higher than men's in the sector. No strong causal links to environmental impacts are found. As no incentives for production increases in the wheat sector are predicted, current sustainability trajectories in land and water degradation will not be altered by liberalisation.

#### ***Intermediate scenario***

Similar but less significant impacts pertain in this sector. World market price increases in wheat result in "less significant" negative economic impacts and negative social impacts, with no direct environmental impacts predicted. Impacts may be less severe on vulnerable groups sensitive to the negative adjustment impacts of the liberalisation scenario. The intermediate scenario may also provide Egypt with more opportunities for strategic involvement in the wheat sector to mitigate negative economic and food security impacts. However, any domestic policies increasing the incentives for domestic production of wheat will be associated with more intensive agricultural practices and will tend to aggravate Egypt's land and water degradation problems.

### SIA matrix of results

In Egypt we see negative economic and social impacts due to increasing wheat import bills. Food security problems for vulnerable groups, such as rural women in the agricultural sector, stand out most prominently as negative social impacts. Small-scale farmers are potentially impacted on several fronts including increased competition from international markets, an inability to adequately improve productivity in an increasingly competitive domestic market, and commodity price/food security impacts. These multiple stresses are prominent in the Egypt case because domestic wheat production is an important feature of the country case. Negative environmental impacts are not causally linked in the Egyptian case.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
Egypt	0/-1	0/-1	0	-1	-1	0	-2	-2	0

#### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

### 9.7. Policy response / implications

Improving opportunities for rural women in general and their access to land and credit are identified as key sustainability issues in the assessment of Egypt's agricultural sector. As this group will tend to be impacted disproportionately by negative economic and social impacts from liberalisation, mitigating policies should focus on this group. Programmes aiming at land ownership and female employment are the most direct policy issues, while education and health services are indirect issues. In general negative impacts from agricultural liberalisation can be expected to affect the rural poor and small-scale farming households disproportionately and these groups will be less negatively impact in an intermediate scenario than in a liberalisation scenario.

Given the high costs of furthering production self-sufficiency in the wheat sector, the need for further intensification of the agriculture to achieve production increase, and current negative land and water impacts associated with agricultural intensification a better understanding of the costs and benefits (economic, social and environmental) of a wheat self-sufficiency policy need to be understood. This has especially important implications for Egypt's approach to further negotiations within the WTO.<sup>147</sup>

<sup>147</sup> FAO, 2000.

Like in the Senegal case and all net-food importing developing countries, an effective implementation of the *Marrakesh Ministerial Decision* is a direct WTO based policy response to negative impacts associated with agricultural liberalisation.

### **9.8. Conclusions**

Rising world wheat prices result in negative economic and social impacts in Egypt. Identifiable difference between the liberalisation and intermediate scenario are only in terms of the significance of the impacts. An intermediate scenario may give Egypt more opportunities to pursue a self-sufficiency policy in the agricultural sector, but some analysts question whether this is an efficient approach to achieve better food security. Diversification from dependence on oil exports into other labour intensive export sectors is identified as a key goal instead. Food security and disproportionate negative impacts on women are the key social impacts, while no direct changes to current sustainability trajectories are identified for environmental considerations. Indirect impacts may result due to strategic domestic policy choices concerning the wheat sector.

## **10. India**

### **10.1. Significance of the Indian Case Study**

India is a net exporting developing country, but as it is not a top trader the significance of the Indian case is more in relation, as will be shown, to rural poverty, gender impacts, food security and agricultural self-sufficiency in a developing country context. India also has a huge population and the world's fifth largest economy, making sustainability impacts in India significant globally.

### **10.2. Introduction**

By 1995 India was the fifth largest economy in the world. However, it is currently ranked 161<sup>st</sup> out of 206 countries in terms of per capita GNI.<sup>148</sup> The size of Indian economy is thus largely an effect of the size of its population. According to India's most recent census the population is now over one billion,<sup>149</sup> and India has become only the second country after China to reach the billion people mark. At the beginning of 1900s the population was under 240 million, but the past 50 years have been characterized by dramatic population growth.<sup>150</sup> Basic development indicators (Table 22) show a somewhat mixed situation in India. Life expectancy has improved, as has access to sanitary infrastructure, while child malnutrition, income and poverty stand out as important problems.

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<sup>148</sup> World Bank. *World Development Indicators 2001- Database*.  
<http://www.worldbank.org/data/wdi2001/index.htm>.

<sup>149</sup> Registrar General & Census Commissioner, India. *Census of India, 2001*. November 2001.

<sup>150</sup> Registrar General & Census Commissioner, India *Census of India, 1991*.

**Table 22: Economic, social and environmental indicators**

Indicator	India	South Asia
Population 1999, million	998	1,329
Population density 1999, people per sq. km	336	278
Population growth, annual average 1965-99	2.1%	2.2%
GNI per capita 1999	\$440 (rank 163)	\$440
GDP per capita, average annual growth 1965-99	2.4%	2.4%
Gross fixed capital formation, average annual growth 1965-99	5.5%	5.3%
Exports of goods and services, average annual growth 1965-99	7.3%	7.2%
Trade (% of GDP) 1999	27% (8% in 1970)	30% (12% in 1970)
Net barter terms of trade (1995=100) 1998	104	...
Food imports (% of total merchandise imports) 1999	9%	12%
Present value of debt (% of exports of goods and services) 1999	104%	...
Domestic credit to private sector (% of GDP) 1999	26.1%	26.1%
Unemployment 1996-98	...	...
Income distribution - Gini index	37.8 (1997)	...
Urban population of total 1999	28% (20% in 1970)	28% (19% in 1970)
Prevalence of child malnutrition 1993-99	45%	47%
Infant mortality rate 1999	71 per 1,000 live births	74 per 1,000 live births
Life expectancy at birth 1999, years	63	63
Access to an improved water source 2000	88%	87%
Net primary enrolment ratio 1997	..., ...	..., ...
Female labor force of total 1999	32.2%	33.3%
Children 10-14 years in the labor force (% of age group) 1999	13% (21% in 1980)	15% (23% in 1980)
Public expenditure on health (% of GDP)	0.8% (1997)	0.9%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	-381	889
Nationally protected areas (% of total land area) 1999	4.8%	4.5%
Emissions of organic water pollutants (kg per day per worker) 1998	0.19	...
Carbon dioxide emissions (per capita metric tons) 1997	1.1	0.9
Genuine domestic savings (% of GDP) 1999	9.0%	8.3%

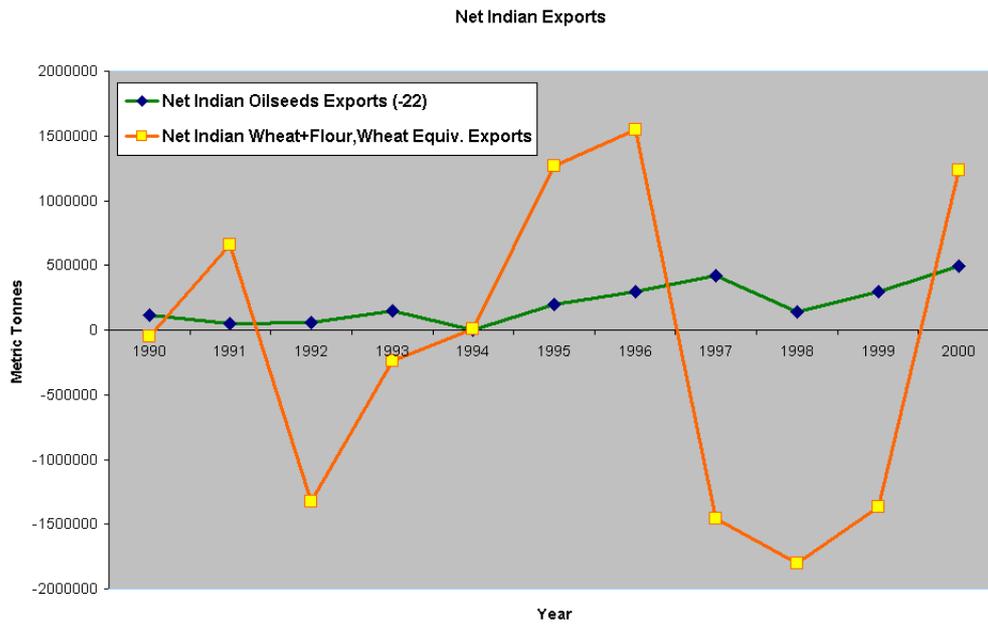
<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 10.3. Trade Conditions

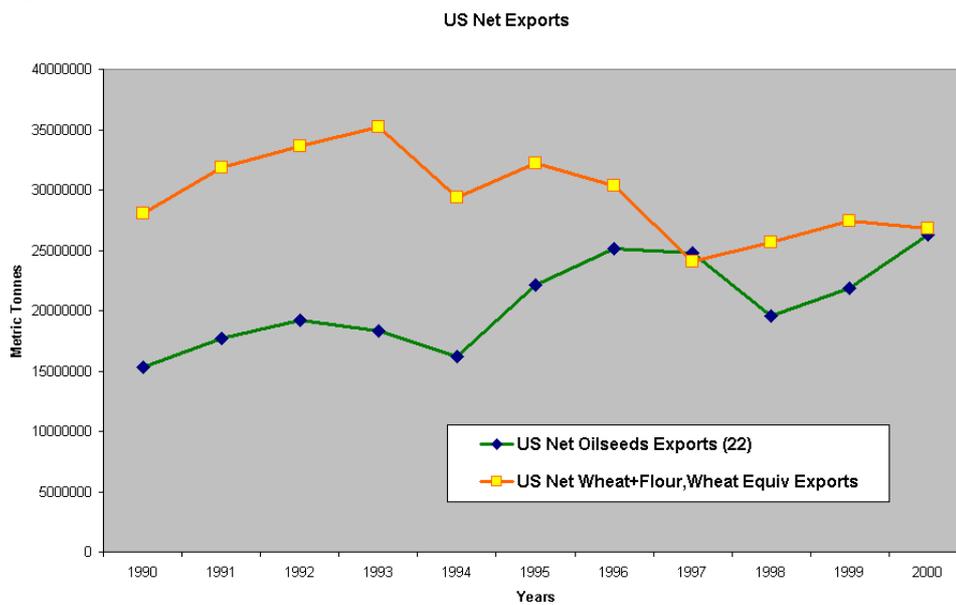
In terms of world agricultural trade, India is not on average a major trader. Figure 13 and Figure 14 below show that average net wheat exports and net oilseed exports are not as significant compared to other major exporters (e.g. US) in the sub-sectors selected for this study.

**Figure 13**



Source: FAO, *FAOSTAT Agriculture Database*. Accessed January 2002.

**Figure 14**

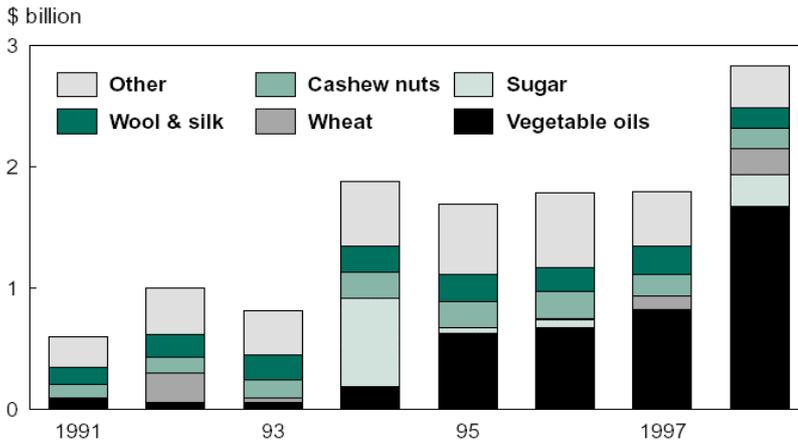


Source: FAO, *FAOSTAT Agriculture Database*. Accessed January 2002.

Importantly though, on a year-by-year basis India has been both a major exporter and major importer of wheat. As Figure 15 shows, vegetables are also an important import in India.

**Figure 15**

**Vegetable Oils Accounted For More than Half of India's Agricultural Imports In 1998**



Source: Foreign Agricultural Service (Attaché reports), USDA  
Economic Research Service, USDA

Overall India was an average net exporter in agricultural products from 1995-1999, with average yearly net exports of just over \$US 2 billion. This places India in the lower half of the world's top 20 net exports, but it is not one of the top 20 gross exports or gross importers, for these years.<sup>151</sup> The majority of Indian production then is for internal consumption.

### 10.3.1. Market Access

In India bound rates for wheat are 100 percent, but flourmills are permitted to import wheat with no tariffs subject to licence and the basic applied rate including surcharge is 50% (Table 23). Bound rates for edible oils are 300 % but applied rates have been between 15-30 %.<sup>152</sup> Note that Table 23, which shows current applied tariffs for edible oils, shows some recent rise in tariffs in the sub-sector. The average bound tariff for all agricultural tariff lines is 116%<sup>153</sup>, while the average applied rate is near 35%.<sup>154</sup>

**Table 23: Import Tariff Rate (Basic+Surcharge) on selected Agricultural Commodities, 2000-01**

Commodity	Percent
Wheat	50
<b>Edible Oil</b>	
RBD Palmolein	71.6
Other refined oil	50.8
Crude palm oil (for vanaspati)	25
Crude palm oil (for uses other than vanaspati)	55
Crude coconut oil	45
Other vegetable crude oil	35

Source: Ministry of Finance, Government of India *Economic Survey 2000-2001*.

<sup>151</sup> Díaz-Bonilla Eugenio, Thomas Marcelle, Robinson, Sherman "Trade Liberalization, WTO, and Food Security" Washington, D.C.: IFPRI, 2002.

<sup>152</sup> FAO, 2000

<sup>153</sup> FAO, 2000

<sup>154</sup> IFPRI "Trade Liberalization & Food Security" A presentation by Ashok Gulati. IFPRI, 2002.

India thus has high bound rate levels but its applied rates are substantially lower, although still significant. This has important implications for future WTO negotiations.

An FAO trade case study on India notes that,

Until 1991, India followed an inward-looking development strategy with a trade regime characterized by quantitative restrictions, licensing and high tariffs... The Government intervened heavily in both product and input markets, through price support programmes backed by government procurement and input subsidies.<sup>155</sup>

India's inward focused policies have resulted in net taxation of the agriculture sector, which is estimated to have taxed the sector at 29% of the value of production during 1971-85, at 18% from 1986-91 and 9% during 1992-95. In 1991 India underwent an economy wide liberalisation process and in the agricultural sector exports of US\$ 3.2 billion and imports of US\$ 0.8 billion in 1991 rose to exports of US\$ 6.7 billion and imports of US\$ 3.3 billion in 1999.<sup>156</sup>

### 10.3.2. Domestic Support

India submitted a detailed report to the WTO on domestic support for the 1995/96 marketing year (Table 24)

**Table 24: Support to Indian agriculture for 1995/96 as notified to the WTO**

Type of support measure	1995/96 outlay	
	US\$ million	Percent of value of agricultural production <sup>1</sup>
1. Green Box	2 196	2.9
2. Product-specific AMS	- 29 619	- 38.6
3. Non product-specific AMS	5 772	7.5
5. Total AMS (2+3)	- 23 847	-31.0
SDT measures	254	0.3

<sup>1</sup> FAO estimates.  
Source: WTO document AG/N/IND/1, 17 June 1998.  
FAO, 2000

Overall support is reported as negative, although spending on green box and non-product specific AMS is noteworthy.

### 10.3.3. Export Subsidies

India did not notify the WTO of any export subsidies during the base period, and is not eligible to provide subsidies in the future except for reducing the costs of marketing exports and internal transport.<sup>157</sup> India has in some cases subsidized indirectly, for example, USDA in 2001 noted that wheat surpluses in India and policy commitments to export surpluses resulted in a situation where "In order to make the wheat competitive in a price-depressed global market, it is being offered to

<sup>155</sup> FAO, 2000.

<sup>156</sup> ERS/USDA "India Relaxes Restraints on Agricultural Imports" *Agricultural Outlook/November 2000*. Washington: ERS/USDA, 2000.

<sup>157</sup> FAO, 2000.

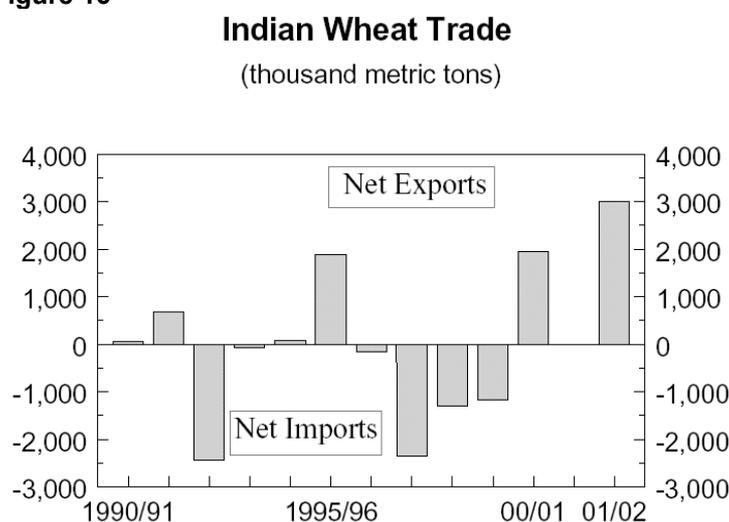
government trading houses, contingent on it being exported, at less than 2/3 the price of procurement, which amounts to an inherent subsidy of \$32 a ton.”<sup>158</sup>

## 10.4. Sustainability Conditions in India

### 10.4.1. Economic Considerations

Agriculture in India today represents over a quarter of total GDP and is even more significant in terms of labour.<sup>159</sup> Three quarters of the population is rural, and 70% percent of rural households depend on agriculture.<sup>160</sup> At the time of independence India was characterised by weak overall economic growth and weak growth in agriculture. Low food-grain production made India dependent on food imports, and the occurrence of droughts chronically brought about food and foreign exchange crises.<sup>161</sup> India is said to have undergone a “Green Revolution” in the 70s and a “Yellow Revolution” in the 80s, making the country largely food self sufficient in all major food crops including wheat and oilseeds. However, India is characterized by large fluctuations in production, as can be seen in Figure 16 below.<sup>162</sup>

Figure 16



Source: FSA/USDA “Indian Wheat Exports Increase Global Competition” June 15, 2001.  
<http://www.fas.usda.gov/grain/highlights/2001/01-06/iatr-0615.pdf>

The growth rate of food grain production in India increased from 2.3 % between 1950-66 to 2.7% from 1966-90.<sup>163</sup> The nominal impacts are significant as India food grain production rose from approximately 51 million metric tonnes in the early 1950s to 185 million metric tonnes four decades later.<sup>164</sup> This growth is attributed to both area increase and yield increase with emphasis on the latter.

<sup>158</sup> USDA “Indian Wheat Exports Increase Global Competition” Washington D.C.: USDA, June 15, 2001.

<sup>159</sup> World Bank *World Development Indicators 2001*. Washington, DC: 2001.

<sup>160</sup> FAO Commodities and Trade Division. *Agriculture, Trade And Food Security Issues And Options In The WTO Negotiations From The Perspective Of Developing Countries: Vol. II Country Case Studies*. 2000

<sup>161</sup> World Bank “South Asia’s Food Crisis: *The Case of India*” Washington, DC: 1996.

<sup>162</sup> FAO Commodities and Trade Division, 2000

<sup>163</sup> World Bank, 1996

<sup>164</sup> Reidhead, William P., Gupta, Suchi., and Joshi, Deepti. (eds.) “State of India’s Environment (A Quantitative Analysis)” New Delhi: Tata Energy Research Institute, August 1996.

Importantly there have been concerns regarding stagnation of the agricultural sector during the period of liberalisation in the 1990s especially in relation to the high growth period of the 1980s. A joint World Bank and WTO publication notes that agricultural growth stagnated to some degree in comparison with relatively robust growth in the 1980s. The report notes that food grain production increased by only 2% between 1991-92 and 1995-96, with the entire sector at growth rates of 3%.<sup>165</sup> A more in depth analysis shows that the average gross product growth rate was 3.2% from 1980/81 to 1990/91 and declined to an average of 1.93% from 1990/91 to 1998/99. Growth of output from the crops sector alone dropped from 3.5% to 2.37% during the same period. Decreases in the rates of yield increase in the sector and specifically in the wheat sub-sector are also noted.<sup>166</sup> The reasons for this slow down have been decline in public sector investment in the agricultural sector, increases in the cost of inputs, especially fertilizer, due to liberalisation, and lack of productivity and competitiveness improvements despite liberalisation efforts.<sup>167</sup>

The share of agriculture in the GDP product has been declining and was around 26% in 2000. Decline in employment in the sector occurred in the 1980s but there was also stagnation of this decline in the 1990s. According to Bhalla the result is “increase in the concentration of the work force in agriculture and a persistent deterioration of relative productivity and income of workers engaged in the primary sector.”<sup>168</sup> As has been noted India’s agricultural sector was characterized until the early 1990s with high levels of protection and support.

#### **10.4.2. Social Considerations**

Per capita income more than doubled over the past 50 years in India<sup>169</sup>, yet the percentage of the population living in poverty was 42% in 1984 according to the World Bank and 40% in 1992 according to UNDP.<sup>170</sup> Thus, the rate of poverty reduction is slow. The Government of India now estimates that the percentage of the population living in poverty is 26.1%<sup>171</sup>, although there has been some debate as to the accuracy of this figure.<sup>172</sup> In terms of food security a UNDP report estimates that 36% of the population should be considered poor if defined as not meeting minimum daily calories, and that 53% of children under-four remain malnourished. This remains true despite a four-fold increase in food grain production.<sup>173</sup> Importantly, three quarters of India’s poor are rural inhabitants. These statistics point to the reality that growth is uneven within India. In the agriculturally rich Punjab state 11% of the

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<sup>165</sup> Trade and Development Centre (A joint venture of the World Bank and the WTO) “Trade and Development Case Studies: India” <http://www.itd.org/issues/india2.htm>

<sup>166</sup> Bhalla G.S. “Political Economy of Indian Development in the 20<sup>th</sup> Century: India’s Road to Freedom and Growth” Presidential Address December 30<sup>th</sup> 2000, 83<sup>rd</sup> Annual Conference of the Indian Economic Association. <http://www.indianeconomics.org/material/j-m+article1.pdf>

<sup>167</sup> Trade and Development Centre  
Bhalla, 2000.

<sup>168</sup> Bhalla, 2000.

<sup>169</sup> Kumar, Shiva A. K. “Poverty and Human Development in India: Getting Priorities Right” UNDP in India, Occasional Paper 30. <http://www.undp.org.in/report/PHDI.htm>

<sup>170</sup> Reidhead, 1996.

<sup>171</sup> Planning Commission *Ninth Five Year Plan Vol I & II, 1997-2002*. New Delhi: Government of India, 1997.

<sup>172</sup> Mehta Aasha, Kapur and Shah, Amita. *Chronic Poverty in India: Overview Study* Chronic Poverty Research Centre, CPRC Working Paper 7.

<sup>173</sup> Kumar, Occasional Paper 30

rural population is classed as poor, while in Orissa the amount jumps to 50%.<sup>174</sup> Table 25 below shows some of the social consequences of disparity between rural and urban people in India.

**Table 25**

**Rural-urban disparities in India, 1991-1994**

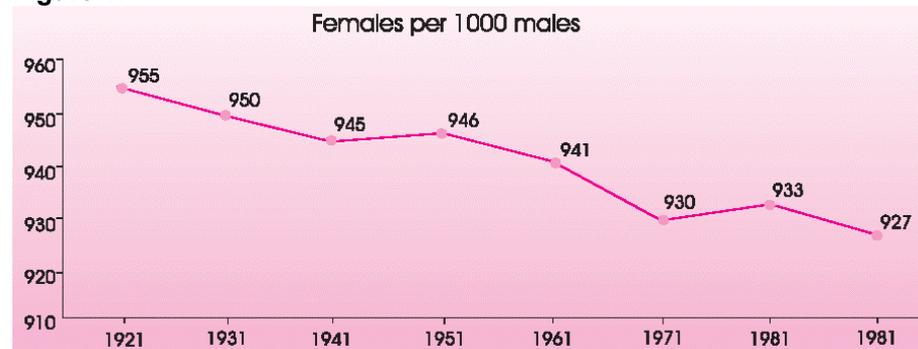
	Literacy (age 6+)	Mean years of schooling	Infant mortality rate	Child mortality rate	Access to safe drinking water
Year	1991	1994	1994	1994	1991
Rural	44.5	3.04	80	26.1	63.6
Urban	73.1	5.76	52	15.7	90.7

Source: Dutta, B., 1998. "Disparities in opportunities: the Indian experience", report from Rural Urban Division, UNDP, available at [www.undp.org.in/Report/IDF98/idfrural.htm](http://www.undp.org.in/Report/IDF98/idfrural.htm) (7 November 2000).

The wide disparities in regional performance and urban versus rural performance are of concern to liberalisation studies, as investment flows may tend to be concentrated in regions with already high levels of infrastructure and social capital thus widening disparity. In the case of India the issue of inequity of distribution is particularly pronounced when one examines gender disparity.

A telling statistic in India is the rate of women in the population in relation to men. India is part of a small group of countries in the world where there are fewer women than men. As Figure 17 below shows, this female to male ratio has actually been declining during India's period of growth.

**Figure 17**



Source: Menon-Sen, Kalyani, Kumar, Shiva A. K., *Women in India. How Free? How Equal?* Report for the UNDP, Office of the Resident Coordinator India, 2001.

India has what has been termed "missing women," as there would be more women than men if women received equal resources in society, such as health care, nutrition, and education.<sup>175</sup> Because of the distribution realities in India, rural women are the worst off segment of society. This is important in looking at agriculture because in

<sup>174</sup> Mehta Aasha, CPRC Working Paper 7.

<sup>175</sup> Menon-Sen, Kalyani, Kumar, Shiva A. K., *Women in India. How Free? How Equal?* Report for the UNDP, Office of the Resident Coordinator India, 2001.

rural areas over 89% of the female labour force is employed in the agricultural sector.<sup>176</sup>

Assessments of social impacts faced by India during the reform period identify common problems associated with trends creating incentives for larger-scale and more market oriented commercial agriculture. In particular, small-scale farmers are negatively affected by increasing competition and vulnerable groups may be impacted by food prices increase and in stability. Problems for small-scale Indian farmers in adjusting to liberalisation noted by the World Bank and the WTO include small-scale land ownership as an impediment to economies of scale, “debt bondage,” government cuts in irrigation expenditure, difficulties in getting credit for fertilizers, increases in the prices of inputs like fertilizers, lack of wage increases, and resulting reduction in food consumption.<sup>177</sup> These types of difficulties tend to aggravate distributional problems and given Indian women’s high dependence on the agricultural sector, particular attention should be paid to social impacts on this group.

### 10.4.3. Environmental Considerations

Turning to the environment, the achievement of improved agricultural growth in India has been accompanied by environmental impacts associated with expansion and intensification (Table 26).

**Table 26: Basic facts about the agriculture sector**

Indicator	India	South Asia
Land use (% of total land area) 1998	Arable 54.3%, Permanent cropland 2.7%, Other 43.0%	Arable 42.4%, Permanent cropland 2.1%, Other 55.5%
Arable land, hectares per capita 1996-98	0.17	0.16
Agriculture average annual growth 1990-99	3.4% (3.1% in 1980- 90)	3.4% (3.2% in 1980- 90)
Index of agricultural production per capita (1989-91=100) 1996-98	107 (93 in 1986-88)	...
Agriculture value added (% of GDP) 1999	28% (46% in 1970)	27% (44% in 1970)
Producer price on wheat (\$ per metric ton) 1998	142	...
Employment in agriculture (% of total labor force) 1998	... (70% in 1980)	... (69% in 1980)
Female labor force in agriculture of total female labor force 1996-98	... (83% in 1980)	... (83% in 1980)
Irrigated land (% of cropland) 1996-98	33.6%	40.8%
Average annual fertilizer use (kg per hectare cropland) 1995-97	89	...
Pesticide use (kg per hectare cropland) 1996	436	...
Tractors per 1,000 agricultural workers 1996-98	6	5
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	92%	93%

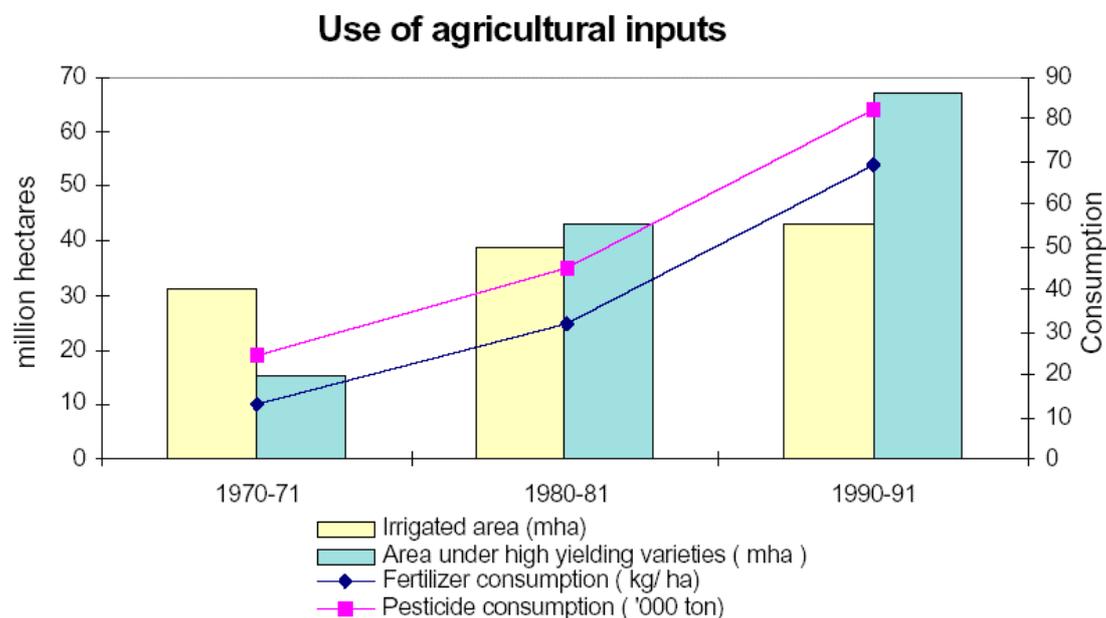
Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

<sup>176</sup> FAO, Sustainable Development Department. *Asia's women in agriculture, environment and rural production: India* <http://www.fao.org/sd/WPdirect/WPre0108.htm>

<sup>177</sup> Trade and Development Centre (A joint venture of the World Bank and the WTO). *Trade and Development Case Studies – Egypt*. <http://www.itd.org/issues/india2.htm>

Figure 18 below shows how the rate of growth in agricultural production has coincided with growth in agricultural inputs.

**Figure 18**



Source: Reidhead, William P., Gupta, Suchi, Joshi, Deepti. (eds.) "State of India's Environment (A Quantitative Analysis)" New Delhi: Tata Energy Research Institute. August, 1996.

In the Indian case study the analysis of environmental impacts will focus on the issue of soil degradation. This environmental impact is important in assessing the agricultural sector both because of the extent of soil degradation in India and because of India's need to meet the food requirements of its enormous population. Table 27 below summarises the soil degradation situation in India today.

**Table 27**

Classification of Indian soil degradation	Area (Mha)	Percent
Water erosion		
loss of top soil	132.5	40.3
terrain deformation	16.4	5
Wind erosion		
loss of topsoil	6.2	4.1
terrain deformation/overblowing	4.6	1.9
Chemical deterioration		
loss of nutrients	3.7	1.1
salinization	10.1	3.1
Physical deterioration		
waterlogging	11.6	3.5
Land not fit for agriculture	18.2	5.5
Soils with little or no degradation	90.5	27.5
Soils under natural condition	32.2	9.8
Total	328.7	100.0

Source: Sehgal, J, and I P Abrol. *Soil Degradation in India: status and impact*. New Delhi: Oxford & IBH Publishing Co., 1994.

Soil degradation is a crucial issue in assessing the sustainability of the agricultural sector because it leads to decreased yield potential and declining reservoir capacity. The causes of soil degradation are often natural, such as weather and soil type, but these causes are easily aggravated by human activities such as deforestation, and inappropriate irrigation and cultivation, both of which occur in the Indian case.<sup>178</sup> Some analysts have tried to quantify the economic losses due to soil erosion in India, and have argued that losses of 11% to 26% of the value of agricultural output can be attributed to soil erosion.<sup>179</sup>

## **10.5. Key Sustainability Issues**

Based on the description of sustainability conditions above, conclusions regarding what sustainability issues to focus on in the impact assessment can be made:

- Productivity of the sector, food self-sufficiency and food security.
- Distribution of resource and poverty alleviation, particularly gender disparity and rural/urban disparity.
- Soil degradation.

These sustainability issues are selected in response to the economic, social and environmental consideration captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for India is based on national government reviews, FAO and World Bank assessments, academic analysis, NGO studies, and other International Organization (IO) reviews.

## **10.6. India Sustainability Impact Assessment**

### **10.6.1. Structure of economic incentives and opportunities**

#### ***Baseline Scenario***

No significant change on average can be expected given that India has not been a major global food trader. From 1992-2000 India was an average wheat importer, and FAO statistics indicate that over this period India's average yearly net wheat imports were 237 935 metric tonnes. Given this low value India is considered essentially self sufficient in wheat production and moderate price recovery on global markets will not impact significantly on the overall structure of economic incentives. Impacts could be significant however on a year-to-year basis given the history of significant production fluctuations or given changes to India's status as self-sufficient in the sub-sector. A similar situation pertains with oilseeds (see Figure 13), while global market price increase in edible oils could have an impact in India (see Figure 15). However, as was noted in the analysis of the economic baseline for this study, the recovery in the edible oil crops sector is expected to be modest to moderate in the longer term and in the short-term prices will continue to be depressed.

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<sup>178</sup> Pachauri, R.K., Sridharan, P.V., (eds.) *Looking Back to Think Ahead: Green India 2047* Tata Energy Research Institute, 1998.

<sup>179</sup> Pachauri and Sridharan, 1998.

### ***Liberalisation Scenario***

The Hertel *et al.* study indicates that India will experience a slightly negative terms of trade loss, slight efficiency gains within the agricultural sector, and modest real income gains in a liberalisation scenario.<sup>180</sup> These results follow from India's status as a net exporter of agricultural products but at a lower level than the World's top exporters, with a relatively high level of protection for domestic markets. They also follow from the evaluation of economic conditions in the sustainability assessment above, which identifies some slowing of growth in the agricultural sector during the recent period of reform in India's agricultural sector. India can be expected to benefit from the elimination of agricultural support in OECD countries and new opportunities for export markets should emerge. At the same time, as India has historically had relatively high levels of protection for domestic agricultural markets a liberalisation scenario may result in increased imports in some agricultural sub-sectors.

It is difficult to find up to date and comprehensive modelling analysis of the impacts of liberalisation for the specific crops and scenarios selected for this study, and where these studies exist for India divergence in results are common. An early OECD report indicates that liberalization would have little impact on India's oilseeds sub-sector, a World Bank report suggests that liberalisation of the Indian oilseed complex would result in positive impacts, and the Government of India's working group on agriculture singles out edible oils for some negative impacts.<sup>181</sup> In the case of wheat, some analysts predict that India will have a significant "wheat gap" over the next two decades and a jump in world prices would thus impact significantly on the domestic dynamics of increasing demand and price responses, especially in poor rural areas.<sup>182</sup> However, other research efforts (e.g. IFPRI's IMPACT model<sup>183</sup>) expect Indian domestic wheat production to keep up with domestic demand.<sup>184</sup> The Indian case is complex and requires more in-depth analysis if conclusive results for the scenarios selected in this case study are to be achieved. Given the broad scope of the SIA methodology this problem pertains for all country case studies, where the need for more detailed and empirically based analysis grows exponentially in comparison with highly aggregated and theoretical global overviews. But the Indian case also demonstrates that the larger the country of analysis and the more complex its agricultural sector, the more difficult and demanding analysis will be. Given the contradictory nature of the economic evidence compiled for this assessment there remains a high degree of uncertainty on the incentive impacts of liberalisation in the selected sub-sectors.

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<sup>180</sup> Hertel *et al.*, 2000.

<sup>181</sup> Subramanian, Shankar. *Agricultural Trade Liberalization and India* Paris: OECD, 1993.

World Bank "The Indian Oilseed Complex: Capturing Market Opportunities" Washington D.C.: July 31, 1997.

Government of India, Working Group on Agriculture *Working Group Report on Agriculture and Allied Sector* <http://planningcommission.nic.in/wrkgrp/agriallied.pdf>, New Delhi: GOI, 2002.

<sup>182</sup> Bhalla G. S., Hazell Peter, Kerr John, "Prospects for India's Cereal Supply and Demand to 2020" Washington D.C.: IFPRI, 1999

<sup>183</sup> Bhalla *et al.*, 1999.

<sup>184</sup> Kumar, P. 1998. "Food demand and supply projections for India." Agricultural Economics Policy Paper 98- 01, New Delhi: Indian Agricultural Research Institute. IFPRI *Impact Model*

### ***Intermediate Scenario***

Similar but less significant impacts can be expected in the intermediate scenario. However, a qualitative difference for this scenario is that India may be better able to mitigate some of the short-term adjustment impacts of liberalisation. The sustainability assessment above has noted concerns that both poverty reduction and agricultural growth have stagnated during the post 1991 reform period. A FAO study suggests that these features should bring forth some concern about future agricultural liberalisation via the WTO in terms of short-term food security for the rural and urban poor. The assessment identifies import competition impacts on small farmers and rising food prices as key negative impacts on vulnerable groups in the short-term associated with liberalisation of the agricultural sector.

## **10.6.2. Production System Characteristics**

### ***Baseline Scenario***

With no significant changes in the structure of economic incentives predicted in the Indian case, no significant change in production system characteristics can be predicted.

### ***Liberalisation Scenario***

As has been noted, some contradictory assessments for the sub-sectors in this analysis exist for India. However, more general analysis of India's current experience with liberalisation of the sector does shed some light on possible structural impacts or production system impacts of liberalisation. A joint World Bank and WTO report notes that the benefits of liberalisation in the 90s have been concentrated on larger farmers "with the capital to buy new technology and inputs and those with the ability to switch to the production of cash crops that enjoyed higher prices over food crops...The losers include the small farmers and landless labourers whose incomes declined as a result of mechanization."<sup>185</sup> It is also noted that in the Indian case strong price responsiveness cannot always be expected in the agricultural sector, especially in terms of gains in production growth rates.<sup>186</sup> As has been noted in the sustainability overview, India has during the 1990s experienced a slowdown in growth rates in food production.

### ***Intermediate Scenario***

In the intermediate scenario similar production changes can be expected, yet the opportunities to mitigate the structural change impacts on small farmers and vulnerable groups may be better due to less significant policy resulting from WTO lead liberalisation.

## **10.6.3. Impacts on sustainability aspects.**

### ***Baseline Scenario***

No significant changes can be predicted on the sustainability trajectories that currently exist in India.

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<sup>185</sup> Trade and Development Centre (A joint venture of the World Bank and the WTO) *Trade and Development Case Studies – Egypt*. <http://www.itd.org/issues/india2.htm>

<sup>186</sup> Bhalla, 2000

### ***Liberalisation Scenario***

The impacts of liberalisation on sustainability will be most directly felt in terms of positive long-term welfare impacts and potentially negative distributional impacts, especially in the short-term. Problems for small farmers in adjusting to liberalisation noted by the World Bank and the WTO include small-scale land ownership as impediment to economies of scale, “debt bondage,” government cuts in irrigation expenditure, difficulties in getting credit for fertilizers, increases in the prices of inputs like fertilizers, lack of wage increases, and resulting reduction in food consumption.<sup>187</sup> Impacts on the rural poor thus tend to accentuate the disparity between urban and rural populations and rich and poor agricultural areas noted in the sustainability overview above. Negative impacts will affect rural women more than any other group in society, and in rural areas over 89% of the female labour force is employed in the agricultural sector.<sup>188</sup>

The environmental impacts are not easily analysed in the India case. Bhalla *et al.* find that continuing land degradation would have a negative impact on cereal production, which would have implications for India’s potential cereal gap noted above. At the same time efforts to better manage and reduce land degradation would have positive effects.<sup>189</sup> The links between further land degradation and impacts on economic and social factors are identified while the direct impacts of liberalisation on land degradation are not clear. Theoretically, rising world prices and increased demand would create incentives to improve yields through better land management, as yield loss due to degradation is identified as a block to production. However, agricultural inputs and lack of inputs are both identified in the Indian case as causes of degradation and it is not clear how further liberalisation will impact these relationships. There is thus a certain level of opportunity and risk in the full liberalisation scenario with regards to environmental impacts associated with the sub-sectors identified.

### ***Intermediate Scenario***

The causal links and resulting impacts in the intermediate scenario are predicted to be to be the same but less significant than in the liberalisation scenario. However, two key features of the intermediate scenario seem to improve results in terms of overall potential sustainability impacts. First, the literature surveyed for the Indian case is in some agreement on how India can best attain the greatest benefits from agricultural liberalisation. Bhalla expresses this view well when he argues that significant gains from global agricultural liberalisation can only be achieved

if the country improves its competitiveness by increased productivity. This requires large investment in rural infrastructure, in agricultural research and in biotechnology, and creation of institutional arrangements for reaching the benefits of research to all the cultivators including the small farmers<sup>190</sup>

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<sup>187</sup> World Bank and WTO

<sup>188</sup> FAO, Sustainable Development Department. *Asia's women in agriculture, environment and rural production: India* <http://www.fao.org/sd/WPdirect/WPre0108.htm>

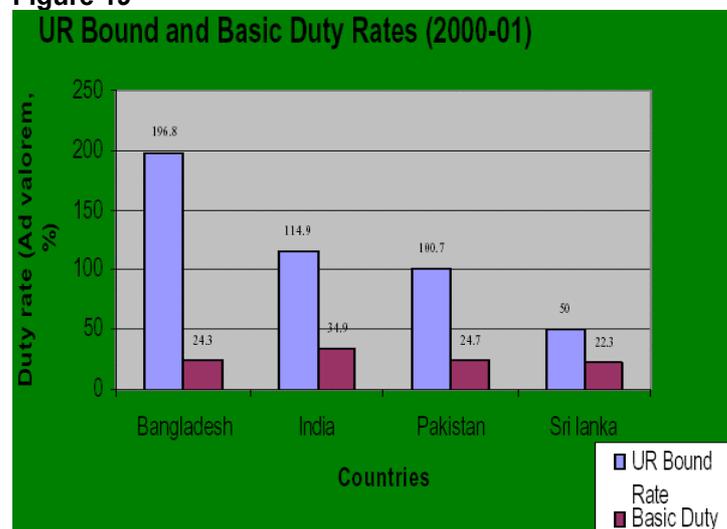
<sup>189</sup> Bhalla *et al.* 1999

<sup>190</sup> Bhalla, 2000.

The intermediate scenario will allow more room for investment of this type in the agricultural sector than the liberalisation scenario. Reference to India’s proposals to the WTO on agriculture supports the conclusion that India favours this type of approach. India states that “Given the diverse conditions and varying stages of agricultural development in developing countries, the need for making relevant provisions to enable them to pursue policies aimed at increasing agricultural production and productivity is thus necessary.”<sup>191</sup>

Second, a key element to consider in the intermediate liberalisation scenarios is the discrepancies between bound rate and applied rates for agricultural products in India. As Figure 19 shows this gap is quite wide in India and other developing countries and partial liberalisation of bound tariff rates may not impact significantly on India’s current structure of incentives and opportunities in the sector or on its ability to protect its markets and ensure price stability as compared to its current capabilities under WTO commitments.

**Figure 19**



Source: IFPRI, 2002

In the intermediate scenario India may gain from better market access for its exports without having to significantly alter its own border policies.

<sup>191</sup> GOA, “Negotiations On WTO Agreement On Agriculture: Proposals by India in the areas of: (i) Food Security, (ii) Market Access, (iii) Domestic Support, and (iv) Export Competition” WTO, January, 2001.

### SIA matrix of results

Overall, for India the economic impacts are not conclusive. Importantly, economic impacts in India may depend on India's ability to meet domestic wheat demand in the future. The Indian case study shows that there is some debate on this issue and that it is not currently known if India will meet these domestic needs over the longer term.

Specific causal links were thus difficult to establish in the Indian case, as it demonstrates a great deal of diversity between regions. The sustainability case above does however establish a potential for negative gender impacts. Environmental impacts are poorly causally linked to the wheat and edible oil sub-sectors, again resulting in ambiguous results.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
India	0	0	0	± 1	± 1	± 1	±1	± 1	± 1

### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

## 10.7. Policy response / implications

Liberalisation provides opportunities in India for economic and social gains due to reductions in domestic support and protection in developed countries. Ensuring that significant measures are implemented to curb support and protection in developed countries so that India can take advantage of its low-cost and non-subsidization characteristics is central for India in future trade negotiations.<sup>192</sup>

Ensuring food security particularly for women in the agricultural sector, small farmers in general, and the rural poor is clearly identified as a policy goal that India must address given further liberalisation in the agricultural sector. An FAO study has been cited as predicting negative impacts for these groups given further liberalisation. However, the same study notes that "flanking measures" such as employment programmes, targeted subsidies, and price stabilization using stocking operations specifically designed for food security purposes, are feasible in the Indian case.<sup>193</sup>

<sup>192</sup> FAO, 2000

<sup>193</sup> FAO, 2000

## 10.8. Conclusion

There appear to be overall positive economic impacts in the liberalisation scenario, while concerns pertain with regards to the distributional effects in particular with regards to small-scale farmers, the rural poor and women. It is expected that liberalisation may further marginalize these groups. The environmental impacts are less clear but there appear to be possibilities of both improvements to degradation trajectories and risks of negative land impacts. The intermediate scenario is more positive given opportunities to mitigate some of the potential negative social and environmental impacts. This is due to an identified need for public investment in India's agricultural sector, and due to a better bargaining situation for India in the WTO context. No impacts can be predicted for the baseline scenario.

## 11. Indonesia

### 11.1. Significance of the Indonesia Case

Indonesia is selected for this study because it is an exporter in edible oil crops (palm oil) and a developing country. Indonesia, together with Argentina, is selected to represent a developing country with a competitive advantage in an agricultural sub-sector. The World Bank notes that Indonesia has been the lowest cost palm oil producer in the world and with the devaluation of its currency following the financial crisis the profitability of exports has increased further.<sup>194</sup> The palm oil case of Indonesia is also important from a sustainability perspective as related economic, social and environmental consideration pertain in the sub-sector.

### 11.2. Introduction

Indonesia has experienced rapid economic growth over the past several decades. GDP grew at over 7 % per year over the past two decades<sup>195</sup>, per capita incomes grew on average 4.8 % over the past 30 years, and the number of people living on a dollar a day has dropped from 87.2 million in 1970 to 21.9 million in 1995.<sup>196</sup> The poverty index shows that Indonesia was successful in raising itself to the status of a middle-income developing country. The incidence of poverty in 1976 was 40.1 % but by 1996 it was only 11.3%. However, the economic crisis faced by Indonesia in 1997 threatens these gains and the incidence of poverty rose to a peak of 24.2 % in 1998.<sup>197</sup> The economic crisis that hit Indonesia in 1997 had wide-spread and deep impacts, and the economy contracted by 13.7% in 1998. Build up of short-term external debt, a weak banking and financial sector, and liberalisation of external trade and the financial sector without sufficient reform of underdeveloped institutional structures to regulate and maintain stability in the economy are some of the factors blamed for the crisis.<sup>198</sup>

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<sup>194</sup> World Bank *Indonesia The Challenges of World Bank Involvement in Forests* Washington D.C.: The World Bank, 2000.

<sup>195</sup> Asian Development Bank *Country Operational Strategy: Indonesia*. March 2001.

<sup>196</sup> World Bank, *Social Policy and Governance* "Indonesia and Poverty"

<http://www.worldbank.org/eapsocial/countries/indon/pov1.htm>

<sup>197</sup> ADB, 2001.

<sup>198</sup> ADB, 2001.

Daryanto, Arief. "Indonesia's Crisis and the Agricultural Sector: the Relevance of Agricultural Demand-Led Industrialisation" UNEAC Asia Papers No. 2, 1999.

Basic statistics (Table 28) for Indonesia show both the historical trends of economic growth and the significance of trade in the economy. As well, social problems such as child malnutrition and environmental problems such as deforestation are evident.

**Table 28: Economic, social and environmental indicators**

Indicator	Indonesia	East Asia and Pacific
Population 1999, million	207	1,837
Population density 1999, people per sq. km	114	115
Population growth, annual average 1965-99	2.0%	1.8%
GNI per capita 1999	\$600 (rank 150)	\$1,010
GDP per capita, average annual growth 1965-99	4.8%	5.6%
Gross fixed capital formation, average annual growth 1965-99	7.6%	9.7%
Exports of goods and services, average annual growth 1965-99	5.6%	10.1%
Trade (% of GDP) 1999	62% (28% in 1970)	70% (24% in 1970)
Net barter terms of trade (1995=100) 1998	95	...
Food imports (% of total merchandise imports) 1999	11%	5%
Present value of debt (% of exports of goods and services) 1999	255%	...
Domestic credit to private sector (% of GDP) 1999	20.1%	104.1%
Unemployment 1996-98	5.5%	...
Income distribution - Gini index	31.7 (1999)	...
Urban population of total 1999	40% (17% in 1970)	34% (19% in 1970)
Prevalence of child malnutrition 1993-99	34%	12%
Infant mortality rate 1999	42 per 1,000 live births	35 per 1,000 live births
Life expectancy at birth 1999, years	66	69
Access to an improved water source 2000	76%	75%
Net primary enrolment ratio 1997	96% male, 93% female	100% male, 100% female
Female labor force of total 1999	40.6%	44.4%
Children 10-14 years in the labor force (% of age group) 1999	8% (13% in 1980)	9% (26% in 1980)
Public expenditure on health (% of GDP)	0.7% (1999)	1.7%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	13,124	7,048
Nationally protected areas (% of total land area) 1999	10.6%	6.9%
Emissions of organic water pollutants (kg per day per worker) 1998	0.16	...
Carbon dioxide emissions (per capita metric tons) 1997	1.3	2.8
Genuine domestic savings (% of GDP) 1999	15.8	25.2%

<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 11.3. Trade Conditions

In the edible oil crops sector palm oil is Indonesia's major export with over 4 million metric tonnes exported in 2000. Indonesia and Malaysia are the world's top palm oil traders. The major imports are soybean and soybean cake, and both commodities were imported at over 1 million metric tonnes in 2000.<sup>199</sup>

Wheat represents a significant import for Indonesia, and in 1999 Indonesia imported over 3 million metric tonnes of wheat while it imported over 4.5 million metric tonnes of rice. Importantly wheat is less significant in terms of domestic food utilization as rice and maize account for the major share of domestic cereal utilization. Over 3 million metric tonnes of wheat was used for domestic food purposes in 1999, while over 32 million metric tonnes of rice and 7 million metric tonnes of maize were used for food.<sup>200</sup> In the Indonesian case wheat plays a somewhat less significant role in the analysis. A limitation of this study is that it is not able to adequately address food security questions and domestic support issues in relation to rice production, which are pivotal in the Indonesian case.

<sup>199</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

<sup>200</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

### **11.3.1. Market Access**

Most of Indonesia's agricultural tariff lines were bound at a ceiling rate of 40% under the URAA, and today the simple average applied rate for all agricultural products is 7.29%. Wheat tariffs are 0% and oil crop tariffs and edible oils tariffs range from 0% to 10%.<sup>201</sup> Indonesia has also had a history of quantitative restrictions and the National Logistics Agency (BULOG) was the lone importer of food commodities such as wheat, rice, sugar and soybeans. However as part of Indonesia's IMF programme BULOG is as of the end of 2001 restricted to rice imports only.

### **11.3.2. Domestic support**

Indonesia has actively supported development of the palm oil sector for over 30 years. Initially the sector was developed via state-owned enterprises, with several smallholder programmes implemented over the same period. The World Bank notes,

The encouragement of large-scale private estates started in 1986 through access to credit at concessional rates for estate development and crushing facilities. Conglomerates now dominate the sector, with eight of them owning land banks totalling 2.1 million ha out of 5.4 million ha officially allocated for oil palm.<sup>202</sup>

It is also important to consider how the palm oil sub-sector in Indonesia is strongly linked to the forestry sector. The most important link is in relation to concessions given to forestry companies, which allows them to clear cut areas that are slated for development into oil palm plantations. Forestry companies get wood utilization permits (Izin Pemanfaatan Kayu IPK), and under these agreements non-selective harvesting techniques are allowed, royalties owed are low, and there is no restoration fee. There are also government subsidies available to private corporations for plantation conversion concessions, but between 1990 and 1997 only 23% of concession area provided under these schemes were actually converted to plantation. A World Bank report notes,

Timber and tree-crop plantations have grown rapidly since the early 1980s. Timber plantation concessions have been promoted by the government, through subsidies and preferential regulations, in anticipation of the growing demand for industrial wood, primarily for the pulp and paper industry. However, because of inappropriate incentives (subsidies, permission to clear cut logged-over forests, and unattractiveness of the long-term investment in timber because of low log prices and pervasive illegal logging) natural forests have been degraded, while the area actually planted has been well below the area allocated. At the same time, significant investments have been made in pulp and paper industrial capacity, which has significantly increased the demand on natural forests to meet their growing raw material requirements. The growth of tree-crop plantations has also been rapid, particularly for oil palm, in response to strong financial incentives. These trends have added

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<sup>201</sup> APEC Economies *Electronic Individual Action Plan – Indonesia 2001* [http://www.apec-iap.org/document/INA\\_2001\\_IAP.htm](http://www.apec-iap.org/document/INA_2001_IAP.htm)

APEC Tariff Database <http://www.apectariff.org>

<sup>202</sup> World Bank *Indonesia The Challenges of World Bank Involvement in Forests* Washington D.C.: The World Bank, 2000.

substantial pressures on the forests, and the incentives have increased in the aftermath of the recent financial crisis.<sup>203</sup>

Thus not only does direct government policy in the palm oil sector affect the industry, but indirect forestry policies and capacity and demand in the industrial forestry products sectors impacts on the scope of palm oil expansion. Recent policy changes, especially those led by IMF structural adjust conditions, are expected to affect the palm oil sector. Relevant policy changes include: export tax reductions on palm oil, liberalization of foreign investment in the sector, revoking conversion permits for non-developed estates, and plantation size limits.<sup>204</sup>

### **11.3.3. Export Subsidies and Export Taxes**

Indonesia does not use export subsidies in the sectors identified for this study and under the URAA it is only eligible to use them for rice. Importantly, export taxes and eventually bans impacted significantly on trade in the palm oil sector during the Indonesian financial crisis in the late 1990s. These measures were implemented in response to currency devaluation and increasing price incentives to export in the sub-sector rather than sell on the domestic market. Due to concerns over domestic supply and food security export taxes were applied at 40% in April of 1998, but were subsequently reduced to 10% in 1999 and 3 percent in February of 2001<sup>205</sup>. These reductions were included as part of an IMF aid package to Indonesia.

## **11.4. Sustainability conditions in Indonesia**

### **11.4.1. Economic Consideration**

The Indonesia sustainability case study focuses on the palm oil sector. This sub-sector has seen exceptional growth in Indonesia over the past four decades. Palm oil plantations area was 106,000 hectares in 1960 and by 1997 there where 2.5 million hectares (a growth rate of 11.2 %/year). Palm oil is an important source of foreign exchange with \$ 1.4 billion in earning in 1997. The majority of exports go to the Netherlands and other EU countries.<sup>206</sup> The sub-sector is also important because Indonesia is the biggest consumer of palm oil<sup>207</sup>, and because the sub-sector is labour intensive. The palm oil industry employed over 2 million people in 1997. The sub-sector's growth was affected by the economic crisis and the ensuing political turmoil that occurred in Indonesia in the late 90s, and has been singled out as a key sub-sector for recovery. Table 29 below provides some basic facts of the agricultural sector in Indonesia. Important to note is that although agriculture accounts for 20% of GDP the sector accounts for 45% of total employment.

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<sup>203</sup> Ibid

<sup>204</sup> World Bank *Indonesia The Challenges of World Bank Involvement in Forests* Washington D.C.: The World Bank, 2000.

<sup>205</sup> APEC Economies *Electronic Individual Action Plan – Indonesia 2001* [http://www.apec-iap.org/document/INA\\_2001\\_IAP.htm](http://www.apec-iap.org/document/INA_2001_IAP.htm)

<sup>206</sup> Casson, Anne “The Hesitant Boom: Indonesia’s Oil Palm Sector in an Era of Economic Crisis and Political Change” Center for International Forestry research. Occasional Paper No. 29. June, 2000.

<sup>207</sup> Palm based cooking oil is a basic food staple

**Table 29: Basic facts about the agriculture sector**

Indicator	Indonesia	East Asia and Pacific
Land use (% of total land area) 1998	Arable 9.9%, Permanent cropland 7.2%, Other 82.9%	Arable 12.0%, Permanent cropland 2.6%, Other 85.4%
Arable land, hectares per capita 1996-98	0.09	0.11
Agriculture average annual growth 1990-99	2.3% (3.4% in 1980-90)	3.3% (4.4% in 1980-90)
Index of agricultural production per capita (1989-91=100) 1996-98	108 (93 in 1986-88)	...
Agriculture value added (% of GDP) 1999	19% (45% in 1970)	14% (33% in 1970)
Producer price on wheat (\$ per metric ton) 1998	...	...
Employment in agriculture (% of total labor force) 1998	45% (56% in 1980)	46% (66% in 1980)
Female labor force in agriculture of total female labor force 1996-98	42% (54% in 1980)	...
Irrigated land (% of cropland) 1996-98	15.5%	37.1%
Average annual fertilizer use (kg per hectare cropland) 1995-97	92	...
Pesticide use (kg per hectare cropland) 1996	88	...
Tractors per 1,000 agricultural workers 1996-98	1	2
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	93%	80%

Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

Since the economic crisis, the agricultural sector and particularly the palm oil sub-sector have been viewed as important in facilitating recovery in the Indonesian economy. It was expected that the palm oil industry might even benefit from the crisis. Severe devaluation of the rupiah during the crisis boosted earnings from palm oil exports as local producers favoured export and foreign exchange earnings rather than selling on the internal market. However, local supplies tightened and prices rose prompting the government to increase export taxes and set export limits, and finally export bans in order to ensure adequate domestic supplies. These measure combined with other fiscal weaknesses in major palm oil companies caused slowed growth in the palm oil sector.<sup>208</sup>

#### 11.4.2. Social Considerations

Indonesia, during its growth period, was also successful in improving basic services such as education and health, family planning, and nutrition. Female literacy is now 83% (up from 54% 30 years ago), primary school enrolment is at 75%, and malnutrition and infant mortality have declined. Problems persist however including low levels of safe water and sanitation services, completion and quality problems in education services, high rates of infant and maternal mortality, and food insecurity for vulnerable groups. As well, Indonesia ranked 90<sup>th</sup> of 165 countries on the gender development index, due to problems with women's representation in secondary education, in the labour force, and in decision making.<sup>209</sup>

The palm oil industry itself has significant social sustainability impacts. Specifically oil palm plantation expansion has caused conflicts with local communities over displacement and allocation of natural resource benefits. Political transition in Indonesia has brought to the fore social tensions in the society in general, and tensions associated with the palm industry specifically. Conglomerates dominate the palm oil

<sup>208</sup> Casson, 2000.

<sup>209</sup> ADB, 2001.

industry and in 1997 just four companies held 68% of the private plantation area in Indonesia.<sup>210</sup> Since the fall of the Suharto regime local communities have increasingly protested and disrupted oil palm estates with the aim of reclaiming land rights.<sup>211</sup>

Social tensions in the sub-sector arises from land and user rights issues in relation to forests and the government's transmigration programmes that promote movement of people from the population dense Java to areas traditionally inhabited by indigenous forest dwelling peoples. A World Bank report argues that in developing a "New Order" regime and the beginning of the 1970s, the Indonesia government used the country's natural capital to fuel economic growth and development and "establish its authority and legitimacy."<sup>212</sup> The benefits from forest national resources have always tended to go to elites according to the World Bank, but as one analyst notes the more recent shift to subsidising large forestry and plantation companies for plantation concessions "permanently places large amounts of contiguous, formerly forested or cultivated lands under the control of corporations based in Jakarta or abroad. It leaves little room even at the margins for rural farmers to continue to eke out an existence."<sup>213</sup>

A Center For International Forestry Research (CFIFR) report finds that large-scale palm oil plantations have frequently been involved in conflict situation especially in the South Sumatra Province, where all 81 oil palm plantations have been involved in conflicts with local communities.<sup>214</sup> In addition to environmental impacts associated with the sector the report concludes that government,

overlapping and chaotic forest land use classification systems work to the benefit of private plantation developers at the expense of the rights and livelihoods of forest-dwelling people...resolution of these problems is hampered by the persistence of the government's top-down approach and non-recognition of traditional land use rights.<sup>215</sup>

As a result social and economic life has been disrupted for many vulnerable groups.

### **11.4.3. Environmental Considerations**

The key environmental issues in Indonesia related to the agricultural sector is the damaging trend in land conversion and deforestation. The large-scale land conversion in palm oil sector in particular is considered to be the major factor in increasing rates of deforestation during the 1990s. Other causes include logging, small-scale land conversion, and illegal logging. Sustainable management of the forestry sector in

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<sup>210</sup> Barber, Charles V., Schweithelm, James. *Trial By Fire: Forest Fires and Forest Policy in Indonesia's Era of Crisis and Reform*. Washington DC: World Resources Institute, 2000.

<sup>211</sup> Casson, 2000.

<sup>212</sup> World Bank *Indonesia The Challenges of World Bank Involvement in Forests* Washington D.C.: The World Bank, 2000.

<sup>213</sup> Malley, Michael "Social Cohesion and Conflict Management in Indonesia" Prepared for the Asia Regional Consultation on Social Cohesion and Conflict Management, Manila, March 16-17, 2000. [http://wbln0018.worldbank.org/Networks/ESSD/icdb.nsf/D4856F112E805DF4852566C9007C27A6/9C8B0488C5BACFC48525692100632974/\\$FILE/p-malley-indonesia.doc](http://wbln0018.worldbank.org/Networks/ESSD/icdb.nsf/D4856F112E805DF4852566C9007C27A6/9C8B0488C5BACFC48525692100632974/$FILE/p-malley-indonesia.doc)

<sup>214</sup> Kartodihardjo Hariadi, Supriono Agus. "The Impact of Sectoral Development on Natural Forest Conversion and Degradation: The Case of Timber and Tree Crop Plantations in Indonesia" Occasional Paper No. 26(E). Jakarta: CIFOR, 2000.

<sup>215</sup> Kartodihardjo & Agus, 2000.

Indonesia has been a key issue for years, and governments have repeatedly committed themselves to implementation of sustainable forestry measures. However, deforestation has been occurring at a rate of 1.7 million hectares per year from 1985-1997, which is greater than the predicted rate of 0.6-1.3 million hectares per year.<sup>216</sup> Over 20 million ha of forest has been lost since 1985. Lowland forests have experienced the greatest reductions because they are best suited for conversion to plantations, and are easy to access. It is also the lowland forests that have the highest levels of biodiversity and the most value in terms of timber production. Indonesia has the world's most abundant biodiversity but deforestation is a major threat to Indonesia's natural resources. The Asian Development Bank notes that forest harvesting is currently estimated to be at 33 million cubic meters (m<sup>3</sup>) per year, significantly above the estimation of sustainable harvesting of 22 million cubic meters. The ADB suggests that forest resources will be exhausted over the next two decades unless trends change.<sup>217</sup> Lowland plains on the three islands of Sumatra, Kalimantan and Sulawesi are expected to lose all their forest cover over the next decade if current deforestation rates continue.<sup>218</sup> Forest cover will then be limited to hilly and mountainous regions.

The causes of deforestation have traditionally been attributed to shifting cultivators, but this traditional practice is no longer wide spread and occurs largely in remote areas. The small-scale actors in causing deforestation today are pioneer farmers, transmigrants and farmers displaced by large-scale operators. Large-scale estate developments particularly oil palm plantations, are the main cause of deforestation today, along with the forestry conglomerates and transmission contractors. These three groups were also largely responsible for the major forest fires of 1997-98 that caused the loss of 4.8 million ha of forest (total burned area was 9.7 million ha). Droughts in 1997 and 1998 set the stage for forest fire risk, but human drivers are considered to have caused the majority of forest destruction due to fire. The World Bank estimates that large-scale land conversion caused 34% of the total forest fires, while shifting agriculture caused 25%. Only 1% was estimated to have been due to natural causes. Estimates of economic costs are between \$9.3 billion and \$7.9 billion, with agricultural and forestry losses accounting for over \$5 billion of the total.<sup>219</sup> The CO<sub>2</sub> emissions were also extensive.

The World Bank identifies governance as a key issues in the threat to Indonesian forests. They note,

The sector is plagued by governance problems, which have made the official forest policy *de facto* ineffective. This is well demonstrated by the events following the 1997/98 forest fires. Of the 176 companies found responsible for starting the fires to clear land for plantations, including 133 oil palm companies, virtually no action has been taken against any company. Illegal logging is pervasive. Almost all domestic consumption of logs is currently met from illegal logging, with official concessions accounting only for processed exports. The lack of implementation of rules and regulations

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<sup>216</sup> World Bank *Indonesia: Environment and Natural Resource Management in a Time of Transition*. Washington DC: February 2001.

<sup>217</sup> Asian Development Bank, March 2001.

<sup>218</sup> Asian Development Bank, March 2001.

<sup>219</sup> Asian Development Bank, March 2001.

governing concession contracts provides a strong incentive for the concession holders not to adopt sustainable practices. Poor enforcement of laws, often in collusion with officials, has resulted in illegal logging levels that now equal legal logging. The timber plantation concession system is ironically leading to degradation of forest areas rather than regenerating them, while unclear and overlapping forest boundaries have resulted in granting concessions and conversion rights in areas meant to be protected and conserved.

Domestic policy and trade in the Indonesian case clearly combine to create sustainability problems.

### **11.5. Key sustainability issues.**

The case of the palm oil sub-sector in Indonesia is important for this SIA study as it addresses important tradeoffs that may be encountered often in a sustainability analysis of trade liberalisation.

The recovery of the palm-oil sub sector in Indonesia is a key element in the overall recovery of the country from economic collapse. Palm oil brings in much needed foreign exchange, is labour intensive, and thus has a potential to curb unemployment resulting from collapse in other sectors. At the same time the palm oil industry threatens Indonesia's forests and biodiversity significantly and has contributed to displacement of, and conflict with vulnerable groups.

From our assessment of the sustainability conditions in Indonesia's palm oil sector clear economic, social and environmental issues can be identified. These are:

- The palm oil sub-sector's ability to contribute to economic recovery
- Social stability and conflict over land rights
- Unsustainable deforestation

These sustainability issues are selected in response to the economic, social and environmental consideration captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for Indonesia is based on national government reviews, World Bank and IMF assessments, academic analysis, NGO studies, and other International Organization (IO) reviews.

## **11.6. Indonesia Sustainability Impact Assessment**

### **11.6.1. Structure of economic incentives and opportunities**

#### ***Baseline scenario***

According to the economic baseline analysis for the edible oil crops sector in this study, the sector is expected to continue to be characterised by short-term price depressions with moderate recovery predicted over the long term. Demand is expected to increase mostly in developing countries. There are signs that the palm oil sector can expect some slightly better performance than other edible oil sectors. The price recovery is modest particularly in the context of historical prices, and no significant change in incentives is predicted.

Wheat is a significant import in Indonesia in comparison to other cereals. However, this is due to the fact that Indonesia is now largely self-sufficient in rice production while it has very little wheat production. In terms of utilization wheat is much less significant compared to rice, and price recovery in the wheat sub-sector is not expected to have any significant impacts throughout the causal chain.

### ***Liberalisation scenario***

In the liberalisation scenario Indonesia can expect to have increasing incentives for palm oil production due to the predicted 11% price increase on global markets for all oil crops. Under extensive liberalisation conditions it is also predicted that production of oil crops will decrease in developed countries by over 5% and will increase by 4% in developing countries.<sup>220</sup> Drastic reductions or eliminations of subsidies in developed countries partly account for this shift. Indonesia, as a low cost producer of palm oil, will have increased incentives for production in the sub-sector. Interestingly the regional analysis predicts that Indonesia will have essentially no welfare impacts from liberalisation in the agricultural sector. This study is not able to identify the reasons for the overall welfare impacts.

As the tariff structure is largely liberalised and export taxes have been reduced significantly recently, commitments via the WTO should not impact significantly on the structure of incentives. Domestic support measures not covered by the AMS calculation may be impacted, but current reforms via the IMF structural adjustment commitments are likely more significant in the context of this case study.

### ***Intermediate scenario***

The same economic incentives pertain in the intermediate scenario but to a lesser extent. Given Indonesia's high bound tariff rates yet low applied rates, the intermediate scenario will not impact significantly or at all on the level of openness in the sub-sector under analysis. Indonesia will likely gain from tariff reductions and subsidy reductions in other countries while the palm oil sector will not be hindered significantly by Indonesia's own commitments.

## **11.6.2. Production System Characteristics**

### ***Baseline scenario***

As only modest price recovery of the sector is predicted no significant changes can be expected for global market price changes. Domestic policy has been established as the key factor and will continue to be the most significant determinant in the sector under the baseline scenario.

### ***Liberalisation scenario***

The price recovery in the oil crop sector and the shift of production from developed to developing countries will increase the incentives for palm oil production in Indonesia. One effect of changed incentives may be a higher percentage of plantation concessions actually being converted into palm oil plantations, instead of these concessions simply being used for the short-term gains from clearing. Overall in the liberalisation scenario we can expect a higher rate of forest converted to plantation.

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<sup>220</sup> ERS/USDA, May 2001

The sustainability assessment has shown that domestic policy in Indonesia has resulted in unsustainable forestry practices in the palm oil sector. Without domestic policy changes liberalisation and the resulting increases in production will intensify currently unsustainable trajectories. However, liberalisation in the palm oil sector is not itself directly causally linked to production system characteristics on a go forward basis as Indonesia already has a well established shift to larger-scale commercially oriented plantations, which are characteristic of liberalisation in agriculture in exporting countries.

### ***Intermediate scenario***

Like in the liberalisation scenario, the incentives for palm oil production increase conversion of forest into plantation. Differences between the scenarios are only in terms of the significance of price and demand incentives for increased production.

## **11.6.3. Impacts on sustainability aspects**

### ***Baseline scenario***

As no major change is expected in the structure of incentives and production system in Indonesia, no change in the trajectories with regards to the sustainability considerations identified in the case study can be expected. In the baseline then the identified unsustainable trajectory in the forestry sector, for example, receives a “0” impact, as baseline international changes in price and demand do not impact directly on current trajectories. Importantly though recent liberalisation measures in Indonesia may be affecting these trajectories such as reductions of export taxes and liberalisation of investment in the palm oil sector. These would tend to increase production in the sector, although it is too early to assess the affect of recent policy changes.

### ***Liberalisation scenario***

Modelling efforts results show that Indonesia cannot expect any significant welfare impacts from global liberalisation in the agricultural sector. Hertel *et al.* show that even though agriculture represents over 20% of Indonesia’s GDP no trade balance change occurs in a liberalisation scenario. This result must be due to impacts in other sectors not analysed in this assessment. Economic benefits can however be expected from price increase in the palm oil sector given Indonesia’s competitive advantage in the sub-sector.

Given Indonesia’s history of weak forest management it can be expected that further incentives for growth in the palm oil sector will aggravate unsustainable deforestation trajectories. Liberalisation within the context of domestic policies that do not aim at sustainable forest use and weak governance in regulating illegal logging is not a direct cause of environmental impacts but is one stressor among others that increases the rate of degradation. Importantly the liberalisation scenario could have some positive environmental impacts. With increasing world prices it has been noted that the rate of conversion of plantation concessions to actual plantation may increase (from 1990-97 only 20% of plantation concessions were converted to oil palm plantations). Using plantation concessions to clear cut areas without introducing plantation has more negative environmental impacts, as the clear-cut area remains unmanaged. Increasing the rate of actual conversion to plantation thus has positive environmental impacts. However, it must be kept in mind that the concession system and its impacts are

largely a domestic policy questions (i.e. to whom and how the government awards concessions). As well, incentives and production structures in other sectors like the pulp and paper industry, which has a high demand for cheap primary inputs, are also significant. Therefore this assessment relies on the historical evidence of weak forestry management in Indonesia and finds that liberalisation in edible oils will tend to increase deforestation rates.

It has also been noted in the sustainability overview above that there has been a trend towards large-scale commercial palm oil operations in Indonesia. Social conflict over land rights has been identified as a key sustainability impact associated with the palm oil sector, particularly as larger-scale operations have increasingly dominated the sector. Given this trend and increasing incentives for production in the palm oil sector negative social impacts on the rural poor, particularly forest dwellers. Positive social impacts can be predicted for poverty and employment for other social groups given increased employment in the sector in response to improving incentives for production.

### *Intermediate scenario*

For the scenarios analysed in this study, the intermediate scenario has very similar impacts to the liberalisation scenario only less significant.

### **SIA matrix of results**

In Indonesia we see positive economic impacts for both liberalisation scenarios due to improving incentives in the palm oil sector. Social impact results were somewhat more ambiguous due to clear conflicts between social groups associated with the palm oil sector. An ambiguous result is thus due to some social groups gaining while others, particularly forest dwelling indigenous groups, incur negative impacts. In terms of environmental impacts we see clear negative impacts on forests, especially in the liberalisation scenario, that are directly causally linked in the assessment.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
	0	0	0	+1	± 1	-1	+2	± 2/± 1	-2

### **Notes:**

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

## **11.7. Policy response / implications**

The Indonesian case is a good example of how liberalisation can impact indirectly on negative sustainability trajectories that are largely caused by domestic policies.

Domestic policy responses to establish sustainable forestry management practices are clearly needed. Likewise, domestic policy is needed to ensure that vulnerable groups often displaced by large commercial palm plantation operators have more secure livelihoods and better established land and natural resource rights.

### **11.8. Conclusions**

Indonesia can expect to gain economically from liberalisation in the palm oil sub-sector, while no significant economic impact can be predicted in the wheat sector. Increased economic benefits will translate in to improving social conditions for some groups although the welfare impacts are ambiguous and the benefits associated with a growing palm oil sector have distributional problems. The most important social impact is in relation to the rural poor especially forest dwellers and indigenous groups. Conflict due to natural resource rights and land rights have been shown to be pervasive in the sub-sector. Liberalisation without improved domestic policy will tend to aggravate this social impact due to increasing incentives for palm oil expansion. Similarly the palm oil sector has been shown to be one of the key causes of unsustainable forest degradation in Indonesia and increasing expansion of the palm oil sector due to liberalisation will worsen these conditions. Without improved domestic policy and mitigating measures negative environmental impacts can be expected.

## **12. Argentina**

### **12.1. Significance of the Argentinean Case**

Argentina is selected as a case study for this analysis because of its status as a net food exporting developing country, and a major exporter of the two food crops selected for this study. Argentina has low to negative support in the sector and is thus also chosen because of its competitive advantage in the selected food crops.

### **12.2. Introduction**

Argentina is one of the world's most important exporters of agricultural commodities and products. Argentina is the fifth largest wheat exporter in the world and the largest exporter of processed oilseeds.<sup>221</sup> Argentina has a relatively small population and thus small internal demand for its agricultural production, making the sector dependant on international markets of for the sale its products.

A review of basic statistics (Table 30) shows that Argentina fairs well on several social indicators such as life expectancy, nutrition, and infant mortality, while some economic indicators show a stagnating economic situation and high unemployment.

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<sup>221</sup> ERA/USDA *Briefing Room, Argentina: Trade* <http://www.ers.usda.gov/briefing/argentina/trade.htm>  
Updated: December 14, 2000.

**Table 30: Economic, social and environmental indicators**

Indicator	Argentina	Latin America and the Caribbean
Population 1999, million	37	508
Population density 1999, people per sq. km	13	25
Population growth, annual average 1965-99	1.5%	2.1%
GNI per capita 1999	\$7,550 (rank 58)	\$3,800
GDP per capita, average annual growth 1965-99	0.4%	1.4%
Gross fixed capital formation, average annual growth 1965-99	1.1%	1.9%
Exports of goods and services, average annual growth 1965-99	5.3%	6.0%
Trade (% of GDP) 1999	21% (10% in 1970)	34% (20% in 1970)
Net barter terms of trade (1995=100) 1998	104	...
Food imports (% of total merchandise imports) 1999	5%	9%
Present value of debt (% of exports of goods and services) 1999	456%	...
Domestic credit to private sector (% of GDP) 1999	25.0%	29.4%
Unemployment 1996-98	16.3%	...
Income distribution - Gini index	...	...
Urban population of total 1999	89% (78% in 1970)	75% (57% in 1970)
Prevalence of child malnutrition 1993-99	2%	9%
Infant mortality rate 1999	18 per 1,000 live births	30 per 1,000 live births
Life expectancy at birth 1999, years	74	70
Access to an improved water source 2000	79%	85%
Net primary enrolment ratio 1997	..., ...	..., ...
Female labor force of total 1999	32.7%	34.6%
Children 10-14 years in the labor force (% of age group) 1999	3% (8% in 1980)	9% (13% in 1980)
Public expenditure on health (% of GDP)	4.9% (1998)	3.3%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	2,851	45,878
Nationally protected areas (% of total land area) 1999	1.7%	7.3%
Emissions of organic water pollutants (kg per day per worker) 1998	0.21	...
Carbon dioxide emissions (per capita metric tons) 1997	3.9	2.8
Genuine domestic savings (% of GDP) 1999	8.2%	9.6%

<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 12.3. Trade Conditions

Argentina is a net food exporter and is among the world's top exporters of the food crops selected for this study. Argentina exported over 11 million metric tonnes of wheat and wheat flour in 2000 placing it in the top five of world exporters. Argentina exported over 4 million metric tonnes of soybeans, nearly 3 million metric tonnes of soybean oil in 2000, and nearly 13 million metric tonnes of soybean cake. This places Argentina in the top three exporters of soybean together with the United States (the World's top exporter) and Brazil.<sup>222</sup> Argentina has a high level of production with a relatively small population, leaving most production for export on world markets (see Argentina's food balance sheet). Argentina has not had a history of significant support in the sub-sectors identified for this study and is thus a "natural" exporter of wheat and edible oil crops.

#### 12.3.1. Market Access

Argentina currently has applied agricultural tariffs of between 8% and 13% for oilseeds for crushing, oilseed oils, and oilseed cakes. Higher rates exist for processed oilseed commodities than for oilseeds. Tariff rates for agricultural products can range from 0% to 20%, while its bound rate under the URAA was 35% for agricultural products. Argentina is a member of the MERCOSUR trading bloc, which has a

<sup>222</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

Common External Tariff (CET). The average applied rate of external tariff is 13.5% for Argentina. The CET has fluctuated since its implementation with averages originally around 10%, a temporary increase of 3% during the Asian financial crisis, and a current increase of 3% over last year.<sup>223</sup>

### **12.3.2. Domestic Support**

In Argentina many agricultural exports benefit from export rebates, which range from 1.35 to 10 percent. In general though, Argentina's government does not have many specific agricultural policies that provide financial support to the sector. With severe fiscal limitations from the convertibility plan adopted in 1991, the general direction of agricultural policy in Argentina has been to less government involvement. Argentina does not on whole provide domestic support in the oilseeds and wheat sectors, but has rather tended to tax the sector. This tax is partly used to favour processed soybean products.<sup>224</sup> In recent years export taxes have been reduced or eliminated, and export tax rebates have declined as well.

### **12.3.3. Export Subsidies and Export Taxes**

Argentina has not made any notification of export subsidies that would be subject to reduction via the WTO in the agricultural sector. Instead, as was noted above, the areas under investigation had tended to be taxed. However, liberalisation measures in the agricultural sector saw most export taxes reduced to zero except for soybeans which had an export tax of 3.5%, applied in part to promote processing in the sub-sector. As of March 2002 however Argentina has re-implemented export taxes of 10% on wheat and soybeans (over and above the aforementioned 3.5% tax on soybeans) and 5% on wheat flour and soybean oil and cake. It should be kept in mind however that these increases are occurring at the same time as currency devaluation and according to USDA analysis "the new taxes are not so large as to offset the financial gains from the devaluation for export oriented products."<sup>225</sup>

## **12.4. Sustainability conditions in Argentina**

### **12.4.1. Economic Considerations**

Over the past several decades Argentina has struggled with high inflation, overvalued exchange rates and crushing external debt.<sup>226</sup> Attempts in the 70s and 80s by the government to stabilize the economy were not effective, and inflation fluctuated wildly (Figure 20).

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<sup>223</sup> The Wallstreet Journal "Index of Economic Freedom – Argentina 2002" Washington D.C.: The Heritage Foundation, 2001. <http://cf.heritage.org/index/country.cfm?ID=4>

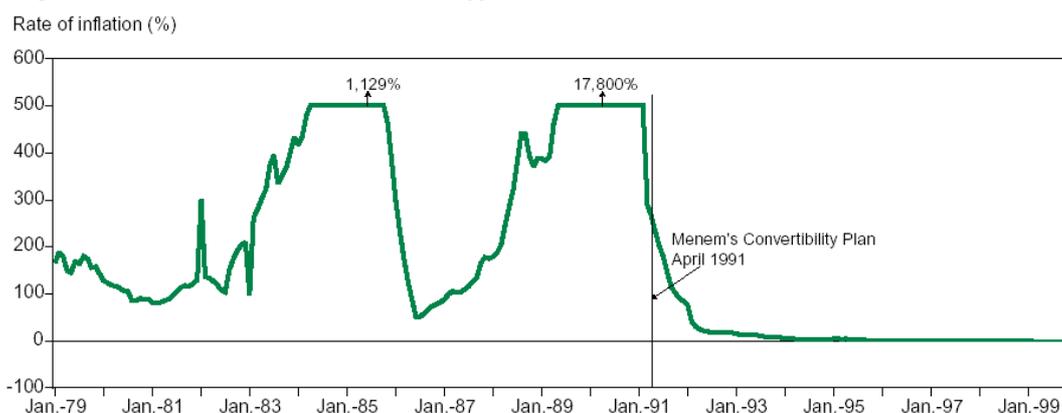
<sup>224</sup> USDA "USDA Country Reports - Argentina: Oilseeds and Products Annual - May 2001" Washington D.C., 2001.

<sup>225</sup> USDA "GAIN Report AR2018, Argentine Government Institutes Exports Taxes" Washington D.C.: USDA, 2002.

<sup>226</sup> Schnepf Randall D., Dohlman Erik, Bolling, Christine. "Agriculture in Brazil and Argentina: Developments and Prospects for Major Field Crops" ERS/USDA, November 2001.

**Figure 20**

**Argentina has suffered from bouts of severe hyperinflation\***



Source: ERS/USDA "Agriculture in Brazil and Argentina: Developments and Prospects for Major Filed Crops" November 2001.

An important feature of the Argentine economy in previous decades that impacted on the agricultural sector was the government's promotion of import substitution beginning in the 1950s. These policies impacted on the growth of the agricultural sector by, for example, imposing import tariffs on agricultural inputs that punished the agricultural sector and kept Argentina from keeping pace with other major exports in yield increases. Prior to 1977 import tariffs on fertilizers and agricultural chemicals were 60 and 65 %.<sup>227</sup>

Basic indicators (Table 31) for the agricultural sector show low growth from 1980-90, with a return to growth after 1990, a declining importance of agriculture in GDP over the past 30 years, and a small percent of labour dedicated to the sector.

**Table 31: Basic facts about the agriculture sector**

Indicator	Argentina	Latin America and the Caribbean
Land use (% of total land area) 1998	Arable 9.1%, Permanent cropland 0.8%, Other 90.1%	Arable 6.7%, Permanent cropland 1.3%, Other 92.1%
Arable land, hectares per capita 1996-98	0.70	0.27
Agriculture average annual growth 1990-99	3.8% (0.7% in 1980-90)	2.3% (2.3% in 1980-90)
Index of agricultural production per capita (1989-91=100) 1996-98	112 (105 in 1986-88)	...
Agriculture value added (% of GDP) 1999	5% (10% in 1970)	8% (13% in 1970)
Producer price on wheat (\$ per metric ton) 1998	85	...
Employment in agriculture (% of total labor force) 1998	2% (13% in 1980)	19% (... in 1980)
Female labor force in agriculture of total female labor force 1996-98	0% (3% in 1980)	13% (17% in 1980)
Irrigated land (% of cropland) 1996-98	5.7%	13.7%
Average annual fertilizer use (kg per hectare cropland) 1995-97	28	...
Pesticide use (kg per hectare cropland) 1996	1,266	...
Tractors per 1,000 agricultural workers 1996-98	190	35
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	75%	74%

Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

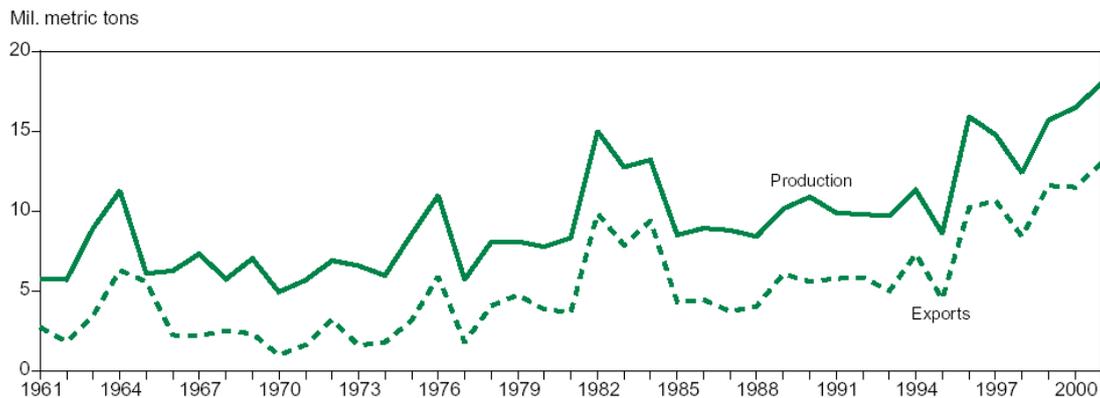
In their study "Sustainable Farming in the Argentine Pampas: History, Society, Economy, and Ecology," Otto T. Solbrig and Ernesto Viglizzo evaluate the

<sup>227</sup> Schnepf *et al.*, 2001.

sustainability of a hundred years of history in the Argentine agriculture sector. They summarise their finding into four distinct periods. The first period from late 1800s until just after the depression of the 1930s was characterized by large growth in the agricultural sector coinciding with positive general economic circumstances. The second (1937-1960) was a period of contraction resulting from reduced external demand, low commodity prices, and internal policies that focused on import replacement and industrialisation to the detriment of the agricultural sector. The third period from the 1960s to 1990 was characterized by returning yet moderate growth largely due to yield increases. For the agricultural sector the combination of support and protection policies in developed countries, falling commodity prices, and internal policies favouring other sectors at the expense of the agricultural sector prevented Argentina from meeting its potential in the agricultural sector. The last period is from the 1990s forward and is characterized first by reform policies that have reduced or eliminate policy distortions disfavouring the agricultural sector (e.g. tariffs on imports of agricultural inputs and taxes on exports), and second by production, and productivity increases.<sup>228</sup>

Statistics on the wheat and soybean sub-sectors in Argentina correspond to the analysis above. Figure 21 and Figure 22 below show increasing production after the 1991 reforms for both wheat and soybean crops.

**Figure 21**  
Argentina's wheat sector has rebounded, with production and exports reaching new highs

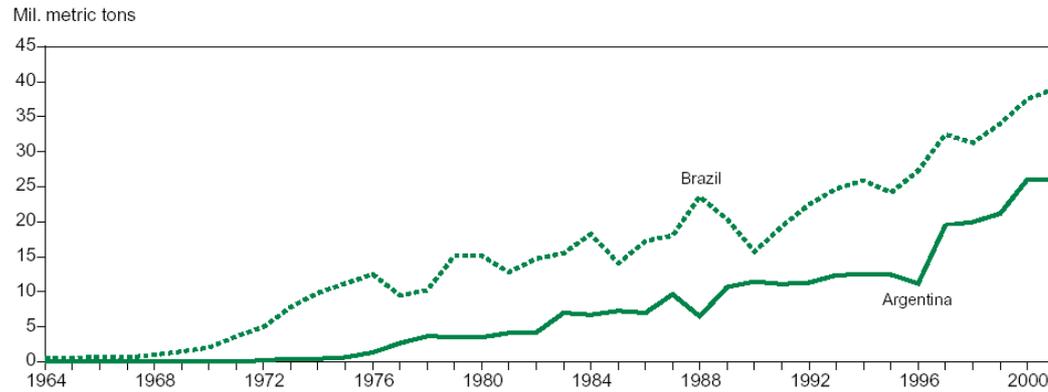


Source: USDA; August 10, 2001.

<sup>228</sup> Solbrig Otto T., Viglizzo, Ernesto. "Sustainable Farming in the Argentine Pampas: History, Society, Economy, and Ecology" The David Rockefeller Center for Latin American Studies. Paper No. 99/00-1

**Figure 22**

The emergence of soybean production in Argentina during the 1970s followed Brazil by about a decade

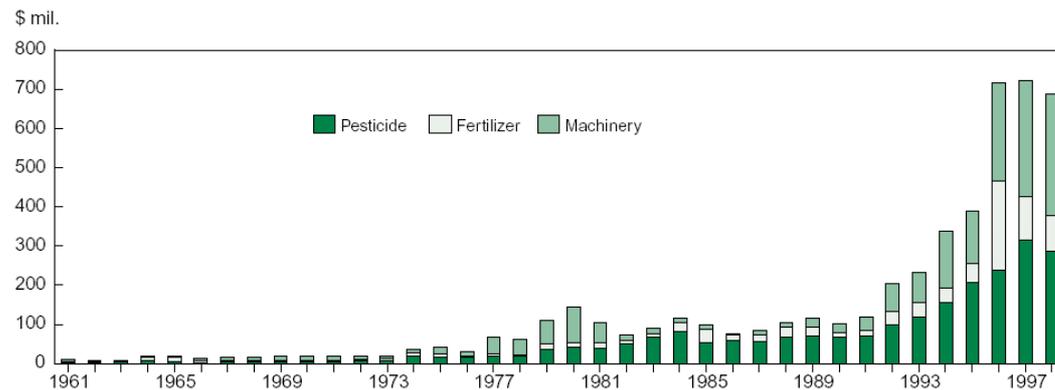


Source: USDA; August 10, 2001.

There has also been a dramatic increase in the use of agricultural inputs and area expansion in the wheat and soybean sub-sectors (Figure 23 and Figure 24).

**Figure 23**

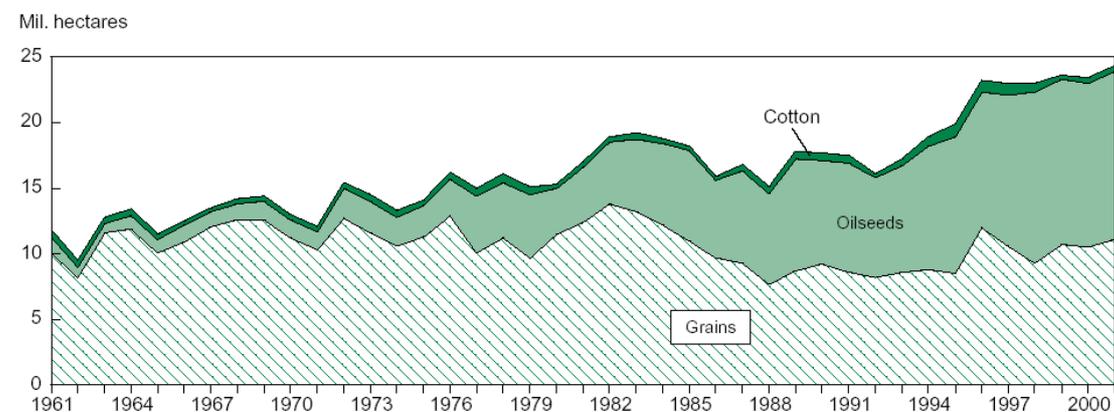
Argentina's imports of agricultural inputs accelerated after 1991 reforms



Source: FAO, FAOSTATS; 1961-98.

**Figure 24**

Argentina's harvested field crop area jumped by 16 percent from 1995 to 1996, and has continued to grow



Source: USDA; August 10, 2001.

The agricultural sub-sectors of wheat and soybean crops have benefited, until recently (see trade conditions above), from elimination of almost all export taxes on major grains and processed oil seed products, removal or reductions of restrictions and tariffs on imported agricultural inputs, and privatisation moves in the marketing and transportation infrastructure.<sup>229</sup> Furthermore, with the implementation of the MERCOSUR agreement Argentina with its major partner Brazil have moved forward in establishing a regional common market and further liberalisation in the agricultural sector.

The *Convertibility Plan* and the major market reforms of 1991 were designed to tackle Argentina's inflation and currency problems. The peso was pegged to the U.S dollar and inflation was controlled. From 1991 to 1994 Argentina experienced strong economic growth but faltered again both in 1995 and 1998 due to, in part, Argentina's vulnerability to international capital market shocks. From a poverty perspective the growth patterns in Argentina and the instability have led to a worsening of social inequality and persistent levels of poverty and unemployment.<sup>230</sup> From 1990 to 1999 during a period of average GDP growth there was a 57% increase in the income gap. The poorest 10% of the population received 2.15% of total income in 1990 but by 1999 they received only 1.5% of total income.<sup>231</sup>

Today Argentina has suffered from several years of recession and is again facing economic crisis. It has defaulted on its \$US 155 billion debt, and on January 6<sup>th</sup>, 2002 emergency measures were put in place ending a decade of the peso being fixed at par with the US dollar, initiating devaluation at a fixed exchange rate of 1.4 pesos to the dollar. The banking sector is expected to incur huge losses, while the export taxes are being imposed on the oil and gas sector to soften the blow. Political instability and economic uncertainty thus continue to dominate Argentina's outlook.<sup>232</sup>

#### **12.4.2. Social Considerations**

Information about social impacts in rural areas is difficult to attain for the Argentina case. Much of the research on the social impacts of liberalisation has focused on the urban poor. A World Bank report attributes this lack of attention to the declining rural population<sup>233</sup>, which is currently at 10% of the total population down from 22% in 1970.<sup>234</sup> There has also been a corresponding decline in agriculture's share of the work force, which was 13% in 1980 and currently stands at 2%.<sup>235</sup> Nonetheless, the World Bank argues that "The rural poor produce mostly for the internal market and current conditions, including liberalization, have produced falling incomes for these small producers."<sup>236</sup> This conclusion corresponds to the urbanization trend noted above. One report notes that 60 000 "agri-cultural establishments" have disappeared from the Pampas region from 1992-1999, and average farm size has increased from

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<sup>229</sup> Solbrig *et al.*, 2000.

ERS/USDA "Argentina's Economic Reforms Expand Growth Potential for Agriculture" *Agricultural Outlook*. March, 1998.

<sup>230</sup>The World Bank, "Poor People in a Rich Country: A poverty Report for Argentina" Report No.: 19992 AR. March 23, 2000.

<sup>231</sup> Inter-American Development Bank *Argentina: Country Paper*. Washington DC: 2000.

<sup>232</sup> *The Economist* "Devaluation's downbeat start" January 12, 2002.

<sup>233</sup> World Bank *Argentina's Poor: A Profile*. Washington D.C.: World Bank, 1995.

<sup>234</sup> World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

<sup>235</sup> *Ibid*

<sup>236</sup> World Bank, 1995.

250 hectares to 350 hectares.<sup>237</sup> Liberalization, and the resulting incentives to use more advanced farming practices (fertilizers, irrigation, GMOs, mechanization) are said to be the causes of Argentina's improving performance in the agricultural sector. At the same time however these features also cause a shift towards large-scale commercial farming practices and marginalization of small-scale farmers. Importantly urban poverty is likely indirectly aggravated by a declining trend in agricultural employment and migration from rural areas to urban centres. Although most studies tend to not discuss the links between changes in agricultural production structures and impacts in terms of urban poverty, this type of analysis may be useful in comprehensive sustainability analyses.

### **12.4.3. Environmental Considerations**

Solbrig and Viglizzo's sustainability assessment of the agricultural sector over the past one hundred years provides somewhat ambiguous results in terms of sustainability and environmental impacts. Prior to 1960 the authors do not note any major environmental problems associated with agriculture, while during the 1960-90 period soil erosion increasingly becomes a problem, which is aggravated by the lack of fertilizer use. Most of the sustainability concerns instead are focused on the under performance of the agricultural sector in the post-war period, which did not meet its output or income potential. In the current period Solbrig and Viglizzo argue that policy changes are returning to a favourable policy environment for agriculture, and the main concern for the future is how a new surge in the use of advanced agricultural technologies will affect the environment.<sup>238</sup>

A report from WRI warns that increasing use of inputs, increasing areas under irrigation, and a lack of government policy to manage irrigation and water withdrawals will result in some negative environmental impacts. The study suggests that soil erosion may improve while water pollution will increase.<sup>239</sup> Another report commissioned by the International Institute for Sustainable Development (IISD) is more positive, and notes that although there has been significant increase in fertilizer use it is not near the more harmful levels in some developed countries. Looking specifically at the use of herbicides the report suggests that the type of herbicides (glyphosates) that make up the bulk of increased use in Argentina are "environmentally neutral". Other emerging practices and technologies like direct sowing and GMOs are also associated with less environmental impact. The study does however identify possible impacts from irrigation from groundwater and lack of proper management structures, although these impacts are described as "latent" as less development of this type of irrigation occurred in the 1990 than was originally expected.<sup>240</sup>

Over all it appears that current environmental impacts are not severe, while trajectories of both intensification and extension may have more serious

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<sup>237</sup> Pengue W, 2001, The impact of soya expansion in Argentina, Seedling, Volume 18, Issue 3, June 2001, GRAIN Publications

<sup>238</sup> Solbrig *et al.*, 2000.

<sup>239</sup> WRI "Sustainable Trade Expansion in Latin America and the Caribbean: Analysis and Assessment" Washington D.C.: WRI, 1997.

<sup>240</sup> Chudnovsky Daniel, Cap Eugenio, Trigo Eduardo, Rubin Sebastian. "Environmental Improvements without Environmental Policies: Argentina Agriculture and Manufacturing Exports in the 1990s" Winnipeg, Manitoba: IISD, 1999.

environmental impacts in the future. Lack of effective water management policies for irrigation appears to be the most current issue.

## **12.5. Key Sustainability Issues**

Based on the description of the sustainability conditions above, conclusions regarding what sustainability issues to focus on in the impact assessment can be made:

- Achieving agricultural export and revenue potentials
- Agriculture's potential to contribute to stable and sustainable economic growth
- Poverty alleviation and rural development
- Environmental impacts due to surges in the use of agricultural inputs

These sustainability issues are selected in response to the economic, social and environmental considerations captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for Australia is based on national government reviews, IMF and World Bank reports, academic analysis, other International Organization (IO) reviews, and NGO reviews.

## **12.6. Argentina Sustainability Impact Assessment**

### **12.6.1. Structure of economic incentives and opportunities**

#### ***Baseline scenario***

Price recovery in the wheat and edible oil sub-sectors will benefit Argentina's export oriented agricultural sector, particularly as a lower cost developing country. As Argentina is a major exporter of both commodities, only positive economic incentives pertain for the agricultural sector under the baseline predictions identified in this study.

#### ***Liberalisation scenario***

A jump in world prices in wheat and edible oils in combination with better market access and reduced subsidies in developed countries will create strong incentives for Argentina to accelerate its current growth in the agricultural sector. All studies reviewed for this report indicate very positive economic incentives for Argentina.

#### ***Intermediate scenario***

The same results pertain in the intermediate scenario but to a lesser extent. One issue however of significance in the intermediate scenario is that Argentina may be better able to promote local processing of commodities under this scenario. Argentina has in the soybean case tended to use economic measures designed to promote domestic processing. Under full liberalisation this option may not be available

### **12.6.2. Production System Characteristics**

#### ***Baseline scenario***

No significant change in the production system is expected, as Argentina has already over the 1990s undergone a process of liberalisation and increasing commercialisation of the agricultural sector. Price changes of the magnitude predicted over the next 10 years will not significantly change this process. Likely domestic policy is much more significant.

### ***Liberalisation scenario***

Under the liberalisation scenario it is expected that the incentives for more intensive and large-scale commercial agriculture increase. Higher production and productivity can be expected. As a result, further decreases in the number of small-scale and medium farms can also be expected. As well further decreases in employment may result due to large farm sizes, productivity improvements and increasing mechanization. An amplified trend of commercialisation in the Agricultural sector and increasing demand for production will also result further intensification of input use in the sector over and above current trajectories.

### ***Intermediate scenario***

The same results pertain in the intermediate but to a lesser degree. As no significant domestic support can be expected under this scenario no qualitative difference between the intermediate scenario and the liberalisation scenario is expected.

## **12.6.3. Impacts on sustainability aspects**

### ***Baseline scenario***

No significant changes to social and environmental impacts from current *trajectories* can be predicted given little change in the production system trajectories. However, some moderate positive economic impacts can be predicted due to recovering commodity prices.

### ***Liberalisation scenario***

In many analyses Latin America is expected to gain most of all developing countries in terms of welfare gains. Importantly however agriculture only represents 5% of GDP in Argentina and 2% of employment. As a result, the Hertel *et al.* study identifies Argentina as having only moderate real income gains in relation to other regions. Thus the economic impacts can be expected to be significant for the sub-sectors identified while the overall welfare gains are moderate. Positive social impacts are thus also predicted although given changes to increasingly commercial farming practices small and medium rural farmers may incur some negative impacts. Environmental impacts will not be significant in the short term, but with increasingly intensive practices, continued expansion, and some domestic structural issues in relation to irrigation there will likely be moderate negative environmental impacts over long-term.

### ***Intermediate scenario***

The same impacts can be expected only to a lesser extent in the intermediate scenario. In the Argentina it is not expected that the either of liberalisation scenarios provide any significant increase in the opportunity to apply mitigating measures to deal with negative social and environmental impacts. In the sub-sectors for this study, such

measure would likely have to be domestic policy measure that are not trade policies and not constrained by WTO measures.

### SIA matrix of results

In Argentina we see positive economic impacts for both liberalisation scenarios. Social impact results were more ambiguous due to some social groups gaining while others, particularly small-scale farmers and the rural poor, may be negatively impacted. There are clear positive overall welfare gains in the Argentina case, while negative impacts on vulnerable groups may be more severe in the liberalisation scenario due to problems in adjusting to more significant economic changes. In general, specific causal links in terms of social and environmental impacts were more difficult to establish in the Argentina case. Argentina shows no significant negative environmental impacts in the short term and only potential impacts in the longer term due to increases of input use. However, actual impacts will depend to a large extent on how domestic policy develops.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
Argentina	+1	0	0	+1	± 1	0/-1	+1/+2	± 1	0/-1

### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

## 12.7. Policy response / implications

Overall it is recommended that Argentina actively seek out liberalisation of the Agricultural sector via the WTO. Mitigating measures should focus on assisting small and medium agricultural producers make successful transitions under new economic conditions. Agricultural diversification and improvements to infrastructure in less commercial agricultural areas are identified as key policy areas. A key environmental policy recommendation is for improvements in management of irrigation and withdrawals from groundwater to avoid negative environmental impacts such as salinization, which have been characteristic of more commercial and intensive agricultural production systems. Argentina would also better ensure its long-term competitiveness by developing strategies and systems to deal with the negative impacts of increased agricultural inputs before these negative impacts affect productivity.

## 13. Australia

### 13.1. Significance of the Australian Case

Australia is chosen for this study because of its status as a net food exporting developed country, and a major exporter in both the sub-sectors identified in this study. Australia's agricultural sector is both export oriented and market oriented, as it has relatively low levels of domestic support in comparison to other OECD countries. Australia thus represents a developed country with a competitive advantage, particularly in wheat, which has low support, and is thus a "natural exporter".

### 13.2. Introduction

Australia is one of the world's most important agricultural traders, and exports \$US 69 billion<sup>241</sup> in agricultural products per year. Basic economic and social indicators for Australia show that it is a high-income country that attains high social standards, and is a large trader (Table 32).

**Table 32: Economic, social and environmental indicators**

Indicator	Australia	High income
Population 1999, million	19	896
Population density 1999, people per sq. km	2	29
Population growth, annual average 1965-99	1.5%	0.8%
GNI per capita 1999	\$20,950 (rank 27)	\$26,440
GDP per capita, average annual growth 1965-99	1.9%	2.4%
Gross fixed capital formation, average annual growth 1965-99	3.5%	3.3%
Exports of goods and services, average annual growth 1965-99	5.8%	5.9%
Trade (% of GDP) 1999	40% (28% in 1970)	43% (29% in 1970)
Net barter terms of trade (1995=100) 1998	100	...
Food imports (% of total merchandise imports) 1999	5%	8%
Present value of debt (% of exports of goods and services) 1999	...	...
Domestic credit to private sector (% of GDP) 1999	85%	129.3%
Unemployment 1996-98	8.0%	...
Income distribution - Gini index	35.2 (1994)	...
Urban population of total 1999	85% (85% in 1970)	77% (73% in 1970)
Prevalence of child malnutrition 1993-99	0%	...
Infant mortality rate 1999	5 per 1,000 live births	6 per 1,000 live births
Life expectancy at birth 1999, years	79	78
Access to an improved water source 2000	100%	...
Net primary enrolment ratio 1997	95% male, 95% female	98% male, 98% female
Female labor force of total 1999	43.5%	43.1%
Children 10-14 years in the labor force (% of age group) 1999	0% (0% in 1980)	0% (0% in 1980)
Public expenditure on health (% of GDP)	5.9% (1998)	6.1%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	0	-7,997
Nationally protected areas (% of total land area) 1999	7.3%	10.8%
Emissions of organic water pollutants (kg per day per worker) 1998	0.19	...
Carbon dioxide emissions (per capita metric tons) 1997	17.2	12.8
Genuine domestic savings (% of GDP) 1999	11.2%	13.5%

<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 13.3. Trade Conditions

Australia is a net food exporter and a top exporter in both the wheat and edible oil crops sub-sectors. Australia is among the top five exporters of both wheat and oilseeds and exported over 18 million metric tonnes of wheat and wheat flour in 2000 and over 4.5 million metric tonnes of oilseeds in the same year.

<sup>241</sup> CIA – Fact Book, January 2002. <http://www.cia.gov/cia/publications/factbook/geos/as.html>

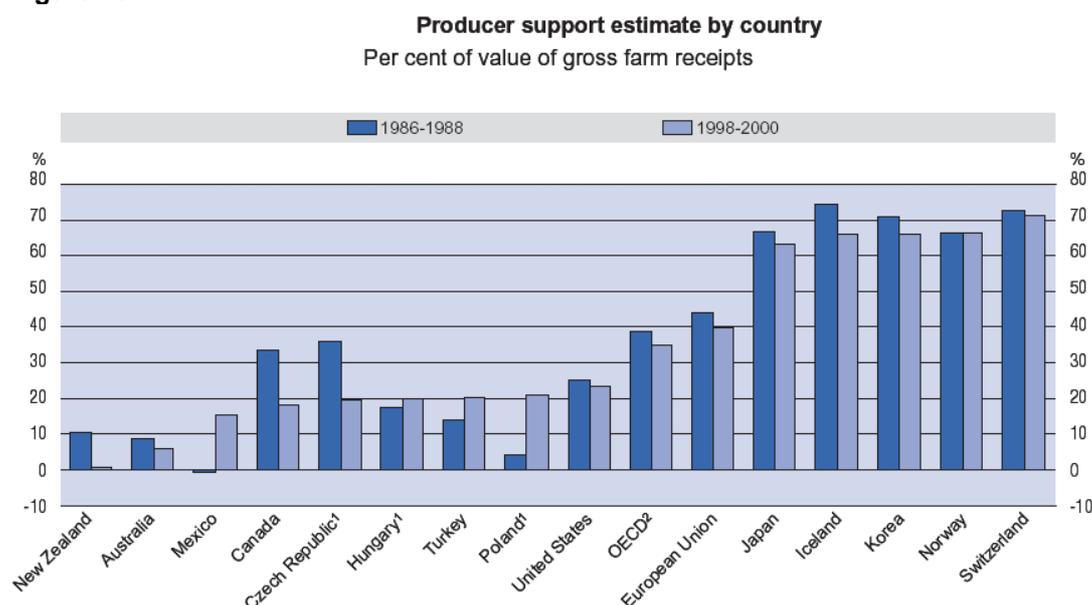
### 13.3.1. Market Access

In the agricultural sector as a whole Australia's simple average bound tariff rate is low at 3.79% and its simple average applied tariff rate in the sector is only 1.17%. No tariffs are greater than 5%.<sup>242</sup> Market access is high although Australia maintains strict Sanitary and Phytosanitary Measures.<sup>243</sup>

### 13.3.2. Domestic Support

The OECD's Producer Support Estimate (PSE) for Australia in 2000 was \$US 1 billion in 2000. Nearly 50% of this support is from payments based on input use, while 25% is associated with market price support. As Figure 25 below shows, Australia has a low rate of domestic support in relation to other OECD countries.

Figure 25



Source: OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2001*. Paris: OECD, 2001.

In the 1980s domestic producer prices were 5% above world market prices. Due to low levels of support in the sector producer prices are now only 2% higher than world market prices.<sup>244</sup>

### 13.3.3. Export Subsidies and Export Marketing

Australia does not use export subsidies in the sector under investigation. Australia's statutory wheat board ceased operation in 1999 and the Australian Wheat Board (AWB Ltd) is now grower owned. Export control was transferred to the Wheat Export Authority (WEA). The AWB has an automatic right to export, while the WEA can grant permits for other exporters. However, the AWB retains a veto over any permits to large exporters.<sup>245</sup>

<sup>242</sup> APEC Economies *Electronic Individual Action Plan – Australia 2001*. [http://www.apec-iap.org/document/AUS\\_2001\\_IAP.htm](http://www.apec-iap.org/document/AUS_2001_IAP.htm)

<sup>243</sup> United States Trade Representative (USTR) "Australia Trade Summary – 2001" Washington D.C.: USTR, 2001. [http://www.ustr.gov/html/2001\\_australi.pdf](http://www.ustr.gov/html/2001_australi.pdf)

<sup>244</sup> Source: OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2001*. Paris: OECD, 2001.

<sup>245</sup> OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2000*. Paris: OECD, 2000

## **13.4. Sustainability conditions in Australia**

### **13.4.1. Economic Considerations**

Australia is a top exporter in both the wheat and oilseeds sub-sectors, and the wheat sub-sector in the second largest agricultural commodity in Australia after beef (Table 33)

**Table 33: Value of Selected Agricultural Commodities Produced and Exported - 1997-98**

Commodity	Agricultural production \$ '000	Unprocessed exports \$ '000
Wool	2,753,936	2,276,797
Cattle	4,138,239	352,348
Sheep	1,066,217	200,159
Pigs	709,806	1,065
Grapes	998,197	82,438
Apples	272,720	37,961
Wheat	3,801,497	3,629,554
Canola	329,847	256,216
Potatoes	493,149	9,984
Oats	223,269	30,305
Sugar cane	1,247,744	3
Milk	2,816,977	67,451

Source: Australian Bureau of Statistics, Yearbook 2002

Basic agricultural indicators (Table 34) show that low levels of labour are dedicated to the sector and that agriculture is not a large contributor to total GDP. Pesticide use is high and agriculture's share of water use is significant.

**Table 34: Basic facts about the agriculture sector**

Indicator	Australia	High income
Land use (% of total land area) 1998	Arable 7.0%, Permanent cropland 0.0%, Other 93.0%	Arable 11.8%, Permanent cropland 0.5%, Other 87.7%
Arable land, hectares per capita 1996-98	2.80	0.41
Agriculture average annual growth 1990-99	3.0% (3.4% in 1980-90)	...
Index of agricultural production per capita (1989-91=100) 1996-98	111 (98 in 1986-88)	...
Agriculture value added (% of GDP) 1999	3% (... in 1970)	...
Producer price on wheat (\$ per metric ton) 1998	127	...
Employment in agriculture (% of total labor force) 1998	5% (7% in 1980)	4% (8% in 1980)
Female labor force in agriculture of total female labor force 1996-98	4% (4% in 1980)	3% (7% in 1980)
Irrigated land (% of cropland) 1996-98	4.6%	11.2%
Average annual fertilizer use (kg per hectare cropland) 1995-97	43	...
Pesticide use (kg per hectare cropland) 1996	2,535	...
Tractors per 1,000 agricultural workers 1996-98	704	927
Annual freshwater withdrawals for agriculture (% of total withdrawals) (estimated for 1987)	70%	30%

Sources: World Bank (2001) *World Development Indicators 2001* and UNDP et al (2000) *World Resources 2000-2001*.

Despite agriculture's minor share of GDP, it is important to note that agriculture accounts for approximately 25% of exports<sup>246</sup> (all commodities account for 57% of

<sup>246</sup> Australian Bureau of Statistics, Yearbook 2002

exports<sup>247</sup>) and food exports alone were worth over \$20 billion AUD in 2000. Australia is a relatively small country in terms of population with just under 20 million inhabitants. As a result, the majority of Australia's wheat and oilseeds production is exported on the international market. Table 35 below shows that 85% of all grain production is for export either directly or indirectly.

Table 35. Input-Output Approach: Value(A) of Agricultural Output Produced and Exported, by Industry - 1997-98

IOIC Industry Class	Australian production	Direct exports	Share of production	Agricultural output embedded in indirect exports	Share of production	Total exports of agricultural output	Share of production
	\$m	\$m	%	\$m	%	\$m	%
Sheep	3,708	1,395	37.6	888	23.9	2,283	61.6
Grains	6,267	4,043	64.5	1,305	20.8	5,348	85.3
Beef Cattle	3,783	312	8.3	1,906	50.4	2,218	58.6
Dairy cattle	3,002	0	0	1,025	34.1	1,025	34.1
Pigs	601	1	0.1	267	44.4	268	44.6
Poultry	1,484	2	0.1	428	28.8	430	29.0
Other agriculture	9,738	857	8.8	2,051	21.1	2,908	29.9
<b>Total agriculture</b>	<b>(d)28,583</b>	<b>6,610</b>	<b>23.1</b>	<b>7,871</b>	<b>27.5</b>	<b>(d)14,481</b>	<b>50.7</b>

(a) All values are at basic prices (i.e. farm gate) which remove distribution costs, including commodity taxes, associated with sale or export of the product.

(b) Includes the value of livestock used for breeding purposes. Also includes an estimate of the value of production by private households for own consumption.

(c) Estimated using total requirements coefficients contained in 1994-95 input-output tables.

(d) Derived by summing the components.

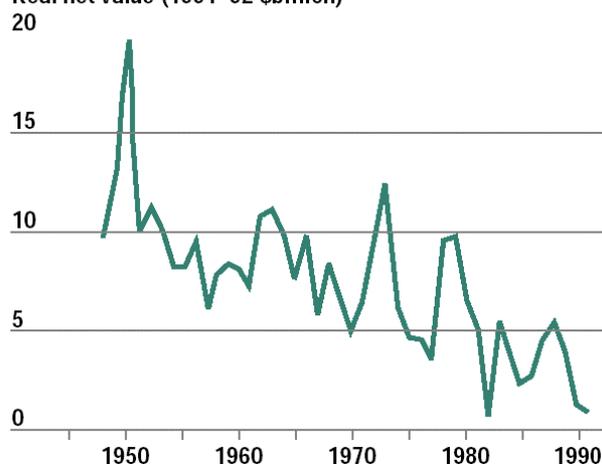
Source: Source: Australian Bureau of Statistics, Yearbook 2002.

Government support to the agricultural sector in Australia is lower than that found in almost all other developed countries which are major agricultural exporters. The OECD estimates that Australia spent \$US 1 billion on producer support measures in 2000 compared to \$US 49 billion in the United States and \$US 90 billion in the EU during the same year.<sup>248</sup> This combination of an export driven agricultural sector and low support levels makes Australia producers sensitive to international market prices and changes. Australia's *State of the Environment Report, 1996*, notes that in assessing the sustainability of the agricultural sector it is important to examine the trends in economic returns in the sector. As 'real' commodity prices have been falling at a greater rate than 'real' per-unit prices of inputs, net farm income in Australia has been falling over the past forty years (Figure 26).

<sup>247</sup> CIA – Fact Book, 2002.

<sup>248</sup> OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2000* Organisation for Economic Co-operation and Development, 2001.

**Figure 26**  
Real net value (1991–92 \$billion)



Source: Department of the Environment – Australia. *Australia State of the Environment: 1996*. Collingwood: CSIRO Publishing, 1996.

Improving agricultural productivity is a major reason for declining commodity prices, and as an advanced developed country Australia has kept pace with other high productivity agricultural economies. Thus, for Australia international market conditions and particularly the issue of trade distorting policies that contribute to depressed commodity prices are essential factors in assessing the sustainability of Australia's agricultural sector, and in assessing rural development and the sustainability of rural livelihoods.

### 13.4.2. Social Considerations

Specific research connecting the agricultural sector, liberalisation and social impacts is not readily available in the Australian case. Instead the environmental impacts of the sector tend to gain the most attention. However, as was noted declining earning for farmers is an important social consideration. Many social assessments for rural Australia often examine specific social problems related to education, crime, and culture but do not often link the social impacts directly with food crops and liberalisation. Aboriginal issues also often addressed, particularly in terms of land rights issues in rural Australia.

Where the links between trade, agriculture and social impacts are more apparent, social assessments are often directly related to environmental problems in the food crops sectors. As will be established in the following section on environmental considerations, Australia has significant environmental concerns and constraints in the agricultural sector in connection with salinity problems. Social assessments of the sector often examine the “social dimensions” of attempting to manage land degradation and of changing production systems in pursuing better land management. Uncertainty and vulnerability associated with threatened livelihoods and uncertain futures in the sector are often identified, along with conflicting values between rural and urban residents.<sup>249</sup>

<sup>249</sup> Marsh, Sally P. “Social Dimensions of Landcare” Sydney: Department of Agricultural Economics, The University of Sydney, 2001. <http://www.general.uwa.edu.au/u/dpannell/dpap0109.htm>

### 13.4.3. Environmental Considerations

In the food crops sector the main environmental issues are land and water degradation. The degradation problems faced by Australia impact directly on the Western “wheat belt” belt regions where nearly 40% of wheat production occurs.<sup>250</sup> Recent government State of the Environment Reports, and Natural Resource Management reports have identified the key agriculturally related land and water degradation issues to be clearing of natural vegetation, over irrigation, inappropriate crop structures and tillage systems. These features result in biodiversity loss, salinization, and soil acidification, among other impacts. The case of salinization has received particularly strong attention, and is an important and useful example for sustainability impacts assessment efforts.

Australia has a dry climate, a landscape that is geologically old, substantial quantities of salt in the landscape, and is characterised by poor natural drainage in agricultural regions. Because of dry and salt conditions, the agricultural lands of the Australian wheat belt regions are affected by what is called dryland salinity. The clearing of native perennial deep-rooted vegetation with shallow-rooted annual crops and pastures causes dryland salinity.<sup>251</sup> The large scale clearing of natural vegetation has caused more water to enter into the groundwater system (leakage), consequently causing water tables to rise, bringing salt to the surface affecting crop growth.<sup>252</sup> Studies show that leakage below farming systems is much higher than leakage in natural vegetation.<sup>253</sup> The impacts of high saline watertables for Australia’s wheat belt region are decreased crop production, degraded water supplies, damaged infrastructure, and higher production costs.<sup>254</sup> Biodiversity loss is another consequence of the clearing of natural vegetation and is further aggravated by salinity itself, as natural vegetation increasingly becomes threatened by degrading soil conditions.

The Prime Minister’s Science, Engineering and Innovation Council of Australia has estimated that the economic costs to rural Australia per year of dryland salinity are \$700 million AUD in lost land and \$130 million AUD in lost production.<sup>255</sup> If current agricultural practices continue it is expected that the rate of salinization will increase over the next 50 to 100 years. Salinity is an environmental problem but its impacts can only be properly understood from a sustainable development perspective.

Many analysts argue that current farming techniques and current technology cannot mitigate the long-term problem of salinity. They argue that addressing salinity in Australia will require major changes to land use in the agricultural sector. A shift

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<sup>250</sup> Australian Bureau of Statistics, Yearbook 2002

<sup>251</sup> Walker, Geln., Gilfedder, Mat., Williams, John. “Effects of Current Farming Systems in the Control of Dryland Salinity” Commonwealth Scientific and Industrial Research Organisation (CSIRO), Land and Water. 1999

Department of Agriculture, Fisheries, and Forestry – Australia, “Managing Natural Resources in Rural Australia for a Sustainable Future.” December 1999.

<sup>252</sup> Walker *et al.*, 1999.

<sup>253</sup> Walker *et al.*, 1999.

<sup>254</sup> Ivey ATP “The Current cost of dryland salinity to agricultural landholders in selected Victorian and New South Wales catchments” Report to Murray-Darling Basin Commission & National Dryland Salinity Program. January, 2001

<sup>255</sup> PMSEIC. *Dryland Salinity And Its Impacts On Rural Industries and The Landscape*. Occasional Paper No. 1, 1999.

from the current annual cropping systems to economically viable deep-rooted perennial plants (trees, shrubs and herbaceous) is often pointed to as how best to address the salinity problem.<sup>256</sup> However, these same analysts argue that economically viable perennial based production systems do not currently exist, and major efforts are required if Australia is to find sustainable alternatives to current agricultural production systems.<sup>257</sup> These economic and environmental realities are closely linked to potential social impacts on rural Australia from loss of income and land associated with salinity, potentially fundamental changes to crop mixes and production systems, and the process of mitigating the consequences of salinity.<sup>258</sup>

### **13.5. Key sustainability issues**

Based on the description sustainability assessment above key economic, social and environmental issues potentially linked to trade have been identified. These issues are selected as most relevant following conclusions from both national government and academic analysis on important impacts in the agricultural sector in Australia. The sustainability issues most relevant for the impact assessment are:

- Impacts on the export focused and world market oriented agricultural sector
- Concerns of declining income and welfare for farmers.
- Environmental, social, and economic effects of agricultural land use especially salinization due to land clearing and over irrigation.

These sustainability issues are selected in response to the economic, social and environmental consideration captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector.

### **13.6. Australia Sustainability Impact Assessment**

#### **13.6.1. Structure of economic incentives and opportunities**

##### ***Baseline scenario***

Under the base line scenario Australia's wheat sector can be expected to gain from recovering world prices. The price recovery predicted is however not significant, thus no significant change in the structure of economic incentives can be predicted.

The oilseeds sector is significantly smaller than the wheat sector and the price recovery predicted, at least in the short term, is less. Again no changes in the structure of incentives can be predicted.

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<sup>256</sup> Stirzaker, Richard., Lefory, Ted., Keeating, Brian., Williams, John. "A Revolution in Land Use. Emerging Land Use Systems for Managing Dryland Salinity" CSIRO Land and Water, 2000.

<sup>257</sup> Stirzaker *et al.*, 2000

Pannell, D.J. "Counting the Costs: Economic Aspects of Salinity in Wheatbelt Valleys of Western Australia." *Proceedings, Dealing with Salinity in Wheatbelt Valleys: Processes, Prospects and Practical Options, Merredin, Western Australia.* August 2001.

<sup>258</sup> Marsh, S.P. "Social dimensions of landcare." SEA Working Paper 01/09, *Agricultural and Resource Economics, University of Western Australia.* 2001

### ***Liberalisation scenario***

The Hertel *et al.* study of liberalisation in the agricultural sector shows that Australia is one of the biggest gainers in terms of trade balance in the liberalisation scenario together with the United States, Argentina and Brazil. This corresponds to Australia's status as a major exporter with low levels of domestic support in food crops. The price increase predicted for wheat will be more significant than the price increase for oilseeds, and these incentive structures should serve to strengthen the current structure of Australia's agricultural sector where wheat production is more significant than oilseeds. Overall the incentives for production and export for both sub-sectors improve, matching well with Australia commercial and world market oriented agricultural sector.

### ***Intermediate scenario***

In the intermediate scenario Australia will have less significant increases in incentives for production and export due to less significant world market price increases. Importantly the intermediate scenario as described brings forth specific concerns for Australia. Particularly support measures being maintained in other developed countries will tend to be negative for the Australian agricultural economy. An ABARE report identifies US decoupled arrangements and EU arable payments as two examples of how Australia's wheat sector may be disadvantaged in future WTO agreements.<sup>259</sup>

## **13.6.2. Production System Characteristics**

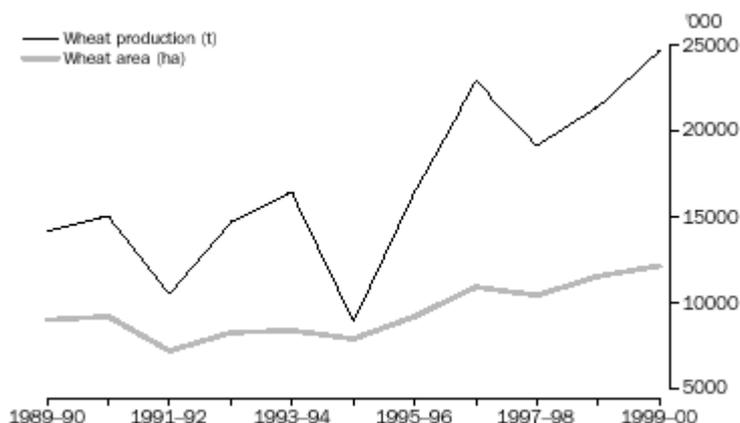
### ***Baseline scenario***

No significant production system changes are expected.

### ***Liberalisation scenario***

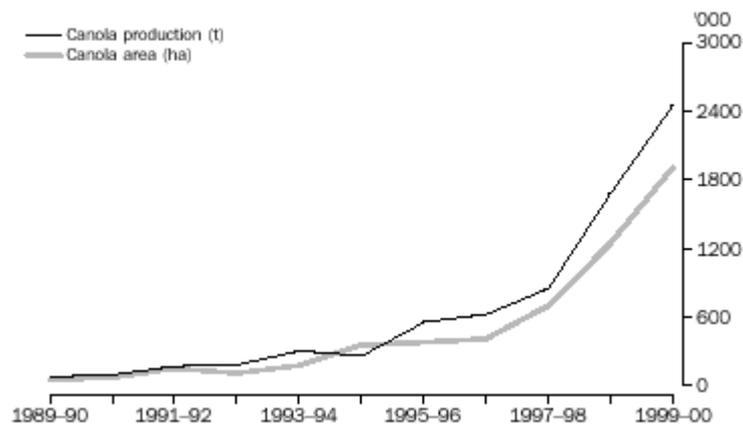
Wheat is currently the dominant food crop in Australia and no change in this crop preference will be expected from liberalisation, as the world price for wheat will increase at a greater rate than the world price for edible oil crops. As Figure 27 and Figure 28 below show both production and area expansion have been on an increasing trajectory.

**Figure 27: Australian Wheat Production and Wheat Area**



<sup>259</sup> ABARE "Global grains policy and WTO agricultural negotiations" Canberra: ABARE, 2002.

**Figure 28: Australian Canola Production and Canola Area**



The changes in the incentives structures resulting from increasing world prices will tend to increase the amplitude of these expansionary trajectories, as the profitability of both sectors improve.

### ***Intermediate scenario***

The intermediate scenario will see the same incentives for increasing production and for area expansion, but to a less extent given less significant price increase.

## **13.6.3. Impacts on sustainability aspects**

### ***Baseline scenario***

No significant changes from the current sustainability trajectories can be expected. However, if prices in the sub-sector continue to recover over the long term some positive economic impacts can be expected, while negative environmental impacts associated with the dryland salinity problem identified in the sustainability case above can be expected. With rising world prices there will be less incentives to change production systems in the agricultural sector, and more incentives to capture short-term economic benefits. As a result we predict no changes in the short-term with possible positive economic impacts in the long term and possible negative environmental impacts in the long-term.

### ***Liberalisation scenario***

In the liberalisation scenario two key sustainability impacts will pertain. Improving economic conditions for the sub sectors will result in economic gain for the sectors and welfare gain for Australia. Hertel *et al.* predict that Australia will be one of the top gainers in terms of trade balance and real income gain per \$Value Added in food agriculture. However it must be kept in mind that due to the minor role of agriculture in GDP for Australia, real income gains compared to other regions is lessened. Nonetheless, the Hertel *et al.* study does still show that Australia will be a large economic gainer from trade liberalisation.

The other important impact will likely be amplification of the negative environmental effects associated with the wheat and oil crop sub-sectors noted in the sustainability assessment above. Structural changes will tend to increase the incentives for short-

term gains from increasing production of wheat and oil crops, which may act as a disincentive to address the dryland salinity problems faced in Australia. Over the long term this may result in negative economic impacts as well.

This study has not been able to adequately identify the causal links between social impacts and trade liberalisation on a go forward basis. In the liberalisation scenario there will be positive social impacts related to economic gains, while to the degree that environmental problems place pressure on the sector in terms of direct economic losses and needs for major structural changes there may be negative social impacts for rural communities.

### ***Intermediate scenario***

In the intermediate scenario the positive economic benefits are predictably less significant. Given that Australia's current domestic policy is characterised by low levels of domestic support it can not be expected that the intermediate scenario provides Australia with more opportunities to pursue its policies designed to mitigate negative social and environmental impacts associated with agriculture. However, Australia may be negatively impacted in economic terms by support policies in other OECD countries.

### **SIA matrix of results**

In Australia we see positive economic impacts in both liberalisation scenarios. These positive impacts are both in terms of general welfare impacts and impacts on producers in the selected sub-sectors. Short-term social impacts are positive due to positive economic impacts in the sub-sectors. However, over the long-term there are risks of potential negative social impacts associated with the adjustments needed to manage land degradation problems. As a result, social impacts in the long run are more dependent on emerging circumstances. Negative environmental impacts are associated with production increases and dry-land salinity problems in the sector, and tend to also be more significant over the long run.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
Australia	0/+1	0	0/-1	+1	+1/± 1	0/-1	+2	+1/± 1	-1

### **Notes:**

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

### **13.7. Policy response / implications**

Economically it is clear that Australia is best served by promoting liberalisation of the agricultural sector. At the same time there are key domestic policy implications for Australia to mitigate potential negative impacts associated with liberalisation. Australia may have to implement mitigating measures to deal with dryland salinity issues. These measures may not be economically optimal in the short-term especially under a liberalisation scenario, but long-term sustainability of the sector will depend on better land management in Australia. The government has started to address this environmental problem beginning in the mid 1990s, and established the Australia's National Dryland Salinity Program.<sup>260</sup> As well, there will have to be consideration of how to address the social impacts in rural Australia associated with changing production systems to deal with negative environmental trajectories.

### **13.8. Conclusions**

In the Australian case there will be positive economic impacts in both the liberalisation scenario and the intermediate scenario, but the liberalisation scenario is more beneficial for Australia. Negative environmental impacts pertain in both liberalisation cases and are associated with market incentives to amplify already negative environmental trajectories associated with current production systems. Social impacts are both positive and negative and are positive when related with a shorter-term economic context, but negative when related with a longer-term environmental context. Only domestic policy responses in relation to the economic, social and environmental impacts of salinity are clearly identified as key mitigating efforts in the Australian case.

## **14. USA**

### **14.1. Significance of the US case study**

As the world's top trading country in the crops identified for this study, the United States is key country for analysis. The US is both a net exporter and has a relatively high level of agricultural support. The US is thus a high production, high trading, and high support developed country, in the scenarios identified in this study.

### **14.2. Introduction**

The United States is the world's largest agricultural trader and exported over \$US 53 billion in agricultural commodities in 2001.<sup>261</sup> Basic economic, social and environmental indicators (Table 36) show that the US is a high-income country that scores well on basic social indicators. On the environmental side carbon emissions stand out as a major issue. Importantly, despite the US's leading role in agricultural trade, the sector itself accounts for only 2% of total GDP.<sup>262</sup>

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<sup>260</sup> The website for this programme is: <http://www.ndsp.gov.au/>

<sup>261</sup> USDA *Food Agricultural Policy: Taking Stock for the New Century*. September 2001.

<sup>262</sup> CIA *The World Factbook*. 2001. <http://www.cia.gov/cia/publications/factbook/>

**Table 36: Economic, social and environmental indicators**

Indicator	US	High income
Population 1999, million	278	896
Population density 1999, people per sq. km	30	29
Population growth, annual average 1965-99	1.1%	0.8%
GNI per capita 1999	\$31,910 (rank 8)	\$26,440
GDP per capita, average annual growth 1965-99	2.0%	2.4%
Gross fixed capital formation, average annual growth 1965-99	3.4%	3.3%
Exports of goods and services, average annual growth 1965-99	6.5%	5.9%
Trade (% of GDP) 1999	24% (11% in 1970)	43% (29% in 1970)
Net barter terms of trade (1995=100) 1998	104	...
Food imports (% of total merchandise imports) 1999	5%	8%
Present value of debt (% of exports of goods and services) 1999	...	...
Domestic credit to private sector (% of GDP) 1999	145.3%	129.3%
Unemployment 1996-98	4.5%	...
Income distribution - Gini index	40.8 (1997)	...
Urban population of total 1999	77% (74% in 1970)	77% (73% in 1970)
Prevalence of child malnutrition 1993-99	1%	...
Infant mortality rate 1999	7 per 1,000 live births	6 per 1,000 live births
Life expectancy at birth 1999, years	77	78
Access to an improved water source 2000	100%	...
Net primary enrolment ratio 1997	94% male, 95% female	98% male, 98% female
Female labor force of total 1999	45.8%	43.1%
Children 10-14 years in the labor force (% of age group) 1999	0% (0% in 1980)	0% (0% in 1980)
Public expenditure on health (% of GDP)	5.8% (1999)	6.1%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	-3,880	-7,997
Nationally protected areas (% of total land area) 1999	13.4%	10.8%
Emissions of organic water pollutants (kg per day per worker) 1998	0.15	...
Carbon dioxide emissions (per capita metric tons) 1997	20.1	12.8
Genuine domestic savings (% of GDP) 1999	9.2%	13.5%

Source: World Bank (2001) *World Development Indicators 2001*.

### 14.3. Trade Conditions

The US is the world's top exporting country for both wheat and wheat flour and edible oil crops. In 2000 net US exports of wheat and wheat flour were over 26 million metric tonnes and net soybean exports were over 27 million metric tonnes. The US was not a top net exporter of soybean oil in 2000.<sup>263</sup>

#### 14.3.1. Market Access

The United States applies *ad valorem* duties on agricultural imports on the basis of their value at the point of export. In the agricultural sector the average applied tariff rate in 2000 was 10.6%. Applied duties on wheat are \$US 0.65/kg and \$US 0.7/kg on wheat flour. Soybeans have no applied tariff while soybean oil has a 19.1% tariff and soybean cake has a duty of \$US 0.45/kg.

The US also uses the other non-tariff measures that affect market access. For example in 1998 the US applied import quotas to wheat gluten as "safeguard measures," effectively cutting EU trade of the product by 40%. The EU retaliated with tariffs on imports of corn gluten feed from the US.<sup>264</sup> Ultimately the US measure was found to

<sup>263</sup> FAO, *FAOSTAT Agriculture Database*. Accessed May 2002.

<sup>264</sup> European Commission *Market Access Sectoral and Trade Barriers Database*. Accessed March, 2002: <http://mkacddb.eu.int/mkdb/mkdb.pl?METHOD=COUNTRY>

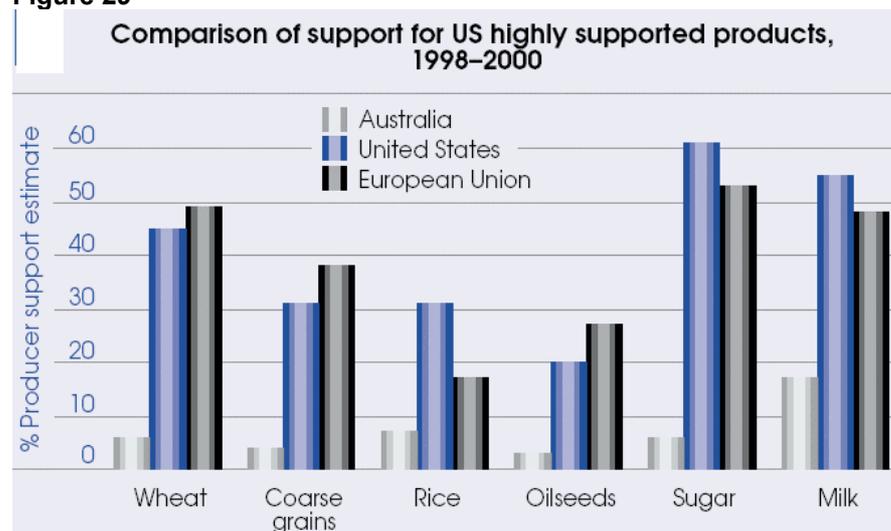
be incompatible with WTO rules in January of 2001.<sup>265</sup> The use of unilateral trade measures by the US is in general characteristic in its trade profile.<sup>266</sup>

The use also applies tariff-rate quotas (TRQs) on 54 different product types. The US has TRQs on peanuts,<sup>267</sup> and this TRQ is relevant for the edible oil crops assessment of market access. Over quota tariffs on peanuts range from 130% to 160% depending on classifications.<sup>268</sup>

### 14.3.2. Domestic Support

The OECD estimates that total producer support (PSE) was nearly \$US 49 billion in 2000, while general services support to the sector was over 22 billion (the Total Support Estimate TSE is over \$US 92 billion for 2000). In the food crops sector the main domestic support mechanism is the Production Flexibility contract payments, which totalled \$US 5 billion, and support-price provisions operating through non-recourse marketing loans. Other payments and support measures such as minimum prices, government purchases, market loss assistance payments, emergency assistance payments, loan deficiency payments, etc..., make up the support structure in the United States. Using data from the OECD 2001 report on agricultural policies in OECD countries, ABARE developed Figure 29 below comparing PSE levels in the US and the EU for both the wheat and oilseeds sub-sectors.

**Figure 29**



Source: ABARE “Rising US agricultural support” ABARE Current Issues 01-7, October 2001.

In the sub-sectors under analysis we see that the PSE as calculated by the OECD is quite close in the given sub-sectors. Importantly it should be noted that the ABARE study identifies an increase in support in the soybean sector from 8% of the value of production in 1986-88 to 20% of the value of production in 1998-00.<sup>269</sup>

<sup>265</sup> Delegation of the European Commission to the United States “EU Commission Welcomes End to Wheat Gluten Dispute” News Release No. 40/01 June 1, 2001.

<sup>266</sup> US, 2001 Economic freedom index

<sup>267</sup> World Trade Organization, “Tariff Quota Administration Methods and Tariff Quota Fill: Background Paper by the Secretariat.” 2002.

<sup>268</sup> Skully, David “U.S. Tariff-Rate Quotas for Peanuts” Washington D.C.:ERS/USDA, 1999.

<sup>269</sup> ABARE “Rising US agricultural support” ABARE Current Issues 01-7, October 2001.

The US' aggregate measure of support (AMS) is below commitment levels in the WTO and was only 29% of the ceiling amount in 1997.<sup>270</sup> At the same time the USDA notes that domestic spending reached record highs in 2000 due to low crop prices. This result is due to more payments being used that are not limited within the WTO's AMS calculation such as production flexibility contract payments.<sup>271</sup> These payments are characterised as "decoupled" because they are not linked to current production, prices, or input use.

### 14.3.3. Export Subsidies

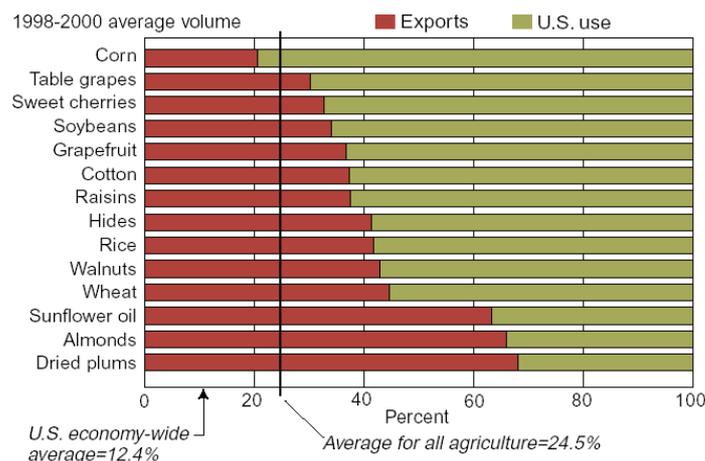
US programmes for export subsidies include: the Export Enhancement Program (EEP), Market Access Program (MAP), and Export Credit Guarantee Program Emerging Markets Program. In 2000 no food crops benefited from the EEP (EEP payments were restricted to frozen chicken). The MAP provides some \$US 90 million for creation, expansion, and maintenance of foreign markets for U.S. agricultural products. The value of export guarantees is estimated to have been \$US 3 billion for 2000 and commodity shipments via food aid programs were estimated to have a value of \$US 1.3 billion.<sup>272</sup>

## 14.4. Sustainability Conditions in the US

### 14.4.1. Economic Considerations

Oilseed and grain crops account for the largest percentage of U.S. sales of agricultural commodities. Soybean is the major U.S. oilseeds crop, and corn and wheat are the major grain crops.<sup>273</sup> Both the wheat and soybean sub-sectors are dependant on export markets with 45% of US wheat production and 34% of soybean production destined for export (Figure 30).<sup>274</sup>

**Figure 30**  
Exports Critical to Demand for Many Agricultural Products



Source: USDA *Food Agricultural Policy: Taking Stock for the New Century*. September 2001.

<sup>270</sup> ERS/USDA-Briefing Room "Farm and commodity policy: analysis of programs and policies" <http://www.ers.usda.gov/briefing/FarmPolicy/usnotify.htm> accessed March 2002.

<sup>271</sup> <sup>271</sup> ERS/USDA-Briefing Room "Farm and commodity policy: government payments and the farm sector" <http://www.ers.usda.gov/briefing/FarmPolicy/gov-pay.htm> accessed March 2002.

<sup>272</sup> OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2000*. OECD: 2001

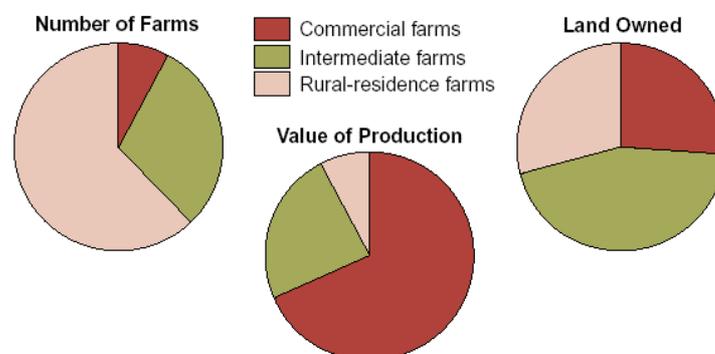
<sup>273</sup> EPA *Profile of the Agricultural Crop Production Industry* September, 2000

<sup>274</sup> USDA, 2001.

The US endowment of natural resources and the level of infrastructure investment result in significant excess capacity in agricultural production in terms of US food and feed needs. Access to foreign markets and agricultural trade liberalisation is thus a central issue for US agriculture and the wheat and soybean sub-sectors specifically. At the same time the US like the EU provides significant financial support to the sector (\$US 49 billion<sup>275</sup> in 2000), and thus can expect important changes to the sector resulting from implementation of liberalisation measures.

The structure of the farming industry in the US has shifted from smaller rural farms to specialized large industrialised operations. Figure 31 shows that the majority of cropland is owned by large commercial to intermediate sized farm, and that commercial farms account for the vast majority of agricultural production in the US.

**Figure 31**  
**Commercial Farms Are Small in Number, Own Less Than 1/3 of the Land, But Produce Most of the Output (1999)**



Source: USDA *Food Agricultural Policy: Taking Stock for the New Century*. September 2001.

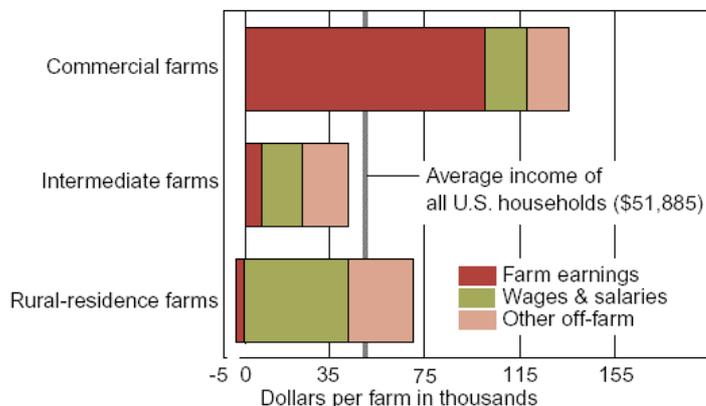
As production is concentrated in a smaller number of commercial farms, the importance of farming to rural areas is also diminished. One fifth of the US population lives in rural areas, yet only 1 of 8 rural communities is now dominated by farming activities.<sup>276</sup> Income structures for farmers have also shifted in the US. Today it is only large commercial farms where farm earnings dominate income, and in small rural residence farms average farm earnings are negative (Figure 32).<sup>277</sup>

<sup>275</sup> OECD *Agricultural Policies in OECD Countries: Monitoring and Evaluation 2000*. OECD: 2001.

<sup>276</sup> USDA, 2001.

<sup>277</sup> USDA, 2001.

**Figure 32**  
Sources of Operator Household Income (1999)



Source: USDA *Food Agricultural Policy: Taking Stock for the New Century*. September 2001.

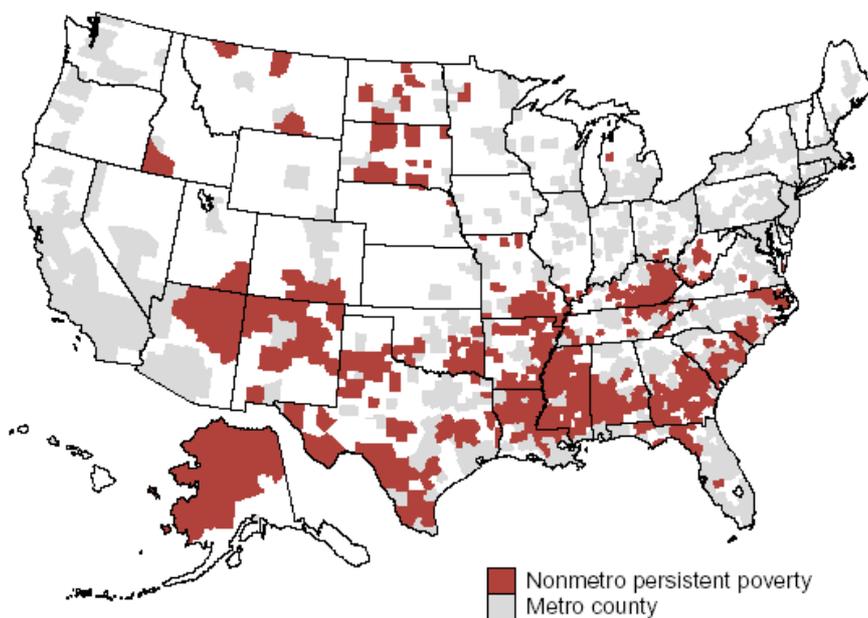
#### 14.4.2. Social Considerations

Changes in the structure of the rural economy brings forth rural development issues such as the need for many areas to move from natural resource based economies to new non-resource based structures and poverty alleviation.

Figure 33 below shows that persistent rural poverty remains a problem in the US.

**Figure 33**  
Nonmetro Persistent-Poverty Counties

These counties had 20 percent or more persons in poverty in 1960, 1970, 1980, and 1990.



Source: USDA *Food Agricultural Policy: Taking Stock for the New Century*. September 2001.

Few, current studies are available on the social impacts of liberalization and agriculture for the United States. This is likely because the US has long since made the transition to a highly urban society, where agriculture plays a very minor role in the economy. As well, we have already seen that farm structures, sizes and incomes have already shifted to the large commercial productions system.

### 14.4.3. Environmental Considerations

The severity of environmental impacts from the agricultural sector has improved over the past 20 years, while at the same time there remain important environmental costs to address. Water and soil degradation along with diminishing open spaces are three environmental impacts that continue to be of significance in the US. Other issues such as food safety and climate change are also gaining increasing attention.<sup>278</sup>

The US Environmental Protection Agency (USEPA) estimates that 40% of US waterways are too polluted for fishing or swimming.<sup>279</sup> The past two decades in the US have been characterised by improved environmental performance and industrial pollution has been reduced significantly. Agriculture pollution however continues to be significant and the major agricultural water pollutants are sediment and nutrient discharge into waterways along with animal waste, pesticides, and salts.<sup>280</sup> Intensive use of fertilizers, pesticides and manure has resulted in high nitrogen and phosphorous levels in waterways located in agricultural areas, and in high occurrence levels of herbicides. Concentration levels of nitrogen in half of the US's agricultural waterways where amongst the highest in the country, and 80% of streams in agricultural areas showed phosphorous levels above EPA standards.<sup>281</sup> Water degradation of this type is facilitated to a large degree by agriculture related soil erosion, which transports dangerous levels of nutrients and sediment into waterways.<sup>282</sup> The impacts from agricultural based water degradation can be both human health impacts in the form of unsafe drinking water and biodiversity impacts in the form of damaged aquatic life.<sup>283</sup> As agriculture accounts for 80% of all water consumption in the US, and as a result water degradation and increasing water scarcity are important sustainability issues for the sector.<sup>284</sup>

Soil loss through erosion is decreasing in the US, and between 1982 and 1997 total erosion on all US crop land decreased by 41%. However the USDA estimates that 129 million acres of cropland or 34% of all US cropland needs improved soil quality. Climate change and its impacts on agriculture have also received considerable attention in the US. This issue has likely received great attention in the US not because the US agricultural sector will be more affected by climate change than other countries, but rather because the US is the top carbon emitter in the world today and because it has a high level of capacity to address climate change impacts. EPA assessments show that despite a high degree of uncertainty on the effects of climate change, the US agricultural sector is expected to be impacted modestly (either positively or negatively) by a doubling of atmospheric CO<sub>2</sub> levels.<sup>285</sup>

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<sup>278</sup> USDA, 2001.

<sup>279</sup> U.S. EPA/USDA *Unified National Strategy for Animal Feeding Operations*. March 9, 1999.

<sup>280</sup> U.S. EPA *Profile of the Agricultural Crop Production Industry*. September, 1999.

<sup>281</sup> U.S. Geological Survey. *The Quality of Our Nation's Waters: Nutrients and Pesticides*. U.S. Geological Survey Circular 1225, 1999.

<sup>282</sup> U.S. Geological Survey, 1999.

<sup>283</sup> U.S. Geological Survey, 1999.

<sup>284</sup> USDA, 2001.

<sup>285</sup> EPA. R.T. Watson, M.C. Zinyowera, and R.H. Moss (eds.) *The Regional Impacts of Climate Change: An Assessment of Vulnerability*. New York: Cambridge University Press, 1998

#### **14.5. Key sustainability issues**

Based on the description of sustainability conditions above, conclusions regarding what sustainability issues to focus on in the impact assessment can be made:

- Access to export markets and international competitiveness
- Intermediate size farm income, rural development and persistent regional poverty
- Water quality/scarcity and soil erosion.

These sustainability issues are selected in response to the economic, social and environmental considerations captured in the SIA framework already developed for the Commission. Our country specific sustainability assessment also allows for more specific identification of important sustainability issues in the agricultural sector. The sustainability assessment for the US is based on national government reviews, OECD reports, academic analysis, other International Organization (IO) reviews, and NGO reviews.

#### **14.6. United States Sustainability Impact Assessment**

##### **14.6.1. Structure of economic incentives and opportunities**

###### ***Baseline scenario***

The US agricultural sector will benefit from recovering world prices in wheat and oilseeds. For wheat, demand and production is expected to increase most in developing countries while the benefits from increasing trade is expected to benefit the EU, Canada, Australia, Argentina and the US the most. In oilseeds similar projections pertain in the longer run, and US production is expected to expand along with Argentina and Brazil.

###### ***Liberalisation scenario***

As both wheat and edible oil crops world market prices are expected to increase along with increases in the volume of trade, there will be increased incentive for production and export. The US is the largest exporting country in both sub-sectors and the largest food exporting country, and correspondingly the Hertel *et al.* study shows the North America having the largest trade balance increase given reductions in tariffs and support. The US sector will then tend to have incentives to increase export even with significant reductions in domestic support including “decoupled” support, according to results from the Hertel *et al.* study.

###### ***Intermediate scenario***

In the intermediate scenario similar but less significant impacts can be expected from rising world prices. A qualitative difference will be that the US will continue to have extensive opportunity to make “decoupled” payments in the agricultural sector. Farmers under this scenario may benefit from both reductions in tariffs in export markets and domestic support policies at home. The USDA study shows that the majority of price increases can be attributed to tariff reductions, while AMS domestic support reductions in developed countries are the second most important contributor to price increases. As a result, the intermediate scenario retains significant price incentives for the US agricultural sector. However, continued high spending on domestic support, which is currently near \$US 50 billion, should be compared in

relation to welfare impacts from liberalisation, which are predicted to be nearly \$US 7 billion per year in the USDA's study.

#### **14.6.2. Production System Characteristics**

##### ***Baseline scenario***

No significant change can be expected to the production system given moderate price recovery.

##### ***Liberalisation scenario***

Given a large world market price increase in the wheat sector and moderate to large price increase in the edible oil crops sector, increased production can be expected for both sub-sectors. The Hertel *et al.* study confirms this assessment with predictions of significant positive trade balance impacts in North America due to liberalisation. Large price increases in wheat than edible oil crops may result in greater increases in wheat production than soybean production in the US, but no quantitative assessment of this possible production shift is possible within the context of this study. However, the USDA modelling assessment of liberalisation does show a shift of edible oil crop production from developed countries to developing countries, but no US specific results are provided.

World market price increases, increases in world trade volume, and liberalisation of the domestic sector will also tend to heighten current trends in the US towards large-scale commercial farming. Thus, only amplification of current production trajectories is expected.

##### ***Intermediate scenario***

No difference between the liberalisation scenario and the intermediate scenario in terms of the production system is expected, except in terms of the weight of the impact.

#### **14.6.3. Impacts on sustainability aspects**

##### ***Baseline scenario***

Some very modest economic gains over the longer term can be expected, but no significant change to the social and environmental sustainability conditions can be causally linked to the predicted moderate recovery in the selected sub-sector.

##### ***Liberalisation scenario***

In the liberalisation scenario positive but "less significant" economic gains can be predicted. Studies show that the US can expect to gain significantly in terms of trade with worldwide liberalisation of the sector. However, when Hertel *et al.* analyse the efficiency gains and significance of the agricultural sector in the US economy they predict that the real income gains in the North America will be very modest. Thus some farmers, especially commercial farmers exporting on the world market, can expect to gain, while the general welfare gains are modest.

A continuation of the already well established trend towards highly commercialised and high input agricultural systems in the US is expected. Large-scale commercial farms will tend to be in better competitive position, while smaller farms may suffer. In

particular the sustainability case study above shows that intermediate size farms households tend to below the average income in the US while commercial farm households are well above the average and rural resident farmers are also above the average. Rural resident farmers tend to rely entirely on non-farm related income (with farm activities representing a small net cost) and thus will tend to be less economically impacted by liberalisation in the sector. However, households with intermediate sized farms that depend to some extent on farm income will be negatively impacted by lack of competitiveness in relation to large commercial farms. Thus, the social impact will depend somewhat on context with large-scale farmers benefiting more than intermediate farmers. No significant improvement to persistent poverty in rural areas can be expected from liberalisation in the wheat and edible oil sectors, as historical trends in terms of the agricultural sector are expected to continue.

Environmental impacts associated with the liberalisation are also difficult to assess. Our study shows that despite declining levels of water degradation in the US overall, the agricultural sector continues to have high levels of water degrading impacts. Improvements in water degradation in the sustainability assessment above are associated with improved practices in other sectors (i.e. industrial sectors). Incentives for increasing production will tend towards aggravating current negative impacts associated with the agricultural sector. Models show that the increasing incentives for production due to increased demand on the world market and increasing world market prices results in increasing exports from the US.<sup>286</sup> An expanding agricultural sector will thus be associated with expanding environmental impacts, given no change in domestic policy.

### ***Intermediate scenario***

In the intermediate scenario the same economic, social and environmental impacts pertain but to a lesser extent. Importantly though, the US given its shift away from AMS payments to “decoupled” payments will have more policy options available to continue to provide domestic support. In terms of social and environmental considerations there may be greater opportunities to mitigate negative impacts. The use of “emergency assistance” payments currently in the US is one such example, and USDA estimates that of the total PSE amount calculated by the OECD, over \$US 6 billion is for “green box” payments.<sup>287</sup> Clearly the degree to which domestic support mitigates negative impacts associated with liberalisation is dependant on domestic policy choices.

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<sup>286</sup> EC - DG Agriculture, 2001.

ERS/USDA, May 2001.

<sup>287</sup> ERS/USDA, May 2001.

### SIA matrix of results

In the US we see positive overall welfare gains that are moderate due to the minor role of agriculture in the economy. Large farm households are expected to gain while intermediate farm households may face some adjustment problems in an increasingly competitive market. As a result social impacts are shown to be positive in the intermediate scenario and more ambiguous in the liberalisation scenario. The intermediate scenario entails more opportunities to use domestic support measures to mitigate negative impacts on intermediate farmers and to deal with environmental impacts of the sector. Environmental impacts are shown to be negative due to increase in production and associated environmental problems in the sector. However, the environmental impacts are not strongly causally linked, as the US case study requires more comprehensive analysis than possible in this study.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
USA	0	0	0	+1	+1	0/-1	+1	± 1	-1

#### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

### 14.7. Policy response / implications

The most significant policy implication in economic terms is that the US is likely to benefit from liberalisation of agriculture and its promotion of liberalisation in the WTO is warranted by this result from a domestic perspective. However, the benefits particularly in terms of average real income or welfare are not large.

The key US policy considerations should be associated with the environmental impacts of the sector, and water degradation appears to be a key impact in US agriculture together with soil erosion. Mitigating social policy in the liberalisation scenario should focus on the negative impacts on intermediate size farm households that are in part dependant on farm income for their livelihoods. The intermediate scenario may provide more opportunities for the US to make domestic support payments designed to improve environmental and social conditions in the agricultural sector.

### 14.8. Conclusions

In the US case the full liberalisation appears to be most positive in overall economic terms, while the intermediate scenario may provide US exporters with better market access while still maintaining some benefits from domestic support measures. Thus both scenarios have positive economic impacts, but they have some qualitative differences. Social impacts are more ambiguous with some general and group specific

positive impacts from positive economic results in liberalisation scenarios. Other groups, especially intermediate sized farmers, may incur some negative impacts particularly in the liberalisation scenario. Negative environmental impacts in the liberalisation and intermediate scenario are expected, especially in the longer term, due to amplification of current negative trends especially in relation to water degradation. As a result these negative impacts are not directly linked to WTO measures themselves, but are instead the result of improving incentives for trade in the selected sub-sectors impacting on domestic conditions and domestic policy that is already established.

## 15. European Union

### 15.1. Significance of the EU case study

One could say that the EU, together with the US, is the world's key player in agricultural trade. Europe is the largest importer in the world of farm products, and also the largest buyer from developing countries.<sup>288</sup> As such, it represents a player that might have the possibility to move world market prices through its policies and market actors. Although in the past, its policies were based on market intervention, CAP reforms are oriented towards a more market-based approach.

Nevertheless, the European Union faces challenges in the agricultural sector that span across a range of sustainability issues. It must meet its obligations under the WTO, accommodate the views of civil society, and address the sustainability issues that have been carved out in, for example, the Sustainable Development Strategy.<sup>289</sup>

### 15.2. Introduction

The EU's agricultural sector cultivated 129 million hectares in 1998, and produced at a value of 213,000 million Ecus. The agricultural sector's role in the EU economy is small but varies significantly between member states (MSs), constituting less than 5% of GDP for most MSs in EU15, and on average only about 2%. There are large regional differences in production technology and products between the North and the South. France is the leading exporter with many efficient producers, as well as quite a few inefficient ones, and a powerful farmer's lobby. Patterns of agriculture in the EU are complex and changing. At a general level there is a clear trend towards intensification and uniform production. Nevertheless, average production still occurs on a much smaller scale than in the US.<sup>290</sup> Basic economic, social, and environment statistics (Table 37) show that EU MSs<sup>291</sup> have high levels of economic wealth and social development.

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<sup>288</sup> European Commission, *EU agriculture and the WTO*. European Commission Directorate General for Agriculture: Brussels, 2001.

<sup>289</sup> Commission for the European Communities, *A sustainable Europe for a better world: a European Union strategy for Sustainable Development, in 2001* 264. Brussels: Commission for the European Communities, 2001.

<sup>290</sup> Reed, M., *International trade in agricultural products*. London: Prentice-hall, 2001.

<sup>291</sup> The World Bank indicators refer to the European Monetary Union.

**Table 37: Economic, social and environmental indicators**

Indicator	Europe EMU	High income
Population 1999, million	293	896
Population density 1999, people per sq. km	122	29
Population growth, annual average 1965-99	0.4%	0.8%
GNI per capita 1999	\$22,250	\$26,440
GDP per capita, average annual growth 1965-99	...	2.4%
Gross fixed capital formation, average annual growth 1965-99	...	3.3%
Exports of goods and services, average annual growth 1965-99	5.5%	5.9%
Trade (% of GDP) 1999	64% (... in 1970)	43% (29% in 1970)
Net barter terms of trade (1995=100) 1998	...	...
Food imports (% of total merchandise imports) 1999	9%	8%
Present value of debt (% of exports of goods and services) 1999	...	...
Domestic credit to private sector (% of GDP) 1999	89.2%	129.3%
Unemployment 1996-98	...	...
Income distribution - Gini index	...	...
Urban population of total 1999	78% (71% in 1970)	77% (73% in 1970)
Prevalence of child malnutrition 1993-99	...	...
Infant mortality rate 1999	5 per 1,000 live births	6 per 1,000 live births
Life expectancy at birth 1999, years	78	78
Access to an improved water source 2000	...	...
Net primary enrolment ratio 1997	94% male, 96% female	98% male, 98% female
Female labor force of total 1999	41.2%	43.1%
Children 10-14 years in the labor force (% of age group) 1999	0% (1% in 1980)	0% (0% in 1980)
Public expenditure on health (% of GDP)	6.6%	6.1%
Average annual deforestation 1990-2000, sq. km <sup>1</sup>	-2,675	-7,997
Nationally protected areas (% of total land area) 1999	11.4%	10.8%
Emissions of organic water pollutants (kg per day per worker) 1998	...	...
Carbon dioxide emissions (per capita metric tons) 1997	8.2	12.8
Genuine domestic savings (% of GDP) 1999	...	13.5%

<sup>1</sup>Negative numbers represent an increase in forest cover. The regional numbers are sums and not averages.

Source: World Bank (2001) *World Development Indicators 2001*.

### 15.3. Trade conditions

In 1998, EU agricultural trade amounted to 62,1 billion dollars worth of exports and 88,7 billion dollars worth of imports, out of a total world trade of 394 billion dollars.<sup>292</sup> For wheat and wheat flour, the European Union has 12% of world export volumes, which constitutes more than Argentina, near par with Australia and Canada, and about half of USA. Excluding intra-EU trade, wheat imports were 4,0 M mt; exports 15,4 M mt and hence net exports 11,4 M mt. However, EU producers are considered to be less dependent on exports than other major producers.<sup>293</sup> Oilseeds demand is predominantly covered by imports (88%)<sup>294</sup> It is the top import product from the US (constituting 1,932 million Euros in 2000).<sup>295</sup>

#### 15.3.1. Market access

Today, there are no tariffs on oilseeds imports to the EU. Wheat is imported through tariff rate quotas, and through a tariff, which has recently been at a zero rate of duty for high quality wheat. Central and Eastern European countries have preferential trade agreements.

<sup>292</sup> WTO: Trade policy review, Vol. 1, Geneva, 2001.

<sup>293</sup> OECD Agricultural policies in OECD countries: monitoring and evaluation, OECD, Paris, 2001.

<sup>294</sup> WTO: Trade policy review, Vol. 1, Geneva, 2001.

<sup>295</sup> See *Part I* of this report.

### **15.3.2. Domestic support**

The domestic support, in the form of the Common Agricultural Policy (CAP) heavily influences the EU's agricultural trade conditions. The CAP is a central feature of the agricultural sector and must be addressed when studying agricultural trade liberalisation and sustainability in the EU. The CAP's objectives have traditionally been to stabilise markets, provide stable income for farmers, and assure supplies and access to consumers at reasonable prices. CAP has traditionally been based on price policy, i.e. common guaranteed prices on products. These are the minimum support prices at which the EC will purchase products from farmers.<sup>296</sup>

Since 1992 the CAP has been progressively reformed with latest round "Agenda 2000" adopted in 1999. The latter is expected to have positive effects on sustainability<sup>297</sup>. Today, lower intervention prices are put in place. As an example, the intervention price for cereals was further reduced. As compensation to farmers, direct compensation payments, arable payments, are made instead, these being considered less trade distorting. Also, set-aside payments to limit production are put in place. The OECD Producer Support Estimate (PSE) for the EU in 2000 was just under € 98 billion for 2000, with the percentage PSE standing at 38%.<sup>298</sup>

### **15.3.3. Export subsidies**

The EU has, together with the US, traditionally been the largest user of export subsidies for grains. Export subsidies were designed to bridge the gap between the high internal prices and the lower world market price. However, reforms of the CAP have led to significantly lower export subsidies in recent years and even exports without refunds. Under the WTO Agreement on Agriculture, the European Union undertook to reduce its export subsidies for wheat from 18.3 million tonnes in the base period to 14.4 million tonnes in 2000. Overall export subsidies in agriculture were 3,5 billion € in 1998, down by almost 50% from 1995. For some period in 2000, EU exported wheat without subsidies. The reduction of EU intervention prices means that sustained increases in wheat world market prices will lead to elimination of wheat export subsidies over long periods.

## **15.4. Sustainability Conditions in the EU**

### **15.4.1. Economic considerations**

The budgetary burden of the CAP is an important economic sustainability concern. In 1999, EU spent 45 billion € on CAP, which thus constitutes the dominant part of the EU's common budget. Accepting new members to the EU without a fundamental reform of the CAP is likely to lead to further budgetary pressure and, in turn, lower political acceptance. Cereals and oilseeds are, together with beef and sheep meat, the main items of budgetary expenditure.

As a result of the CAP, the EU found itself in the 1980s with production surpluses, soaring budgetary allocations and increasing environmental problems. In 1992, this led to the 'MacSharry Reform', the objectives of which were to "strengthen competitiveness, realign supply with demand and target support more effectively. The

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<sup>296</sup> Kallio, P., *Export subsidies in an imperfectly competitive market when market shares matter: the case of international wheat trade*, in *Agricultural economics research institute*. Helsinki: 1998.

<sup>297</sup> European Commission, 2001.

<sup>298</sup> OECD, 2001.

1992 Reform entailed measures such as set-aside schemes, and the reduction of export subsidies.<sup>299</sup>

In the context of assessing sustainability in the EU agricultural sector it is important to note that grain yields are very high in EU, for instance the wheat yield was 2.7 times higher than in the US in 1995. This has historical reasons in that land for production is much more scarce in the EU. Part of the reason for this is higher rainfall and land quality but also because land and output prices are higher, fertilisation is more intensive and yields are higher. EU yields are increasing steadily, as a result of technological improvements as well as agricultural policy. However, this trend can be expected to change with increasing emphasis being put on environmental protection.

The higher prices in some sectors that result from the CAP are passed on to consumers. Price support means that consumers generally pay more than market equilibrium prices for the products in the EU. This is likely to affect the poor more than the rich.<sup>300</sup> On average, EU residents spend 19.7% of income on food, as compared to 11.4% in the US. The current reform discussion on the CAP is likely to lead to lesser price support and more direct payments, hence implying shifting the costs from the consumers to taxpayers. This shift will probably have some positive distributional consequences, since poor people who spend a larger share of their income on buying food than on taxes (relative to higher income social groups) are likely to be better off in total.

#### **15.4.2. Social considerations**

The agricultural sector's role in employment in general is rather limited, although it is higher in certain MSs like Greece and Portugal than in the rest of the EU. But there are important social aspects to consider. The price support for agricultural products have both maintained employment in the sector and allowed smaller-scale farms to stay in business. This has led to rather different rural village societies as compared to for instance the US where these types of rural settings are very rare. On the social side, it is worth focusing on "rural viability" where the dependency from rural communities on agricultural production is a major issue and in many cases a dilemma. As such, rural social settings may deserve more attention than their share of the total population would indicate.

Demographic characteristics, changes in social structures and income, and levels of education in rural areas are related to agricultural policy and to the agriculture-environment linkages. For instance, education and income levels can be associated with farm management practices.<sup>301</sup> However, there are important equity concerns in current sector policy. EU agriculture is not primarily made up of small-scale farmers. It is rather a very diverse industry with some very efficient larger producers as well as small-scale producers. Evidence suggests that there is a strong link between farm size and farm income in the European Union. Farmers with the highest gross margin and highest income have the largest areas. This pattern seems to be reinforced by government support schemes, since the large and extra-large farms received 50% of

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<sup>299</sup> Antle, J., J. Lekakis, and G. Zantias, eds. *Agriculture, Trade and the Environment*. 1998, Edward Elgar: Cheltenham.

<sup>300</sup> OECD Agricultural policies in OECD countries: monitoring and evaluation, OECD, Paris, 2001.

<sup>301</sup> OECD, *Environmental Indicators for Agriculture*. Paris: OECD, 1997. p. 62.

the support in the European Union. These farmers are reported to have incomes that are higher than the average worker in the European Union.<sup>302</sup>

There are growing concerns about how current agricultural practices affect public health, animal rights, and the natural environment. The cultural landscape with pastures, forests, has been shaped by agriculture over centuries. This landscape is an important part of people's recreation and well-being. Intensification of agriculture is a threat to the cultural landscape. Today, the EU is attempting to reverse the trend of intensification and an integral part of the EU policy is the multi-functionality concept that sees environmental protection, rural development, food safety and food quality as integral parts of the agricultural issue.<sup>303</sup> This is well in line with the idea of sustainability integration, which is also high on the policy agenda. Maintaining agricultural activities in remote areas is seen as important to prevent de-population and unemployment with its significant social downsides.

#### **15.4.3. Environmental considerations**

The agricultural sector provides an important environmental sustainability function in Europe, including preservation and management of the landscape, environmental protection, but also a socio-economic sustainability function for rural areas, as discussed above. In terms of natural resource use, the sector is large, occupying 45% of land use in the EU. Therefore, the environmental dimensions of sustainability are of critical importance in an SIA study, including biodiversity; inland, marine, and coastal waters; and soil degradation.

Land use is the underlying cause behind biodiversity change and loss of cultural landscapes, and agricultural policies and practices play a large role in this. Habitats and species are under pressure from intensive agriculture. Semi-natural habitats such as meadows, pasture, small-scale mix farming, hay making and extensive livestock grazing areas are under threat. These are traditionally prominent landscape types in Europe, which depend on extensive agriculture and low input of nutrients. All countries have experienced contraction of semi-natural areas.<sup>304</sup> Typically, pastures are converted to more intensive grazing areas. Continuing yield increases will lead to concentration towards highly intensive production in some areas and very low production in others. Without semi-natural landscape types, rich plant and animal life disappears, and the "open landscape" is at risk. The set-aside policy of 1992 was developed to deal with over-production and to address environmental problems related to semi-natural habitats. However, environmental consequences of set-aside are highly complex and site-specific.

Eutrophication and pesticide pollution from leaching and run-off into marine environments and inland waters is a very serious sustainability problem today. In the agricultural sector, fertiliser and pesticide use have decreased since the 1980s, due to improved application methods. Nonetheless, in Sweden, eutrophication due to excess fertilisation has been identified as the largest environmental cost to society today<sup>305</sup>.

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<sup>302</sup> ABARE. US and EU agricultural support, *Current Issues*, Canberra, October 2000.

<sup>303</sup> European Commission, *Contribution of the European Community on the multifunctional character of agriculture*. European Commission, Directorate General of Agriculture: 1999.

<sup>304</sup> European Environment Agency, *Europe's environment: the second assessment*. Luxembourg: Office for Official Publications of the European Communities, 1999.

<sup>305</sup> The environmental accounting project at The National Institute of Economic Research 1992-97.

The North Sea, the Mediterranean Sea and the Baltic Sea all suffer from too high nutrient concentrations, mainly resulting from nutrient surpluses in agriculture.

Soil degradation (e.g. erosion and salinization) is a widespread and increasing problem in Southern Europe. Soil erosion is caused by land abandonment and intensification (which are connected). Soil salinization is also affecting the South, caused by over-exploitation of water tables. Desertification is increasing in vulnerable areas in Southern EU. In general, the intensification of agriculture is a major driver behind these different types of intensification.<sup>306</sup> However, organic agriculture increased between 1990-1995 from 1.5% to 6% of total agricultural land.<sup>307</sup>

### **15.5. Key sustainability issues**

Based on the review of the issues related to the agricultural sector, key sustainability considerations to focus on in an SIA are:

- Budgetary expenditure
- Consumer prices
- Rural livelihoods and equity
- Rural landscape and biodiversity
- Water quality especially, eutrophication
- Soil degradation (South)

### **15.6. EU Sustainability Impact Assessment**

The SIA is based on three scenarios. The baseline scenario in the EU context is constituted by the commitments under the current WTO commitments and the Berlin Agreement. The liberalisation scenario corresponds to a drastic reduction or removal of export subsidies, tariffs and direct payments. The intermediate scenario corresponds to a moderate reduction in export subsidies and tariffs, and direct payments. The intermediate scenario reflects the EU's negotiating objectives for the Doha round. However, the scenarios are not CAP reform scenarios and do not deal with aspects other than CAP trade measures. Thus, support for concerns such as food safety, multi-functionality, animal welfare and environmental protection should be seen as exogenous to the scenarios.

#### **15.6.1. Structure of economic incentives and opportunities**

##### ***Baseline scenario***

The baseline scenario predicts weak increases in prices for oilseed in general combined with demand increases in developing countries. We also have an outlook of moderate increases in wheat prices. With a moderate price recovery in the wheat sector and a weak to moderate price recovery in the agricultural sector in the global markets, we are looking at a possible weak terms-of-trade<sup>308</sup> improvement for the EU. Opportunities for wheat production would improve further. However, the trade deficit

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<sup>306</sup> European Environment Agency, 1999.

<sup>307</sup> European Environment Agency, 1999.

<sup>308</sup> Terms of trade is the price of exports divided by the price of imports. According to economic theory, a rise in the terms of trade increases a country's welfare.

in the sectors remains significant since the value of the oilseed imports is much larger than the value of wheat exports.

### ***Liberalisation scenario***

In the liberalisation scenario, export subsidies for wheat go down, world prices will go up and domestic prices go down, according to OECD's agricultural outlook. Both increasing world prices in wheat and increasing trade volumes are expected. Predictions of increasing prices in oil crops and increasing volumes of oil crops. The removal of tariffs would in theory lead to a terms-of-trade deterioration. In addition liberalisation scenario entails significant reductions in direct payments, and thus important restructuring of the sector could be expected.

### ***Intermediate scenario***

Similar but less significant price incentive changes are expected. In terms of domestic structure, the intermediate scenario entails a significant difference due to the retention of green and blue box measures. As a result direct payments may continue to provide some incentives to produce over and above the market equilibrium.

## **15.6.2. Production system characteristics**

### ***Baseline scenario***

In the baseline scenario the predicted price change would move the EU towards a moderately increasing agricultural production overall. A decisive policy factor in this scenario is the continued direct payments system that could contribute to increasing production. Further than that, it is not possible within the frames of this study to say anything about the crop mix, technology or changes in resource allocation overall.

### ***Liberalisation scenario***

If we accept a liberalisation scenario characterised by reductions in direct payments, changes to the production system should occur. The Hertel *et al.*, study show that the EU will have the most significant balance of trade impacts under a liberalisation scenario. A very large negative trade balance impact is expected, with large positive efficiency gains in the sector, and moderate real income gains in relative terms. The ERS/USDA study also sees significant welfare gains in the EU. It must be kept in mind that the Hertel *et al.* study does not treat any domestic support as "decoupled" while the ERS/USDA study does not include domestic support that is not part of the AMS calculation. To the degree that direct payments are non-distorting the Hertel *et al.* study will over estimate the trade balance impacts. Neither study actually analysis the question "decoupled" payments, but rather assumes in the model that they are distorting or are not distorting. This is one clear area of where more research is need within economic models in order to adequately assess the impacts of future agricultural trade liberalisation

For the purpose of this study we do suppose production decreases would occur in the EU, and the scenario should lead to increasing specialisation.

### ***Intermediate scenario***

In the intermediate scenario, tariff reductions and decreasing export subsidies will, in combination with considering maintenance of some AMS domestic support and no change to blue box and green box support, lead to some production increases. The

composition and structure of production might have a potential for change, but this is contingent on exogenous policies, not the liberalisation process itself. We do consider this potential for policy response to be higher than in the liberalisation scenario.

### **15.6.3. Impacts on sustainability aspects**

#### ***Baseline scenario***

Increasing intensification leads to increasing production. Continuing high budgetary pressure is a real problem, although if prices recover sufficiently in the wheat market, export subsidies will continue to be mostly redundant. The production increase will not have a big employment impact. There are no indications of significant changes for sustainability issues such as rural landscapes and livelihoods issues, water quality and eutrophication, although implementation of EU Policies should start to help reverse this trend.

#### ***Liberalisation scenario***

The terms-of-trade loss should be offset by the efficiency gain from improved resource allocations and as a result we should get welfare gains on the consumer side. Production and income from the sector will tend to suffer, depending on how we forecast the competitiveness of the EU agriculture in the global markets. However, budgetary expenditures are expected to be significantly lower, constituting an important sustainability gain. The environmental implications of a production system change depend on the environmental characteristics of the crops in the EU context. However, a liberalisation leading to decreased production in the aggregate, as production shifts more to developing countries, is likely to lead to moderate decreases in environmental stresses. One could hypothesise that environmental pressure would fall. (Ervin, 2001) However, in the EU context, decreased production can also be a stressor on sustainability issues. Rural livelihoods could be affected and would require considerable attention in a policy response. The major point though, is that net change would probably consist of heterogeneous changes across the region. However, the large scale modelling does not capture the diversity of change that is needed to forecast sustainability impact. Site-specific studies are required.

#### ***Intermediate scenario***

In the intermediate scenario, the general observation is that it provides greater opportunities for domestic measures to offset potential sustainability side effects of liberalisation. Partial liberalisation combined with retaining direct payments and box measures would ideally provide for a possibility to retain production and employment in the sector, while also allowing for measures within the “boxes” that could safeguard environmental and landscape concerns. Therefore, it is given a high ranking on social and environmental impacts. Continued budgetary pressures provide for a moderately positive impact on the economic dimension.

As Ervin points out, the weight of evidence does *not* suggest that production changes from trade liberalization and expansion will cause broad sustainability impacts in developed countries<sup>309</sup>. Significant economic welfare gains could be expected from

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<sup>309</sup> David E. Ervin, *Trade, Agriculture, and Environment* in *International environmental economics: a survey of the issues* / edited by Gunther Schulze, Heinrich W. Ursprung, Oxford University Press., New York 2001.

liberalised agricultural trade, and there is, in particular in the intermediate scenario significant scope for targeted domestic policies such that sustainability parameters will most likely be improved across the board.

### SIA matrix of results

Overall there are positive economic impacts from liberalisation in terms of general welfare and budgetary expenses while there are clear negative impacts on producers, particularly in the liberalisation scenario. This results in more context specific economic impacts. Social and environmental impacts are expected to be more positive in the intermediate scenario as there is some indication that the EU has a better-established agenda to address social and environmental impacts in the agricultural sector. Ambiguous environmental impacts are shown in the liberalisation scenario due to predictions of production decreases. As has been noted in the EU case study, there are environmental impacts associated with decreases in production and more regionally specific analysis is required to establish the environmental effects of these production decreases.

**Impacts of Trade-Related Agriculture Measures in the WTO**

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
EU	-1	0	-1	± 1	+1	+1	± 2	± 1	± 1

### Notes:

A = economic impacts (changes in level of average real income; net fixed capital formation; employment)

B = social impacts (changes in level of equity and poverty, health and education; gender inequality)

C = environmental impacts (changes in air, water and land quality; biological and diversity; air resource stocks)

0 = non-significant impact compared with the base condition

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

## 15.7. Policy implications

Reforms of the EU agricultural policy, first the MacSharry Reform and lately Agenda 2000, have improved the sustainability performance of the sector over the last decade. These implications are likely to overshadow any sustainability implications that trade liberalisation within the WTO process in itself might lead to. Sustainability impacts in the agricultural sector seem to depend much more on domestic policy decisions than on trade negotiations. The CAP reform under the Berlin Agreement is expected to have only a very limited impact on world trade patterns.<sup>310</sup> Market forces of growing worldwide supply and demand dominate these patterns. Increasing volumes in the wheat exports, with or without liberalisation, is likely to lead to an intensification of agriculture, which must be seen as a very serious policy consideration to deal with.<sup>311</sup>

Eventually, the WTO process will lead to domestic support reductions, but the potential for domestic policy response to the WTO-driven trade policy changes will likely be more powerful in the intermediate scenario. The possibility for safe-guard

<sup>310</sup> OECD Agricultural Outlook 2001-2005, Paris, 2001, OECD

<sup>311</sup> OECD Environmental Indicators for Agriculture, Vol. 3, 2001, Paris, OECD

measures should be considerable in all scenarios. To improve the sustainability performance of the agricultural sector in the EU, more objectives-driven policies based on multi-functionality objectives that are now on the decision agenda domestically should be put in place to replace the current forms of support. A deregulated agricultural market in the EU, with only minimal trade distorting subsidies, market-based environmental protection schemes and rural development policies rather than production policies will lead in the right direction, and enhance the sustainability of European agriculture. The WTO process as well as accession process for Eastern Europe countries could contribute to further CAP reform process.

Market access for poor countries to the EU market is also a global sustainable development issue that the EU, along with the US and other OECD countries, will increasingly be expected to address within as well as outside the WTO process.

## 16. Concluding Discussion of Results

### 16.1. SIA Case Studies

In the cases of the **net food importing developing countries** we see similar sustainability impacts.

#### Impacts of Trade-Related Agriculture Measures in the WTO

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	A	B	C	A	B	C	A	B	C
Senegal	0/-1	0/-1	0	-1	-1	0/-1	-2	-2	-1
Egypt	0/-1	0/-1	0	-1	-1	0	-2	-2	0

In both case studies we see negative economic and social impacts due to increasing wheat import bills. Food security problems for vulnerable groups, such as rural women in the agricultural sector, stand out most prominently as negative social impacts. Small-scale farmers are potentially impacted on several fronts including increased competition from international markets, an inability to adequately improve productivity in an increasingly competitive domestic market, and commodity price/food security impacts. These multiple stresses are better addressed in the Egypt case because domestic wheat production is an important feature of the country. In Senegal we see some negative environmental impacts due to increases of production in the groundnut sector since there is no indication that currently unsustainable farming practices will be significantly affected by liberalisation. Conversely, negative environmental impacts are not causally linked in the Egyptian case.

In the **net food exporting developing countries** we see positive economic impacts in both liberalisation scenarios. However, for India the economic impacts are not conclusive. Importantly, positive or negative economic impacts in India may depend on India's ability to meet domestic wheat demand in the future. Some debate on this issue was identified in the Indian sustainability assessment but no conclusion could be drawn.

#### Impacts of Trade-Related Agriculture Measures in the WTO

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	Econ	Soc	Env	Econ	Soc	Env	Econ	Soc	Env
Indonesia	0	0	0	+1	± 1	-1	+2	± 2/1	-2
India	0	0	0	± 1	± 1	± 1	±1	± 1	± 1
Argentina	+1	0	0	+1	± 1	0/-1	+1/+2	± 1	0/-1

Social impact results were somewhat more ambiguous for net exporting developing countries. In Indonesia this result is due to clear conflicts between social groups associated with the palm oil sector. An ambiguous result is thus due to some social groups gaining while others, particularly forest dwelling indigenous groups, incur negative impacts. In all three cases it is also suggested that vulnerable groups

especially small-scale farmers and the rural poor in general may be negatively affected by liberalisation. These negative impacts may be more severe in the liberalisation scenario due to problems in adjusting to more significant economic changes. Specific causal links were more difficult to establish in the Argentina and Indian cases. India in particular demonstrates a great deal of diversity between regions, although the potential for negative gender impacts is clear.

In terms of environmental impacts we see wide diversity in the results for these three country cases. Indonesia demonstrates clear negative impacts on forests, especially in the liberalisation scenario, that are directly causally linked in the assessment. Argentina shows no significant negative environmental impacts in the short term and only potential impacts in the longer term due to increases of input use. However, actual impacts will depend to a large extent on how domestic policy develops. In the Indian case the environmental impacts are poorly causally linked, resulting in more ambiguous results.

For the **net food exporting developed countries** there are positive economic impacts for all country case studies in both liberalisation scenarios.

#### Impacts of Trade-Related Agriculture Measures in the WTO

Impact on	Significant Impacts								
	Baseline Scenario			Intermediate Scenario			Liberalisation Scenario		
	Econ	Soc	Env	Econ	Soc	Env	Econ	Soc	Env
Australia	0/+1	0	0/-1	+1	+1/± 1	0/-1	+2	+1/± 1	-1
USA	0	0	0	+1	+1	0/-1	+1	± 1	-1
EU	-1	0	-1	± 1	+1	+1	± 2	±1	± 1

In Australia we see positive short-term social impacts due to positive economic impacts in the sub-sectors. However, over the long-term there are risks of potential negative social impacts associated with the adjustments needed to manage land degradation problems. As a result social impacts are more dependent on emerging circumstances. Negative environmental impacts are associated with production increases, and tend to be more significant over the long run.

In the US, large farm households are expected to gain while intermediate farm households may face some adjustment problems in an increasingly competitive market. As a result social impacts are shown to be positive in the intermediate scenario and more ambiguous in the liberalisation scenario. The intermediate scenario entails more opportunities to use domestic support measure to mitigate negative impacts on intermediate farmers and to deal with environmental impacts of the sector. In the EU we see similar impacts as in the US with positive economic impacts from liberalisation in terms of general welfare and budgetary expenses, but there are clear negative impacts on producers, particularly in the liberalisation scenario. This results in more context specific economic impacts. Social impacts are expected to be more positive in the intermediate scenario as there is some indication that the EU has a better-established agenda to address social and environmental impacts in the agricultural sector. Ambiguous environmental impacts are shown in the liberalisation scenario due to predictions of production decreases. As has been noted in the EU case study, there are environmental impacts associated with decreases in production and

more regionally specific analysis is required to establish the environmental effects of these production decreases.

## **16.2. Challenges encountered in performance of the sectoral SIA**

In this sectoral application of SIA methodology some important difficulties were encountered that should be considered in future sectoral SIAs. Two types of issues seem most prevalent. First, issues associated with the specific parameters chosen for assessment, and second, methodological issues will be addressed.

The choice of two crop sub-sectors for analysis in this study made it difficult in some country case studies to adequately address key sustainability impacts effectively. For example, in both the Senegal and Indonesia cases an adequate assessment of food security would have to also include the rice sector, as rice is most significant in terms of domestic food usage in both cases. As well, domestic production of rice is important in both Senegal and Indonesia, especially the latter, while wheat production is not. In order to appropriately address sustainability impacts in country case studies it may be more useful to examine the sector as a whole in a fewer number of cases than to only examine parts of a sector in a greater number of cases.

As has been noted earlier, already completed modelling studies of the economic impacts of liberalisation in the agricultural sector did not match the parameters and scenarios laid out by the Commission at the onset of this study. This is true not only for the differences between the various original scenarios, but in relation to the crop and country specific parameters. Unless significant resources are allocated to actually performing independent economic modelling efforts, SIAs will have to be responsive to existing research and this should be considered early on in the planning stage. It is noted by the Consultant that there is considerable interest in more quantitative analysis in SIAs. On a note of caution, it is important to not overstate the results from economic modelling as quantitative facts. To a large degree, results from CGE models are quantitative expressions of the economic theory that underlies the model. With different theoretical assumptions significantly different quantitative results pertain. These models are certainly useful, particularly in comparing results between countries/country groups and between sectors of the economy. However, SIAs should not rely exclusively on these types of appraisals, as assessments of sustainability conditions in countries/country groups will be equally as important.

In general, the scope of sectoral SIAs needs to be carefully considered at the initial planning stages. We feel that the SIA methodology already developed for the Commission and used in this study acts well as a framework for incorporating a wide range of economic, social, and environmental issues. However, as a methodology there are some problems in how to deal with the complexity inherent in sectoral SIAs that attempt to analyse impacts in a broad set of country cases. In highly theoretical and aggregated studies this may be less of a problem, but once sector and country-specific studies are attempted the data and analysis demands grow exponentially. This study has gone some way to develop further methodological tools within the SIA framework that can help to bridge the gap between macro-level policy analysis taking place in mainstream economic modelling exercises, and micro-level, field-type sustainability analysis at the local levels.

Nonetheless, much more detailed analysis is required to perform complete SIAs than was possible in the scope of this study. Particularly for large countries/country groups with more complex relationships in the agricultural sector, such as the Indian, US and EU cases, the level of analysis possible in this study is not satisfactory. Given the level of detail required for country specific case studies the scope of SIAs and the resources allocated to such studies need to be well matched. Another option for consideration is to return to the more aggregated approach used in the Kirkpatrick and Lee SIA methodology. Agricultural SIAs could be performed on country groups aggregated to: LDCs, net food importing developing, net food exporting developing, net food importing developed (high and low domestic support), and net food exporting developed (high and low domestic support). It also seems feasible to aggregate country groups in similar ways for other sector assessments. It should be kept in mind though that aggregation of this kind will result in more theoretical and anecdotal arguments in SIAs.

A final methodological issue is in relation to the presentation of SIA results in matrix format. The results in this study have shown that there is some potential for confusion with the current matrix used in the SIA methodology. Much of the problems associated with the current matrix are inherent in any attempt to summarise a complex set of relationships in a matrix format. In an SIA analysis a matrix will never be able to fully capture the reasoning within the analysis itself, and understanding results will invariably require a carefully reading of the SIA itself. Having noted this, the matrix will be better understood if it is accompanied with a short textual “unpacking” of the indicators as was done in this study. In terms of the indicators themselves it was found that the notion of presenting results in term significance of impacts was appropriate:

0 = non-significant impact

1 = lesser significant impact

2 = greater significant impact

+ = positive impact

- = negative impact

± = positive and negative impacts: net effect uncertain and/or varying according to context

-/+ = range indicating variation over time

However, the numerical presentation of what are qualitative descriptions is confusing. One suggestion is simply to fill the matrix with text instead of numbers or other types of indicators. For example impacts could be expressed as, “**less** significant **negative**,” “**more** significant **positive**,” or “**uncertain or varying less** significant.” This would be the most effective way to ensure that readers are not tempted to add impact results, as even non-numerical red, yellow, green light type indicators are often treated quantitatively by readers.

A more problematic issue is the need for better defined explanations for how to motivate the choice of certain descriptions of impacts over others. For example, in this study it was apparent in some case studies that the general economic welfare impacts at a societal level were different that at the producer level. Should this result entail a varying impact or should the Consultant attempt to assess to what degree negative impacts for a particular sector or social group are off set by general gains (or

visa versa). If impacts are always to be distinguishable between winners and losers for each impact category clearly the SIA matrix will almost invariably result in  $\pm$  or uncertain and/or varying impacts. Thus, more guidance is needed for those applying SIA methodology about what is entailed in assessing if an impact is significant or not.

### **16.3. Additional Methodological Suggestions**

As mentioned earlier, assumptions of economic theory that underlie modelling efforts often do not hold in reality, and the functions that link the production systems to the sustainability impacts are very complex and ambiguous and rarely well understood. Therefore, macro-level modelling and prediction exercises can only provide a framework for discussion. It should be noted at the outset that in this study, environmental sustainability aspects have only been possible to predict with aggregated data and theoretical reasoning. However, most sustainability implications will be highly site-specific. What is needed for the assessment is case-specific information to match with the production change estimates. What specific features and functions do the agricultural land or the marginal areas have? Specific national and sub-national information is needed. A regional hot-spots analysis of areas of high value and risk could be an important feature of an in-depth assessment. If we project an increase in land use and production, what lands are affected in the country? Are they of high or low environmental value? Does the agricultural system in itself contribute to ecosystem sustainability? Is the demographic and economic situation such that increasing production leads to higher inequality? These are all specific factors that are critical to the outcome of the assessment. Sustainability assessments must ultimately depend on localised empirical data and field studies to an extent that has not been possible within the frames of this pilot study. With detailed models of land areas, production and natural resource conditions, and social conditions it would be possible to predict environmental and social impacts in a more ambitious way.

An immediate problem here is the lack of adequate data to conduct such disaggregated analyses. There is a gap between the need for information and the availability or capabilities to deliver such information. For the foreseeable future, this will not be resolved even with rather well resourced SIA studies. Systematic efforts must be put in place at the international level to fill the data gaps, and, for instance, deploy geographical information systems to resolve the problem. This should probably be the task of global agencies such as UNEP, UNDP and WTO, through cooperation between national statistics agencies.

In the meantime, the key challenge for the SIA is to bridge the gap between macro-level policy analysis at the national and international levels that is taking place in mainstream economic modelling exercises, and the micro-level, field-type sustainability analysis at the local levels that is taking place in anthropological and ecological research and project impact studies. Aggregated SIA studies, as is the basis of the current SIA methodology, tend to lose much critical information when aggregating from the local context to the national or international level. Baseline sustainability conditions vary spatially between and within regions, and impacts of agricultural practices also vary spatially.

This has implications for the methodology as well as immediate policy implications for the negotiations in so far as generic policies implemented that are not fitted to

local conditions will have many different and unintended side effects. In any case, the diversity on economic, social and environmental conditions not only between countries but also within countries calls into questioning the usefulness of broad analyses. What might be needed most are local and regional case studies that represent certain type conditions in different parts of the world.

#### **16.4. Advice on Sectoral Indicators**

Indicators can be used to monitor changes at several different points in the conceptual framework developed for this study. The elements of our conceptual framework coincide with the well-established Driving Force-Pressure-State-Impact-Response indicator model originally developed by the OECD and further modified and developed by numerous indicator developers.

- ❖ Underlying trends in the structure of economic incentives and opportunities that are *driving* the changes in the development (to become sustainable or unsustainable);
- ❖ Underlying trends that cause changes in the production system, which puts a *pressure* on the economy, society and environment;
- ❖ The pressure from the change in the production system that results in a transformed economic, social or environmental state through impacts on sustainability aspects; and
- ❖ The *policy response* that can target any of the above parts, but is preferably aiming for the structural changes, or the changes in the production system those trends are causing.

A limited set of indicators is normally more effective than a large number of indicators. Too many indicators easily becomes overwhelming, both in development and interpretation. An important step in indicator selection is therefore to narrow down the set of indicators according to a number of selection criteria, which focus the selection on indicators with the following features.

**Direct link to potential sustainability impacts.** The main purpose of the selected indicators is to enable the monitoring of the project's direct and indirect sustainability impacts. It is important to remember that such impacts may be both negative and positive. However, the monitoring (and control) of adverse sustainability impacts may be considered as more important since they have a negative effect on people's welfare and livelihoods and, in the worst case, risk becoming irreversible. The analysis of cause-effect relationships is therefore vital in defining potential impacts for which indicators can be selected. Note, however, that the indicators do not necessarily have to be impact indicators in order to capture potential impacts of project activities. As long as the cause and effect links are established, it is possible to select either a pressure indicator to monitor the cause behind the observed impact, or an impact indicator to monitor the actual effect. An example of this is the indicator "land use change", which is an indicator of a pressure on the natural system. This pressure can result in several different impacts, such as soil erosion, loss in biodiversity, and migration. By monitoring land use change, one can therefore obtain a first signal (or indication) of a change that should be further analysed and, perhaps, mitigated.

**Relevance in the long run.** To enable a comparison of impacts over time (that is, a comparison between the baseline situation and coming monitoring results), the selected indicators should be relevant in the long run.

**Clear definitions.** The message conveyed by the selected indicators should be unambiguous to avoid confusion in their development or interpretation. The selected indicators should therefore be clearly defined.

**Relevant for as many countries as possible.** Having the possibility to use the same indicator set in each assessment as one objective of the proposed indicators, and inter-country comparison as another, the proposed indicators should aim to be relevant for as many countries as possible in the world. This implies that well-established indicator developing organisations will be used as the main source of information and data. It should be noted, however, that there might be a need to complement the proposed indicators with case specific indicators.

**Based on existing data.** In order to be practical and realistic, the selection of indicators has to be based on existing international indicator or data collections. Any other indicators would not be comparable with other countries assuming there are not enough resources to develop new indicators for all countries affected by trade liberalisation in the agricultural sector.

Using these features as a way of identifying appropriate indicators, a useful set of indicators can be selected and used. These indicators are likely to include aspects such as agricultural GDP, poverty, agricultural employment (disaggregated between men and women), health, wheat /oil output and share of agricultural GDP, agricultural employment, land use – stock of agricultural land, pesticide and fertiliser use (as kg/ha), water use intensity and efficiency, water quality, soil erosion, and biodiversity.

While the current study is not resourced to provide quantitative or disaggregated results for each critical sustainability aspect, we have identified a set of indicators that represent these factors and should be readily available through international data sources.

<i>IMPACT CATEGORY</i>	<i>SUGGESTED INDICATORS</i>
<b><i>Economic:</i></b> Economic performance Budgetary pressures Productivity Aggregate income effects	Agricultural GDP as % of total GDP Budgetary expenditure as % of GDP Agricultural GDP/employee Employment and income levels in the sector
<b><i>Social:</i></b> Food security Poverty Gender  Population migration Social conflict Biodiversity	Average daily per capita calorie supply (kilocalories) Share of farmers below poverty line Women's engagement in the sector as a % of total female employment Urbanisation rates No. of protests and petitions (agriculture related) Protected area as % of total land area
<b><i>Environment:</i></b> Soil quality Deforestation Marginal land appr / idling Rural landscape change Depletion of water resources Water quality	Average annual fertilizer use in kg/ha Forest cover as % of total area and % changes Agricultural and forest land conversion rates % change Different landscape types in ha and % changes Annual water withdrawals as % of water resources Access to safe drinking water % of population

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# Appendix 1

## 1. INTRODUCTION

The European Commission decided in 1999 to carry out a sustainability impact assessment (SIA) of the proposed WTO new round of multilateral trade negotiations.

The objective of the assessment is not to assess the desirability of WTO-led liberalisation as such but to assess how best to define a full package of domestic policies and international initiatives which would produce the optimal outcome in terms not only of liberalisation and economic growth but also of other components of sustainable development.

### Phases One and Two of the Sustainability Impact Assessment

In June 1999, the Commission awarded a contract for the SIA project to the University of Manchester's Institute of Development Policy and Management. During Phase One of the SIA, the Contractors created a methodology for the Impact Assessment - this is detailed in the Phase One report (see Note below).

During Phase Two, this methodology was used to make a broad, qualitative assessment of the impact upon sustainability of the proposed New Round agenda, based on several scenarios, including the EU's proposals. The Contractor also put forward ideas about how to best maximise the positive impacts of the expected liberalisation and rule making. The details of this work can be found in the Phase Two report (see Note below).

## 2. CONTINUATION OF THE SIA – PHASE THREE

The work completed in Phases One and Two, including the assessment methodology which was developed, is now to be used as the basis for Phase Three of the SIA, a further assessment of the impact on sustainability of trade liberalisation.

The purpose will be to provide a better basis than has existed to date for EC institutions to shape any sustainability-related aspects of the EC approach to current negotiations in specific areas, and to provide an SIA-based review of the results of negotiations when the time comes to present them for formal adoption.

The Commission has in particular undertaken to carry out an SIA of whatever negotiations take place in the WTO context in the absence of a comprehensive round of negotiations. Negotiations on agriculture and services have been underway since January 2000.

As part of the preparations for the definitive launch of Phase 3 of the SIA on WTO negotiations, the Commission has decided, as a pilot project, to select a contractor for the running of a sectoral impact assessment in the area of agriculture – sector foodcrops, where negotiations are currently underway.

## 3. OBJECTIVES OF THE SECTORAL IMPACT ASSESSMENT

The main objectives of this contract of the for a sectoral Sustainability Impact Assessment are to:

- A. *conduct an SIA of the WTO trade negotiations under way in the area of agriculture, covering specifically the sector of major foodcrops - an examination of their potential economic, environmental and social development impacts. The work should include the use and further development of the methodology, as developed in Phase One, for the specific purpose of this study. The contractor should particularly take into account the forward looking elements of the work he is to carry out, and the necessity for all output to be made available and usable for the planned Phase 3 of the overall SIA of a new round of WTO negotiations.*

- B produce a comprehensive SIA of any package of agreed or prospective results in this area, based on a number of scenarios (minimum 3, maximum 5).*
- C participate upon request in the dialogue concerning this sectoral SIA on agriculture negotiations with all interested European stakeholders. The European Commission organises, in the framework of its trade policy dialogue with civil society, regular meetings to discuss trade and sustainable development. In particular, the work on phases 1 and 2 of the SIA has been accompanied by civil society meetings that have provided useful feedback about the process and the methodology in use. The contractor appointed for the project under discussion would be expected to be available for such debates upon request, but at least twice during the running of the contract.*
- D similarly, the team in charge of phases 1 and 2 had established a credible international network of SIA experts and had participated in policy debate on SIA with experts in other countries and within other international organisations. The contractor to be appointed for the project under discussion would be expected to continue these activities, specifically aiming at the establishment of a network of specialists on the study of sustainability in the area of agriculture and foodcrops, and to maintain and further the development of this network. A complementary aim for this part of the contract would be to ensure that any continued work on the SIA would be able to depend on a solid and reputable body of expertise in the area..*

#### **4 WORK TO BE CARRIED OUT & SERVICES TO BE RENDERED**

All reports and other work which is submitted should be provided on floppy disk / in electronic format as well as four hard copies (one of which should be loose leaf).

An outline of the work to be carried out - 'Interim Report' - as detailed below, shall be submitted within two weeks of the date of the signature of the contract. This will then be discussed with Commission experts before work begins. The precise management of the project, and the allocation of resources available under the contract, will be fine-tuned by agreement between the Contractors and the European Commission.

The Contractor will, in addition to the above 'Interim Report':

- a. provide two reports, the first after 3 months, the second at the end of the contract covering:

an in-depth sustainability impact assessment of the potential outcome of ongoing negotiations in the sector foodcrops/agriculture. This work will include:

- adjustment and development, as appropriate, of the methodology – including an examination of the comments received thus far from Member States, the European Parliament and Civil Society. Such adjustment should include the definition of any necessary additional sustainability indicators, a further breakdown of the country groupings used and a possible expansion of the scale on which impacts are measured;

- the provision of guidance on what flanking measures might be introduced to best maximise the positive impact on sustainability of further liberalisation/changes in rule-making. This should include an assessment of the various options for introducing mitigating and enhancing measures, including measures which might be introduced in other fora.

All of the above should be established for a minimum of three potential scenarios. Commission experts will provide information to the Contractors about negotiating developments to assist in the construction of these scenarios.

The reports should provide a concise summary of the findings, accessible to trade and non-trade specialists alike. They should expressly be written with the aim to provide all necessary information about methodology, indicators etc. to enable any follow-on contractor (phase 3) to seamlessly continue the work.

- b. attend meetings in Brussels with Commission officials. These will include: presentations and explanations by the Contractor of work done to date; an opportunity for the Contractor to obtain further information from the Commission on negotiating developments; and discussion of the specific sectors to be assessed.

This will entail, as a minimum, one meeting at the start of the project and then one further meeting during the duration of the contract;

- c. participate in public meetings organised by the Commission (these involving representatives of Member States, the European Parliament and Civil Society). These will include presentations and explanations by the Contractor of work done to date and an opportunity for all interested stakeholders to provide direct input to the Contractor.

This will entail one meeting (held back-to-back with the meeting with the Commission) during the duration of the contract;

- d. Make documents and information on progress of the work on the contract available electronically on the Site to be established/maintained by the contractor appointed to work on the overall methodology with a link to the DG Trade Web Site;
- e. establish a direct e-mail address allowing all interested parties to provide input to the work;
- f. provide a final report covering the full package of prospective results in the sector under discussion.

## 5 VALUE OF CONTRACT

The value of the contract is estimated to be less than € 40,000.-, based on an average 40 to 70 working days plus travel, and other, expenses. However, the tenderer should be aware that the contract award criteria are based on the economically most advantageous tender (best unit price/quality relationship) and that the Commission's estimation is purely informative.

## 6. PAYMENT

Payment shall be made in EURO.

**Remuneration:** payment shall be made according to time spent on the project based on submission to the Commission by the Contractor of duly established invoices.

**Reimbursements:** travel and related costs can be invoiced according to the amount agreed in the contract. For the reimbursable costs, payment shall be made following presentation of original receipts (plus one copy) as part of the main payment.

## 7. The offer must include:

- all the information and documents required by the authorising department for the appraisal of tenders on the basis of the award criteria set out at point 10,
- *The consultant should have no-conflict of interest and be completely independent. A statement of independence should be included in the offer.*
- A price per unit of time, in accordance with point 9.

- > In drawing up his bid, the consultant should bear in mind the provisions of the standard contract attached to this invitation to tender (see annexes)
- > In case of consortiums of firms or groups of service providers: detailed information that specifies the role, qualifications and experience of each member or group.
- > Legal status of the company/organisation
- > Name and title of the person entitled to sign
- > Complete banking references (account n° and bank's name, full address of the local branch, international bank code or SWIFT code); and
- > VAT N°

## 8. Quotation of prices

Prices must be quoted in EUR (€) using the conversion rates published in the C series of the 'Official Journal of the European Communities' on the day when this invitation to tender was sent out.

The offer should indicate the prices for units of time (in EUR per day) that are fixed and non-revisable amounts.

Estimated travel and subsistence expenses must be indicated separately. The tenderer should include a provision of € 10 000 for any travel required to meet representatives of DG Trade and to participate in public or international meetings.

Prices should be quoted free of all duties, taxes and other charges, including VAT, as the Communities are exempt from such charges under Articles 3 and 4 of the Protocol on the privileges and immunities of the European Communities.

Tenderers will have to submit an offer quoting unit prices for type of services requested (as described in detail above). In addition the tenderer should also give his/her own estimation of the amount of working days that he/she believes will be needed for this project. For the avoidance of any doubt, the tenderer is not requested to quote a lumpsum price. The price offer should be based on the following grid :

	Daily rate Senior Expert In €	N° of proposed Senior experts	Daily rate Junior Expert In €	N° of proposed Junior experts
Consultancy : fees for sustainability impact assessment in the sector foodcrops/agriculture + production of 3 reports + coordination with contractor for the overall SIA methodology				
Participation in meetings with Commission, in public meetings, and in international meetings				
Creation and maintenance of a website				
Establishment of a direct e-mail address				
Other (please specify)				

Provision for travel expenditure	€10 000
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**9. Award Criteria for the choice of the contractor**

Economically most advantageous tender.

Criteria to be applied are Unit prices and the following quality criteria:

- 1.) quality of the proposal / offer (30%)
- 2.) Level of qualifications of the expert(s) (or team) proposed (30%)
- 3.) Level of experience with related and relevant projects in the field of impact assessment (40%)

Enclosures:

Annex I: Provisions related to tenders and the award of contracts

Annex II: General terms and conditions applicable to service contracts

Annex III: Standard contract with the specific and general conditions, obligations of the consultants, which will be proposed to the selected contractor.