

**Colombia: Integrated assessment of
agricultural trade liberalization:**

With a focus on the corn sector

Preface

The Alexander von Humboldt Institute has a mission to promote, coordinate and carry out research that contributes to conservation and sustainable use of biodiversity in Colombia, ultimately for the population's advancement and wellbeing. For the 2005–2010 period, the Institute generated the strategic plan “Biodiversity for Development”: the sustainable management of ecosystems”, which considers basic and applied research on biodiversity and knowledge integration in policy making at different levels, as objectives.

To meet the objectives proposed, the Institute developed and applied different methodological approximations for *ex ante* analysis of policies, aiming to integrate sustainability with national decision processes. Hence, it was logical for the Institute to take part in UNEP's IAP project, “Strengthening Capacity for Integrated Assessment, and Planning for Sustainable Development: Agricultural Trade Liberalization and its Relation to Biodiversity and Poverty Reduction”.

This report reflects a methodological application to quantify impacts of agricultural commercial liberalization on three national variables, namely economic, social, and biodiversity. It aims to demonstrate the processes that are triggered with the signing of a Free Trade Agreement with the United States of America.

Some of these processes include direct impacts on prices, demand and internal consumption; changes in production costs, effects on cultivated areas and implications of displacement of agricultural/non-agricultural activities; social conflicts; coherences or divergences with other national policies; food security and pressure on wildlife resources, among others.

From these linkages we can draw observations that sustainable policies require the ecosystem approach, and with the inherent complexity, there is a clear challenge to devise explicit, tangible methods.

We want to show our appreciation to the stakeholders who contributed to the integrated assessment project. This project helped to fortify the relationships among the private and public stakeholders, which will help sharpen the application of the ecosystem approach in national development.

Fernando Gast Harders

Acronyms and abbreviations

AGROCADENAS	Observatorio de Competitividad Agrocadenas Colombia del Ministerio de Agricultura y Desarrollo Rural
AIA	Agenda Interna Agropecuaria/ Agricultural Internal Agenda
ALADI	Latin American Integration Association
CAN	Andean Community of Nations
CAR's	Corporaciones Autónomas Regionales
CARICOM	Caribbean Community
CBDC	Community Business Development Corporations
CCI	Corporación Colombia Internacional
CEGA	Centro de Estudios Ganaderos y Agrícolas
CIAT	Centro Internacional de Agricultura Tropical
CIMMYT	International Maize and Wheat Improvement Center
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CONPES	Consejo Nacional de Política Económica y Social
CORPOICA	Colombian Corporation for Agricultural Research
DANE	Departamento Administrativo Nacional de Estadísticas
DNP	Disarmament and Non-Proliferation
DTIE	Division of Technology, Industry and Economics
ETB	Economics and Trade Branch
IGAC	Instituto Geográfico Agustín Codazzi
ICA	Colombian Agricultural Institute / Instituto Colombiano Agropecuario
IDEA	Instituto de Estudios Ambientales (Universidad Nacional de Colombia)
IDEMA	Instituto de Mercadeo Agropecuario
IAP	Integrated Assessment Project
FAO	Food and Agriculture Organization
FEDECAFE	Nacional de Cafeteros de Colombia
FENALCE	Federación Nacional de Cultivadores de Cereales y Leguminosas
FINAGRO	Fondo para el Financiamiento del Sector Agropecuario, FINAGRO

FTA	Free Trade Agreement
Humboldt Institute	Instituto de Investigación de Recursos Biológicos Alexander von Humboldt
IAIA	International Association for Impact Assessment
MAC	Public Mechanism to Administer Contingencies
MADR	Ministry of Agriculture and Rural Development
MAVDT	Ministerio de Ambiente, Vivienda y Desarrollo Territorial
MCIT	Ministry of Commerce, Industry and Tourism
MEAs	Multilateral environmental agreements
MEHTD	Ministry of the Environment, Housing and Territorial Development
MERCOSUR	Mercado Común del Sur
NGOs	Non-governmental organizations
NPD	National Planning Department
PIC	Prior Informed Consent
POPs	Persistent Organic Pollutants
SBC	Secretariat of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal
SAFP	Sistema Andino de Franja de Precios, or Andean System of Prices and Price Ranges
TLC-USA	Tratado de libre Comercio con USA
UMATAS	Agricultural Technical Assistance Units for Municipalities
UNEP	United Nations Environment Programme
WTO	World Trade Organization

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United Nations Environment Programme

The United Nations Environment Programme (UNEP) is the overall coordinating environmental organization of the United Nations system. Its mission is to provide leadership and encourage partnerships in caring for the environment, by inspiring, informing, and enabling nations and people to improve their quality of life without compromising that of future generations. In accordance with its mandate, UNEP works to observe, monitor, and assess the state of the global environment; improve the scientific understanding of how environmental change occurs; and in turn, determine how such change can be managed by action-oriented national policies and international agreements. UNEP's capacity building work thus centres on helping countries strengthen environmental management in diverse areas, which include freshwater and land resource management; the conservation and sustainable use of biodiversity, marine and coastal ecosystem management; and cleaner industrial production and eco-efficiency, among many others.

UNEP, headquartered in Nairobi, Kenya, marked its first 30 years of service in 2002. During this time, in partnership with a global array of collaborating organizations, UNEP achieved major advances in the development of international environmental policy and law, environmental monitoring and assessment, and our understanding of the science of global change. This work also supports the successful development and implementation of the world's major environmental conventions. In parallel, UNEP administers several multilateral environmental agreements (MEAs), including the Vienna Convention's Montreal Protocol on Substances that Deplete the Ozone Layer, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (SBC), the Convention on Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade (Rotterdam Convention, PIC), the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, and the Stockholm Convention on Persistent Organic Pollutants (POPs).

Division of Technology, Industry and Economics

The mission of the Division of Technology, Industry and Economics (DTIE) is to encourage decision makers in government, local authorities and industry to develop and adopt policies, strategies, and practices that are cleaner and safer, make efficient use of natural resources, ensure environmentally sound management of chemicals, and reduce pollution and risks for humans and the environment. In addition, it seeks to enable implementation of conventions and international agreements and encourage the internalization of environmental costs. UNEP DTIE's strategy in carrying out these objectives is to influence decision-making through partnerships with other international organizations, governmental authorities, business and industry, and NGOs; facilitate knowledge management through networks; support implementation of conventions; and work closely with UNEP regional offices. The Division, with its Director and Division Office in Paris, consists of one centre and five branches located in Paris, Geneva and Osaka.

Economics and Trade Branch

The Economics and Trade Branch (ETB) is one of the five branches of DTIE. Its mission is to enhance the capacities of developing countries and transition economies to integrate environmental considerations into development planning and macroeconomic policies, including trade policies. ETB helps countries develop and use integrated assessment and incentive tools for achieving poverty reduction and sustainable development. The Branch further works to improve our understanding of environmental, social, and economic effects of trade liberalization and the effects of environmental policies on trade, and works to strengthen coherence between Multilateral Environmental Agreements and the World Trade Organization. ETB also helps enhance the role of the financial sector in moving towards sustainability. Through its finance initiatives, ETB also helps enhance the role of the financial sector in moving towards sustainability.

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1. Summary

This integrated assessment project for sustainable development in Colombia evaluates the effects of trade liberalization on biodiversity and agro-biodiversity, economic sustainability of small farming, and changes in food security that may occur if production structures change. The corn sector was chosen as representative of the small farm economy in the case study.

The key areas of our investigation involved identification of: (a) new pressures on natural ecosystems caused by the increase of agricultural activity; (b) impact of any expansion or contraction on the sustainability of the small farm economy; (c) changes in traditional production systems; (d) impacts on *in situ* conservation of agro-biodiversity; and (e) impacts on food security.

During the course of the project, the Government of Colombia decided to introduce the Agricultural Internal Agenda (AIA) to strengthen the rural sector in the face of newly competitive market conditions and opportunities stemming from the negotiation of a Free Trade Agreement (FTA) with the USA. Hence, the project team also identified the AIA as the subject of integrated assessment. This was discussed at regional workshops with participants from the small farm economy. Since participation was one of the key elements of integrated assessment, various reviews helped establish a feedback channel from those who are most likely to be affected.

Using statistics from the corn-producing sector of the small farm economy as a case study, the project applied a set of qualitative and quantitative tools to analyse trends and threats, as well as to identify opportunities and alternatives. The project also relied on non-governmental organizations (NGOs), academic sources, the private sector, and the small farm sector. To analyse the information accumulated, statistical series were constructed, followed by further analysis.

Through regional workshops, consultations with experts and discussions with an ad-hoc taskforce, the project constructed a set of proposals that were presented to the AIA taskforce.

1.1 Background

In recent years, the decades-old debate about the relationship between international trade and the environment has taken on growing importance due to greater understanding of the environment, the development of strengthened multilateral environmental agreements (MEAs), rapid economic globalization and the growing number of international trade agreements.

At the end of 2003 the Instituto de Investigación de Recursos Biológicos Alexander von Humboldt (Humboldt Institute) presented a proposal to UNEP's Economic and Trade Branch for an assessment on free trade agreements, through the programme: "Capacity Building for Integrated Assessment and Planning for Sustainable Development".

Integrated assessments have become important tools to integrate environmental and social criteria with conventional developmental economics analysis. In this type of evaluation, the participation of stakeholder parties is fundamental. They allow access to information that otherwise would not be available in a more conventional approach.

To develop and coordinate the project's research lines, an ad-hoc taskforce was formed with representatives from the Ministry of Commerce, Industry and Tourism (MCIT), the Ministry of the Environment, Housing and Territorial Development (MEHTD), the Ministry of Agriculture and Rural Development (MADR), the National Planning Department (NPD), and the Humboldt Institute.

The conclusions derived from this evaluation will hence give special support to those who formulate domestic policy, including those who are managing the AIA (Agricultural Internal Agenda)¹. It is hoped that the conclusions and recommendations will qualitatively and quantitatively enrich the design of national policy in ways that will mitigate negative social, economic and biodiversity effects.

¹ CONFECAMARAS, DNP, Ministerio de Comercio, Industria y Turismo, Organización de los Estados Americanos, TRUST, USAID Colombia (2005) Agenda Interna para la Productividad y la Competitividad.

2. The links between agriculture, trade liberalization and the environment

Agriculture sector policies have an effect on the socioeconomic development of rural areas, as well as the environment and natural resources. Agricultural policies have in turn been strongly influenced by macroeconomic changes including shifts in international trade.

Processes eroding biodiversity in Colombia have historically resulted from different economic sectors, but especially the agricultural sector because of its close relationship to biodiversity. Among the direct causes is the transformation of habitats due to the expansion of the agricultural frontier. Similarly, pollution is likely to become a cause of biodiversity loss.

Traditional economies are known to have agricultural practices that are relatively friendly to the environment, partly through diversified production. Hence, the small farm economy and its fate due to agricultural trade liberalization are of particular interest.

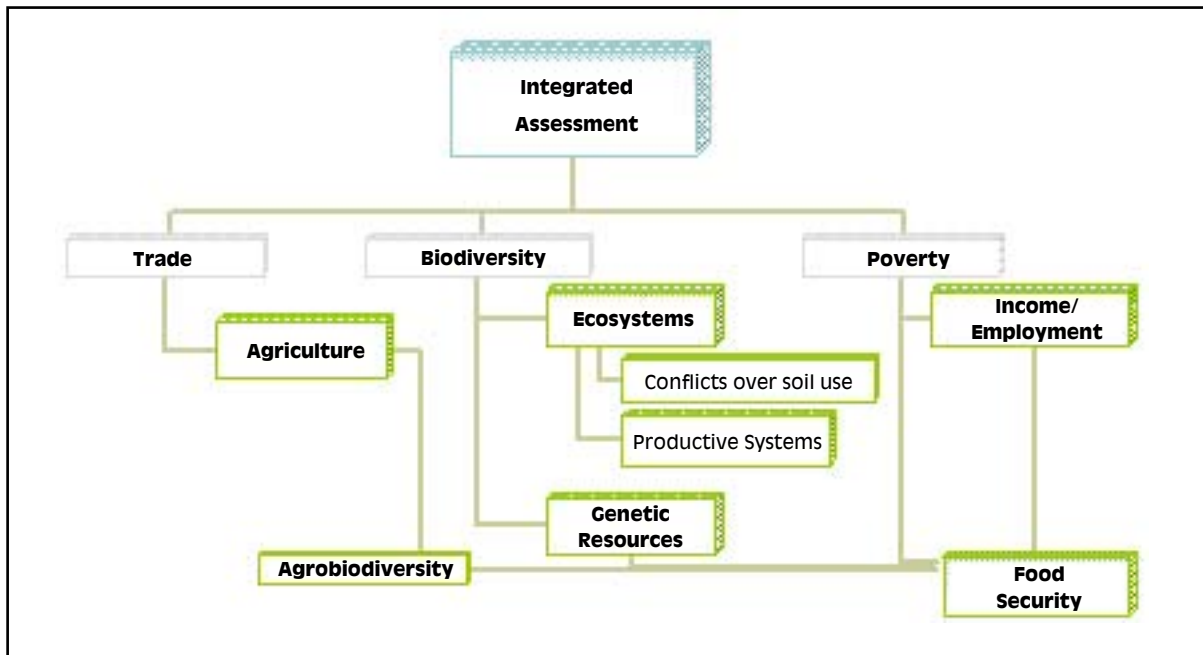
To analyse the effects from agricultural trade liberalization, therefore, the project needed to identify the impact of trade changes on agricultural production structure leading to changes in biodiversity, sustainability of the small farm economy and food security.

Some principal questions to be asked are:

- Will the process of trade liberalization generate changes in the national productive structure?
- Will this new productive structure cause changes in the use of the soil, including expansion or contraction of agricultural or grazing lands, which will imply new pressures on natural ecosystems?
- Will new trade arrangements include or exclude small farm economies from new production dynamics and what impact will this have on traditional production systems?
- If changes are observed in traditional production systems, will this imply conservation or loss of hereditary materials?

To answer the questions, several indicators were selected. Economic indicators were used to study the behaviour of the farm sector. Employment and income indicators worked as social indicators and also as indicators of food security, while changes in soil use and environmental friendliness of productive systems were chosen as indicators of pressure on ecosystems (see Figure 1).

Figure 1: Principal indicators



2.1 Explaining trade liberalization

On the environmental level, according to UNEP, trade can promote distributive efficiency when countries already specialize in production of goods and services that have comparative advantages. Competition can provoke an increase in efficiency as companies are pushed to innovate. Efficiencies are also imported through technology transfer (UNEP, 2002).

However, a study (Nuñez, 2002) pointed out that changes in economic structure due to comparative advantages can have negative effects on a country, especially when those structural changes lead to unsustainable economic activities exploiting easily available natural resources. The implication is that economic behaviour can have positive or negative consequences (IAIA, 2004)².

2.2 Explaining the small farm economy

The small farm economy plays a key role in Colombian rural food security and in total national agricultural output³. Small farmers produce about two thirds of all national agricultural output in Colombia (see Table 1), a proportion which rises if illicit cultivation is included.

² International Association for Impact Assessment. (IAIA). 2004. Preliminary Discussion, Paper Assessing the Biodiversity Impacts of Trade: Principles and Practice.

³ Classification into small farms and commercial farms is by crop. Mainly small farm crops: coffee, traditional corn, banana, sugar cane, yuca, potatoes, fruit trees, beans, vegetables, cacao, ñame, agave, wheat, coco, arracacha, sesame, tobacco, barley, as well as non-mechanized crops and crops without irrigation. Primarily commercial crops: irrigated rice, coffee, sugar cane, mechanized dry land rice production, corn with modern technology, palm oil, sorghum, cotton, bananas for export and soy.

Table 1: Small farm share of agricultural production 1999-2000

Concept	Type of farm	Including coca and poppy production (%)	Without coca and poppy production (%)
Area cultivated	Small farms	68.1	67.3
	Commercial farms	31.9	32.7
Crop value	Small farms	69.1	62.9
	Commercial farms	30.9	37.1

Sources: Forero, 2003, calculated from statistics of the Ministry of Agriculture and FEDECAFE. For coca and amapola: Áreas Policía Nacional, Tavera 2000, in United Nations Food and Agriculture Organization, The World Bank, and United States Agency for International Development, 2003.

Other important characteristics of the Colombian small farm economy include:

- Poor access to adequate communication and transportation due to mountainside locations.
- Poor technology, caused by lack of agricultural technology transfer.
- More employment per hectare than commercial farms, partly due to low opportunity costs for surplus family labour.⁴
- Mixed systems of production are employed instead of single crop systems.
- High integration into the domestic market, informally or informally, from the involvement of agricultural finance, landowners and merchants.

The small farm economy has been observed to have a strong capacity to absorb shocks from economic crises.⁵ This ability to react to new circumstances will be a focal point in the following analysis, particularly in relation to government policy.

2.3 Explaining agricultural diversity and food security

Agro biodiversity or agricultural biodiversity, understood as the biodiversity of food production, is a fundamental component of food security. Agricultural trade liberalization and the globalizing economy are causing biodiversity loss by promoting industrial agricultural production, which encourages single crop systems and uniformity of production. In addition, demographic pressures, existing inequalities in the size of landholdings, and lopsided control of natural resources generate market pressures that threaten agro biodiversity and food security.

Food security, however, does not depend alone on agro-biodiversity. Since the concept of food security first emerged in the 1970s, its definition has been evolving, reflecting the technical and political complexities of the issue.⁶ The most recent definition was negotiated at the 1996 World Food Summit in Rome: “Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life” (FAO, 1996).

⁴ Jaramillo, C.F. (2002), Crisis y transformación de la agricultura colombiana 1990-2000, Banco de la República y Fondo de Cultura Económica, Bogotá.

⁵ See remarks of Jaime Forero in (IAvH, 2004).

⁶ For a review of the concept of food security, see (FAO, 2003a) and (FAO, 2003b).

The relationship between poverty and food security is also a central part of the food security debate. Food insecurity may be caused by various factors including cultural, political, economic or social practices, and deterioration of physical capital and local natural resources. It needs to be addressed because grave structural barriers exist preventing gains from trade, and also because trade has a direct bearing on food security.

International trade also has an impact on economic growth, employment, income distribution, and government revenues. All of these factors directly influence household income, a fundamental factor for access to food.

3. Colombia's agricultural and trade sectors

Colombia's constitution mandates the state to facilitate appropriate means to improve the income and quality of life of small farmers and the rural poor, and places the onus on the Government to take special care to protect food production. Both mandates have to be taken into account when considering sectoral policy, economic activity and trade in agricultural products.

At the beginning of the 1990s, Colombia's agricultural policies underwent major reforms from economic deregulation (*Apertura Económica*). This implied reframing the role of the State by reducing direct intervention in markets while growing its role as provider of public goods and services that allow the country's economic potential to grow.

Since 1990, Colombia has worked towards open economic participation in agriculture. It has signed numerous international agreements of within the frameworks of the World Trade Organization (WTO), the Andean Community of Nations (CAN or *Comunidad Andina de Naciones*), the Latin American Integration Association (ALADI or *Asociación Latinoamericana de Integración*), the Group of Three Treaty (Mexico, Colombia and Venezuela), MERCOSUR and the Caribbean Community (CARICOM or *la Comunidad del Caribe*). Bilateral trade agreements were also signed, some of which saw significant tariff protection reductions for the local agricultural sector.

3.1 General trends in agriculture

Valuable soil resources, which the country needs for its development, are currently underutilized. An analysis of figures available from IGAC (*Instituto Geográfico Agustín Codazzi*) for 1987 and CORPOICA (*Corporación Colombiana para la Investigación en Agricultura*, or Colombian Corporation for Agricultural Research) for 2002, show that there were 21 million hectares suitable for cultivation (including tree farms), but only 4 million hectares, or 19.4 per cent, were under cultivation. Moreover it was uncertain whether those 4 million hectares were actually suitable for cultivation. Partial reason lies in the armed conflict in rural areas of the country, which affects land use.

Still, the volume and value of agriculture production has been increasing. One reason would be value added by the addition of more permanently cultivated land and more intensive cultivation. As a consequence, agricultural productivity has significantly accelerated.

From 1990 to 2004, Colombian agricultural trade had more exports than imports, in contrast to the overall domestic economy. Export stability depended almost entirely on coffee, imports of which were practically nonexistent.

Other exports leading to positive trade balance included cereals and livestock. Colombia's agricultural trade was exported to mainly the following countries: USA (35 per cent), European Union (20 per cent), and Venezuela and Ecuador (14 per cent).

Since 1996 there has been a constant upward revaluation of the Colombian peso, which has diminished the competitiveness of Colombian products, especially of transportable goods. The national bank estimated that the real rate of exchange reached its maximum level in 2003 with a total upward revaluation of 37 per cent. Although the level of revaluation has subsided it has significantly affected Colombia's agricultural sector by reducing international competitiveness.

The most important agricultural products affected by the revaluation were coffee, bananas, flowers, sugar, fruit, cotton, beans, palm oil, corn, wheat, milk and eggs.

3.2 Social issues and food security in Colombia

The indexes for poverty and hunger are more pronounced in the countryside than in the cities, as the countryside has a lower concentration of wealth and higher inequality. *“For the year 2000, the population in a situation of poverty rose to 24.9 million, of which 9.7 million (40 per cent) were hungry, that is to say they do not have sufficient income to guarantee access to a basic market basket of food. In rural areas the incidence of poverty is even higher: 10 million of the 12 million Colombians who live in the countryside are poor”* (MADR, 2003a).

Concentration of income, one of the highest in Latin America, constitutes a grave problem in Colombia. Some 40 per cent of the poorest households earn only 12.3 per cent of total income. This poor distribution has caused food insecurity in Colombia, given very poor distribution of demand and consumption capacities (MADR, 2003a).

An MADR study points out that food imports nearly doubled in the decade 1991-2001, rising to 19.6 per cent of the country's food supply. The study indicated that while this percentage was still not high, its rapid rate of growth and the groups of food most imported (cereals, oils and fats, and legumes) were causes for concern.⁷ This could constitute an important piece of evidence pointing to the effect of trade on food security, and the increasingly important role trade could play in the near future.

Colombian public policy has tended toward short-term assistance for vulnerable population sectors rather than developing a long term integrated vision for food security. On the positive side, the level of social expenditure achieved by Colombia in the 1990s was a considerable achievement, although it was still insufficient to meet the needs of the population.

3.3 Environmentally friendly practices in Colombian agriculture

Agricultural development can threaten the sustainability of both natural productive systems and productive systems arising from human needs. It is thus necessary to analyse the environmental impacts of agricultural activities, and find ways to generate alternatives that minimize environmental damage.

One of the ways is to analyse the structure and functioning of productive systems to see how they affect ecosystems and agro-ecosystems. The attempt to identify a referential baseline has revealed deficiencies in work already done earlier at a national level.

⁷ MADR, 2003b.

In an effort to fill this gap, a developmental impact model was introduced by the Humboldt Institute and IDEA (*Instituto de Estudios Ambientales*) of *Universidad Nacional*.⁸ This model permits classification of agricultural subsectors according to ranges of favourable or unfavourable impacts on biodiversity (see Tables 2 and 3). Systems of production are defined as a set of elements including operations and practices that characterize particular crops. It is important to re-state that this model does not include considerations of how agricultural activity affects either natural soil systems or agricultural soil systems.

Table 2: Developmental impact model ranges of classification

7.5-10	Very favourable productive system for biodiversity
5-7.5	Favourable productive system for biodiversity
2.5 -5	Unfavourable productive system for biodiversity
Less than 2.5	Very unfavourable productive system for biodiversity

Table 3: Areas rated for favourability in Colombia in 2003

Land type	Hectares cultivated in 2003
Total cultivated land unfavourable to biodiversity	1.785.242
Total cultivated land favourable to biodiversity	2.105.267
Total grazing land unfavourable to biodiversity	38.302.387

These findings form the referential base connecting trade analysis with changes in the productive structures. It should be noted that the intention behind the investigation was not to recommend discarding national production. Rather, the investigation hoped to point to the necessity of implementing more favourable and more environmentally friendly systems.

3.4 General policy framework

The application of integrated assessment necessitates the selection of a specific planning process for policy, planning and programme evaluation. Since this assessment is being made within the framework of agricultural trade liberalization, one of the most relevant instruments for analysis is the process of free trade negotiations with the USA. The AIA⁹ was selected as the domestic planning process most closely related to the issues surrounding this assessment.

The Colombian government's agricultural policy from 2002 to 2006 sought to develop competition at the national and international levels.¹⁰ It supported productive chains which had the possibility of conquering new foreign markets, or which could be developed as competitive import substitutes.

⁸ IAvH – IDEA, 2003.

⁹ CONFECAMARAS, DNP, Ministerio de Comercio, Industria y Turismo, Organización de los Estados Americanos, TRUST, USAID Colombia (2005) Agenda Interna para la Productividad y la Competitividad.

¹⁰ Available online from <http://www.minagricultura.gov.co>

Moreover such productive chains should have significant impacts on sectoral performance and on the lives of rural inhabitants. The strategy was based on 15 initiatives to promote employment, including restructuring the UMATAS (*Unidades Municipales de Asistencia Técnica Agropecuaria* or Agricultural Technical Assistance Units for Municipalities, similar to County Agricultural Stations) to provide better support to producers' associations, allow the sale of seeds of genetically modified organisms, and improve rural finances with special emphasis on small and medium sized producers. To facilitate the process, various agencies in the sector have been fused into a single entity to improve coordination and give all-around attention to the needs of the rural sector.

Colombian trade policy meanwhile had two fundamental instruments. One was the SAFP (*Sistema Andino de Franja de Precios*, or Andean System of Prices and Price Ranges), the main objective was to use variable tariffs to stabilize prices for agricultural commodities which faced unstable prices on international markets or which experienced severely distorted prices.¹¹ The other was the MAC (*Mecanismo Público de Administración de Contingentes*, or Public Mechanism to Administer Contingencies), which established an auction system for the right to import determined agricultural products.¹²

In 2006, a put option market for agricultural commodities was started in Colombia to provide a mechanism for reducing risks price fluctuations likely to accompany a FTA with the USA. This mechanism is administered by the National Agricultural Exchange (*Bolsa Nacional Agropecuaria*) and includes options for cotton, corn, sorghum, and soy. Colombia's agricultural policy however fails to take into account the reduction of protective tariffs due to the FTA and has to be updated.

3.5 TLC-USA Free Trade Agreement

Historically the United States of America has been Colombia's biggest trading partner. Bilateral trade with the USA has become even more important in recent years, rising from US\$6.2 billion in 1992 to US\$10.2 billion in 2002. Of this amount US\$5.2 billion were in exports to the USA from Colombia, and \$5 billion were exports from the USA to Colombia.

By negotiating a FTA with the USA, known as the TLC-USA (*Tratado de libre Comercio con USA*), the Government of Colombia hopes to achieve a number of important goals. In agriculture the government hopes to increase exports of certain agricultural products to improve the welfare of the population. To absorb the shock in the sector caused by imports, the government hopes to design internal mechanisms and achieve agreements to offset the internal support the USA provides to its own agricultural producers.

In the event that the free trade agreements with the United States are not successful, the government has identified the three ways Colombia will be affected:

1. Colombian exports to the USA will be displaced by exports of countries with trade preferences.
2. Colombia will lose competitiveness compared to Central America, Chile, and its Andean partners.
3. Foreign investment will be redirected toward countries with better access to US markets and better guarantees for foreign investors.

¹¹ *Decisión 371 in Comisión del Acuerdo de Cartagena.*

¹² *Decreto No. 430 de 2004.*

Since Colombia will lose its preferences under the trade agreement known as ATPDEA in 2006, these impacts will be serious.¹³

In the preparation stage before FTA negotiations, the Government of Colombia undertook studies that looked at the impacts of trade on areas under agricultural cultivation as well as production, given different policy instruments.¹⁴ Before the start of negotiations, MADR also conducted a preparatory study focusing on goods identified as sensitive to changes in trade policy. The study, carried out under the direction of Luis Jorge Garay, formed the basis of Colombia's negotiating positions (MADR, 2005).

This study also produced analysis of the impact more international trade would have on productive structures. However, that study did not also delve into the environmental implications. Nor did it investigate issues of biodiversity, agricultural biodiversity and food security, even though socially sensitive goods were given priority in the MADR study because of their importance to the family market basket.

Given that competitiveness is not a static concept, TLC-USA must result in propitious conditions to foment innovation and better productive processes. This is precisely needed to create mechanisms to avoid environmental deterioration and create new sustainable environmental goods and services.

It is hoped that the FTA will result in recomposition of the economy in a way that it specializes in production of goods that are more competitive. Assuming that this comes true, there is an important need to understand the social and environmental impacts, which is what this project partly addresses.

For the MADR study, the government introduced an innovative participatory process of public consultations to support the decision-making process, which deserves to be highlighted. Nevertheless, during this project's regional workshops, there were public calls to further strengthen the modes of consultation and participation.

The parties involved in national production also revealed serious doubts about the viability of domestic production of sensitive products when free trade is imposed (see Section 5.7). They sought additional internal measures to help them adjust to the new market conditions. At the same time, those parties who depend on foreign markets were very interested in the negotiations. Nevertheless, neither group was given the opportunity to influence the negotiations.

3.6 Agricultural Internal Agenda

The AIA determines the national development policy framework and is a response mechanism to strengthen the capacity of the rural sector in the face of higher competitiveness posed by the TLC-USA. This domestic policy was selected for integrated assessment since it has strong connections to a concrete instrument of trade liberalization.

¹³ Of the 168 agricultural items protected by the ATPDEA, only 15 had really been protected. Of the 4,336 industrial items, only 51 have been protected. The president of the SAC has expressed the opinion that the agreement served very few sectors, and in the majority of cases it had been impossible due to non tariff barriers, not to mention technical measures and other barriers. There was also concern that Colombian products did not receive sufficient trade advantages, especially the agricultural sector.

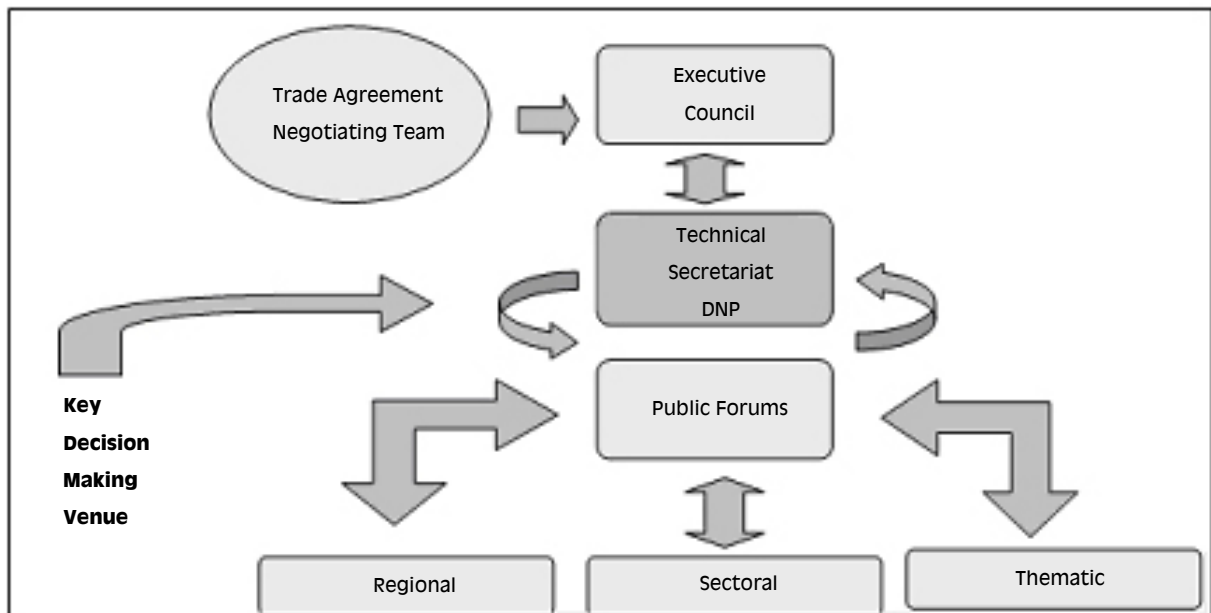
¹⁴ Among the issues reviewed were: bar code identification for Colombian agricultural and agro-industrial products in the USA market, comparative advantages of Colombian products, rural agricultural competitiveness in Colombia, agricultural supply and demand response changes, the option of partial trade liberalization, and production and consumption decisions of a small farm economy, among others.

One of the aims of the AIA is to support the productive sector during the implementation of the FTA and to see that institutions are adequate to meet their commitments. Components for strategic action include: (a) development of a domestic production support policy; (b) promotion of higher crop yields and more efficient production; (c) improvements in sanitary and technical capabilities to gain access to markets; and (d) the implementation of a rural development policy to mitigate against adverse effects which are likely to befall some agricultural sectors.¹⁵

These components concur with “Visión 2019”¹⁶ by the National Planning Department for the agricultural sector. This programme aims to make more efficient use of tropical comparative advantages and promote processes with higher added value, primarily through technological innovation so as to gain access to international markets.

The AIA has a well-defined decision-making structure, with the Director of Sustainable Rural Development (*Dirección de Desarrollo Rural Sostenible*) responsible for agricultural issues and acting to advise the Executive Council of the AIA (see Figure 2).

Figure 2: AIA decision making processes



¹⁵ CONFECAMARAS, DNP, Ministerio de Comercio, Industria y Turismo, Organización de los Estados Americanos, TRUST, USAID Colombia (2005) Agenda Interna para la Productividad y la Competitividad.

¹⁶ DNP. Presidencia de la República. (2005). Visión Colombia II Centenario: 2019 Propuesta para discusión.

4. Colombia's corn sector – a case study

Public consultations and preliminary studies have suggested the need for a crop case study due to the large scope of the study. In order to select the most representative product, a few criteria were established: crops important to food security¹⁷; crops which conserved local varieties¹⁸; crops with relatively minimal negative impact on biodiversity¹⁹; crops which are part of the small farm economy²⁰; crops which are cultivated over significant areas²¹; products with specific goals in the 15 social impact initiatives of MADR; products sensitive to trade liberalization; and products linked to agro industry.

Application of these criteria revealed that three products complied with the majority of the criteria: corn, yucca, and beans. Corn was chosen because it met the largest number of criteria.

Corn is fundamental for the food security of the small farm sector. It is protected against international price fluctuations by the SAFP, the MAC and through additional domestic support. Consequently it is highly sensitive to any FTA and/or agricultural trade policy. Corn is well connected to agro business, while 72 per cent of lands planted with corn are also part of the small farm economy. Most importantly, corn is the crop of home consumption *par excellence*. Farmers eat the corn, and they feed their poultry and pigs with it. Small farmers grow corn to store for later consumption and sell the portion that is surplus to their own needs (Forero, 2002). A high percentage of corn varieties are native or improved. Moreover the majority of them are important to agricultural biodiversity.

The project analysed information covering social, environmental, and economic aspects of the corn subsector to identify linkages of effects. Information was compiled to define a baseline and trace the impacts of sector liberalization that began in the 1990s. From this analysis the project could predict tendencies likely to occur in the future from trade changes and develop projections. The analysis depended on primary information constructed with various quantitative and qualitative tools.

¹⁷ International Treaty on Genetic Resources for Food and Agriculture.

¹⁸ Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia.

¹⁹ According to the indicator developed by an IAvH and IDEA study.

²⁰ Forero, 2002.

²¹ MADR, 1999.

4.1 Corn cultivation in Colombia

Corn (also called maize) is the main cereal grain in Latin America. It is grown in widely diverse environments: from sea level to 3,000 meters above sea level; from extremely cold climates to very hot climates; in both humid and semi-arid locations; and on steep mountain sides as well as on the plains. It grows in many types of soil, and can be produced with a large variety of techniques and technologies.²² In Colombia, corn is grown in almost every ecosystem where agriculture exists, but is cultivated most intensely in the tropical Caribbean lowlands and the temperate and cold zones in the Andes mountains.²³

4.2 Corn productive systems

A system of production is a set of agricultural elements, operations, and practices that characterizes particular cultivations. In the colder areas of Colombia, corn is grown in rotation with wheat and potatoes. In warmer and tropical parts, corn is grown together with ahuyama (a type of pumpkin), sweet potatoes, candia, cucumbers, rice, guandúl, watermelons, and others. Corn can also be grown in single crop systems but also rotated with other crops. Levels and types of technology used to produce corn are as diverse as the other factors.

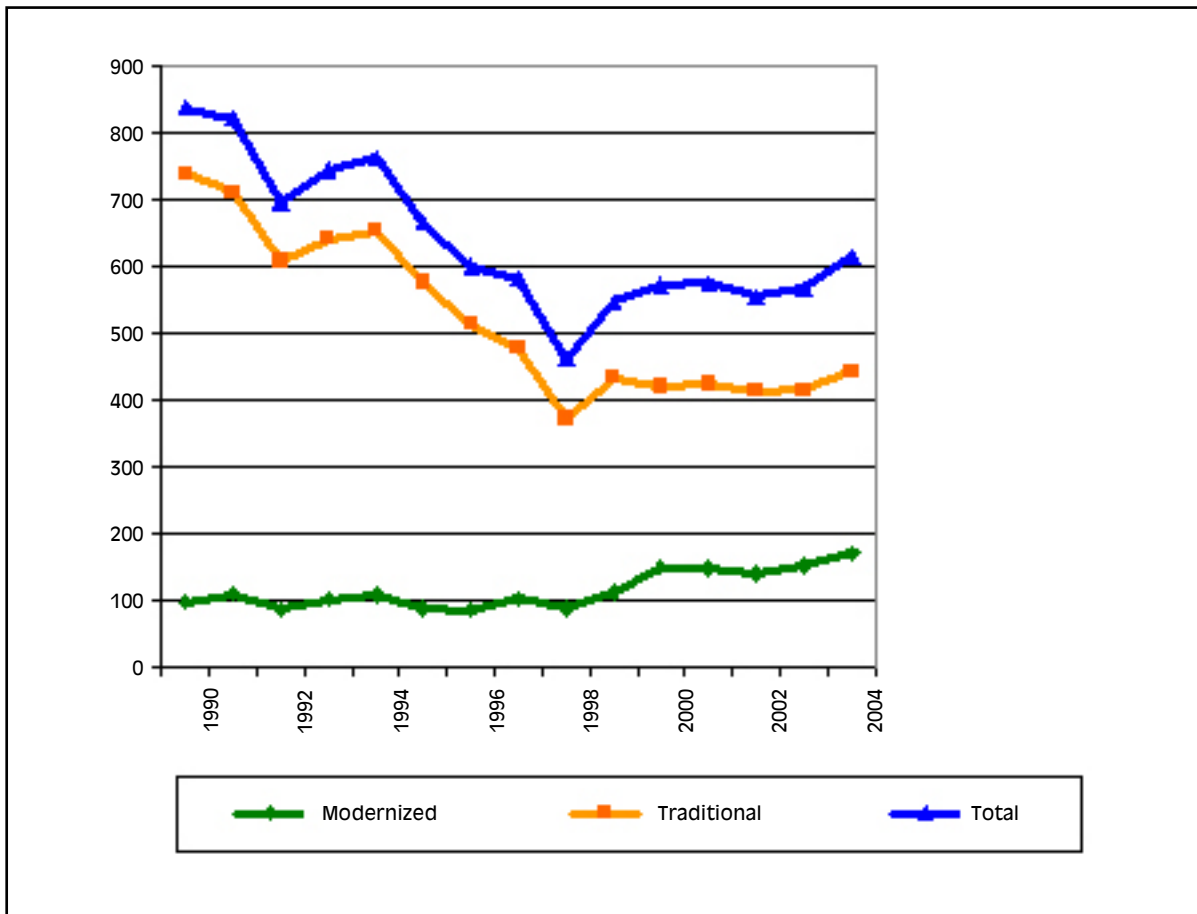
From the production's point of view, corn is grown under two systems: traditional and modernized. The line between the two is not always well defined, but the amount and kind of machinery used is usually the defining factor, for these factors influence the amount of time needed and the types of inputs used, especially seeds and fertilizers. The framework of this analysis assumes that the traditional system is characteristic of the small farm economy. Similarly we assume that modernized production is characteristic of big producers.

Historically the area cultivated under the traditional system has been larger than the area under modernized systems. Nevertheless the proportion of land under traditional cultivation is declining relative to modernized cultivation. This tendency accelerated after agricultural deregulation in 1991, and with the disappearance of IDEMA, the entity which purchased a large part of the national harvest (see Figure 3).

²² La economía del maíz en América Latina.

http://www.cimmyt.org/Research/Economics/map/impact_studies/ImpactsMaize66_97/ImpactosLA/pdfs/ImpactosLA_economia.pdf

²³ Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia.

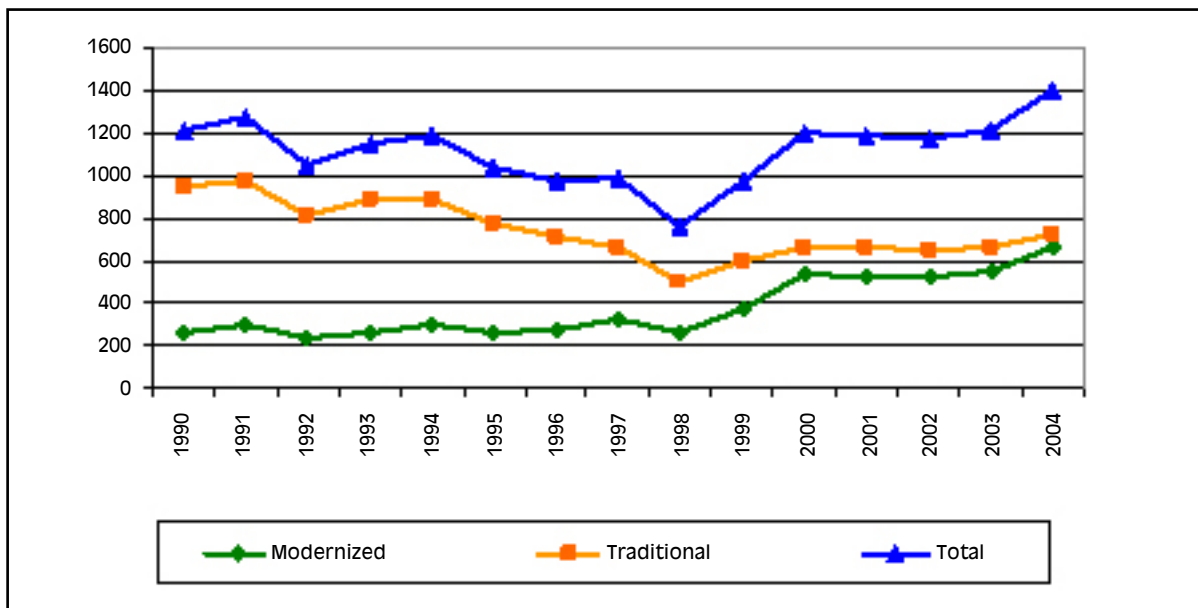
Figure 3: Cultivation trends 1990-2004 (hectares)

Source: MADR, 2005

From 1998-2004, traditional systems experienced a modest recovery in response to new policies. Traditionally cultivated areas increased by 70,777 hectares. However, the net reduction for the entire period is about 40 per cent compared to the 1990 figure.

For modernized systems from 1998 to 2004, the trend is continuously upward. In 2004 hectares under modernized cultivation reached the highest point ever at 171,081 hectares, a 74 per cent increase from the 1990 figure. A comparison of tonnage harvested is also provided (see Figure 4).

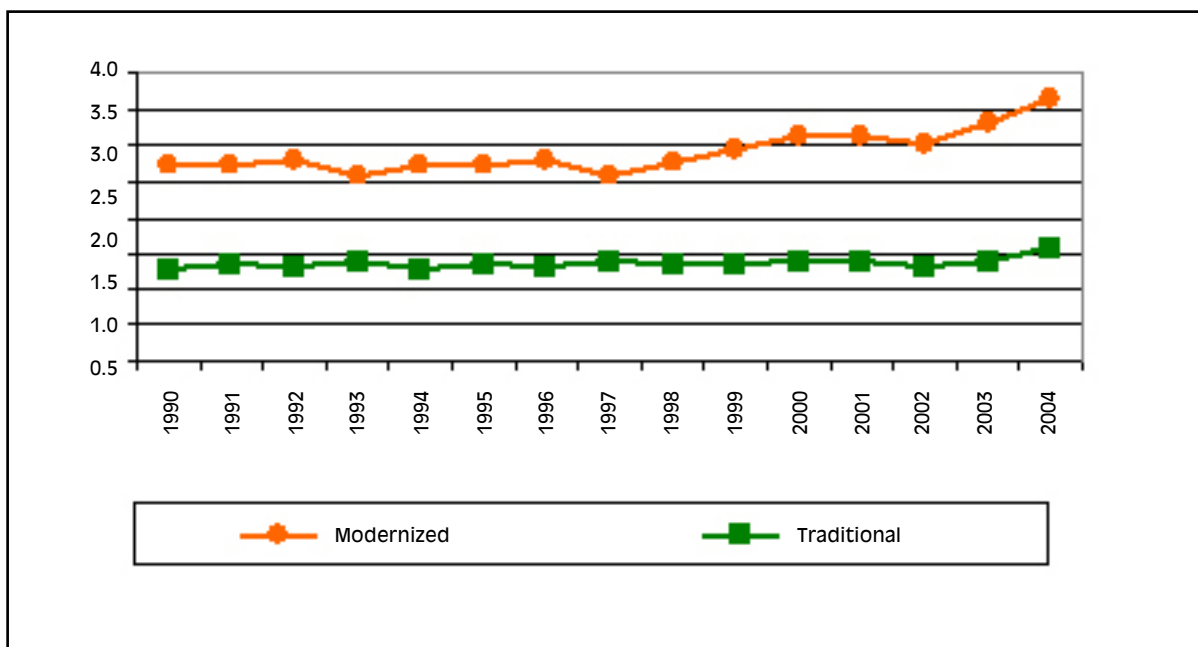
Figure 4: Corn production 1990-2004 (thousands of metric tonnes)



Source: MADR, 2005

Yields increased slowly, despite research which produced high yield corn varietals, hybrids and technological packages for different climates and types of cultivation (see Figure 5). Low levels of adoption of new technology, possibly due to deficiencies in the process of technology transfer and characteristics of cultivation, could be a contributing factor.²⁴

Figure 5: Average national yield 1990-2004 (metric tonnes per hectare)



Source: MADR, 2005

²⁴ Quintero Luis Eduardo (1999). La Producción y Comercialización de Granos y Algodón en Colombia BNA.

The key factor for the traditional system is labour, which accounts for between 35 per cent and 44 per cent of all production costs (Garay *et. al.*, 2004). Depending on the degree of modernization, mechanization is substituted for manual labour. These costs account for 35 per cent of total costs, seeds account for 20 per cent and other inputs account for 23 per cent in modernized systems.

4.2.1 Traditional systems

Small farmers, including indigenous communities and Afro-Colombianos, use this system of production. No studies exist which indicates the exact numbers involved in this type of agriculture. Making this type of count would in any case be complicated, given that all types of farms from little family plots to commercial farms would have to be included.²⁵ There are however 333,300 small family farms.²⁶ From the size of the cultivated area, a good assumption would be approximately 147,809 traditional corn producers.

Traditional corn cultivation is practiced in 32 districts of the country, usually on mountainside plots. The predominant size of each plot is 2 hectares. Garden vegetables may be included on the plot. Generally when the plot is larger, the reason is because the soil is not as productive. A profile of traditional systems would be:

- Traditional systems use both combined technology and autochthonous technology. Like the use of different seed varieties, the use of agricultural chemicals is widespread. Nevertheless a few initiatives exist which use only organic inputs and creole seeds. The use of agricultural chemicals is closely related to level of market integration and is strongly influenced by the green revolution model. The use of creole or natural varieties is explained by the facts that they are cheaper than hybrids, are more adaptable, and, with good management, removes the need to buy seeds in the market. While creole seeds generally produce low yields, they are very resistant and tolerant of local conditions, and have lower requirements for agricultural inputs and for manual labour.
- Traditional knowledge is amply used, mainly for the cultivation of creole varieties. Specific applications include soil management, erosion control, plant selection, seed conservation and preparation for planting, storage of crops, identification of best planting times, pest management and control, and cross breeding.
- Family labour predominates on small farms. It is divided among different activities: those inherent to corn production, those related to associated crops, those related to other farm activities, and occasionally day labour on other farms. This diversification of labour occurs because, although corn is grown for food and is key to farm income, its production does not require year-round labour.
- Local communities of small farmers produce for home consumption and for the market. Part of their production generates income to buy goods and services which they do not produce themselves on the farm. These goods and services additionally satisfy nutritional and productive needs. Surveys conducted within this project indicate that 54 per cent of small farm products destined for the market are sold through intermediaries in the local township, 40 per cent through other intermediaries, and only 5 per cent through local storage centers.

²⁵ Ibid.

²⁶ CEGA, Caracterización del maíz, Diciembre 2003.

- Studies showing the exact structure of land ownership and tenancy of small corn producing farms do not exist, but surveys conducted by this project show that 75 per cent of small corn farmers own their own farm while the remaining 25 per cent work some form of rented land. Access to formal credit is generally limited. Economic flows in the sector are uncertain, plus the small farm culture has little tradition of using this type of resource.
- Although some small corn farmers are affiliated to FENALCE, there are no other specific farm associations for the sector. In general, Local Community Action Committees and other local associations are the only forms of organization. In the indigenous communities there are the Cabildos and Cabildo associations.
- There are a few producers' associations in the Caribbean, Valle de Cauca, Nariño, Atrato Medio and the Pacific Coast regions, which are composed mostly of indigenous communities or Afro-Colombianos, and who receive support from *Grupo Semillas* (Seeds Group) and *Organización de Cooperación Internacional Swissaid*. They have investigated and documented local corn varieties, management, production and traditional uses of corn, and also developed activities to conserve and recover seeds through exchanges and from isolated planting of specific varieties.
- The best corn yields using traditional methods in 2004 were 2.5 metric tonnes per hectare in the Department of Tolima.²⁷ Yields of creole corn vary according to the terrain. Generally they were between 0.7 and 1.3 metric tonnes per hectare in 2004.²⁸

4.2.2 Modernized systems

Most medium-sized and large-scale producers use modernized systems of corn production. According to project calculations, there were approximately 11,405 farms in this category in 2004. Modernized corn farms are distributed throughout 18 departments.²⁹ They generally occupy flat lands with planted areas of more than 5 hectares, and usually are bigger than 15 hectares. The soil quality is generally very suitable for agriculture. A profile of modernized systems would be:

- These farms can be divided into high, medium and low levels of modernization. They use improved seeds (mainly hybrids), fertilizers, and chemical insecticides. They can also use integrated systems to manage pests.³⁰
- They plant both yellow and white corn, given that both types of corn have the same production requirements, and the choice of one or the other depends only on market conditions.³¹ In the last ten years, seed producers have introduced toothed and semi-toothed hybrids to Colombia for cultivation on hot flat terrain using modernized production systems. The hoped-for end market is agricultural industry.³²

²⁷ MADR 2005, Anuario Estadístico.

²⁸ Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia.

²⁹ MADR 2005, Anuario Estadístico.

³⁰ Quintero Luis Eduardo (1999). La Producción y Comercialización de Granos y Algodón en Colombia BNA.

³¹ MADR. 2004 Costos de Producción de Maíz Amarillo Tecnificado en Colombia Quintero Luis, Acevedo Ximena, Rodríguez Ramiro. www.agrocadenas.gov.co.

³² Ibid.

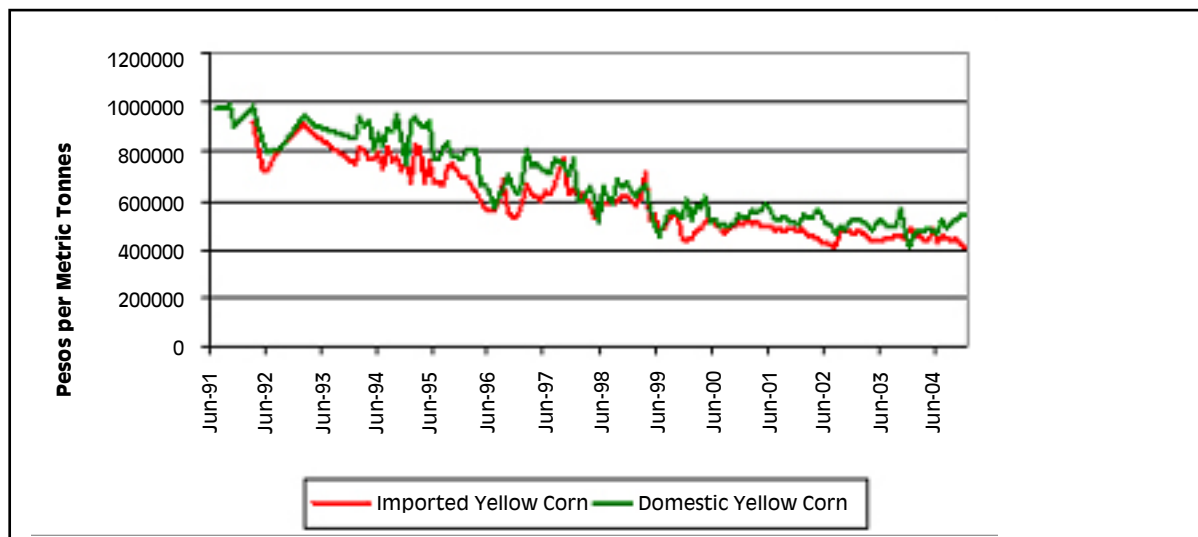
- According to MADR, the average amount of manual labour required to work one hectare here is 37 hours. However, the number of work days required depends on the degree of modernization. Areas like Sucre, where planting is done by hand, require around 35 days of labour, while Cordoba, which is highly mechanized and technified, requires only 11 days of labour per hectare.³³ Most labour is done by hired employees
- Although some portion of production will be consumed on the farm, production is mainly market oriented. Yields vary according to location. In 2004 the highest yields were in Norte de Santander with 6 metric tonnes per hectare. The lowest yields were in Sucre with 2 metric tonnes per hectare.³⁴
- Many medium and large modernized producers are part of FENALCE. In terms of research at the national level, there are state programmes of improvement led by CORPOICA, FENALCE, as well as multinational seed companies. At the international level, there is the CIMMYT Research Center. Research has a coherent approach to increasing both national production and yields.

4.3 Domestic economic importance of corn

After coffee, corn is the second most important crop in Colombia. It is first among the seasonal or transitory crops. In 2003, 14 per cent of the agricultural area of the country was planted in corn, and 35 per cent of the area planted in seasonal or transitory crops.³⁵ In 2004, 72 per cent of the hectares planted in corn used the traditional system, and 28 per cent used modernized systems.

An analysis of yellow corn prices on the National Agricultural Exchange shows that historically the price of domestic yellow corn has been within the range of imported corn prices, reflecting the importance of the different mechanisms that exist for the absorption of the corn harvest. One can observe a general 45 per cent reduction in real prices paid to producers for domestic yellow corn in 1991-2004 (see Figure 6).

Figure 6: Prices of imported and domestic yellow corn (at 2004 prices)



Source: IPP from DANE and Banco de la República, prices from BNA

³³ The number of days estimated for these two departments was estimated from surveys done by producers within the framework of this project and validated by experts in the region. MADR and FENALCE use national calculations of an average of 37 days per hectare, assuming the same intensity for traditional and technified production.

³⁴ MADR 2005, Anuario Estadístico.

³⁵ MADR (2005) Anuario Estadístico.

It is estimated that 70 per cent of all imported corn is used to produce balanced animal feeds, primarily chicken feed. Meanwhile, corn produced in Colombia has three principal destinations:

1. The formal market which includes the food processing industry, both for human and animal consumption
2. The informal market where corn is sold directly to end users for consumption in soups, as flour, and in other family uses
3. Subsistence consumption by small producers.

In the last five years the food processing industry has absorbed an average of 27 per cent of national domestic production, even though prices have increased over the last three years (see Table 4).

Table 4: Estimated consumption of domestic corn

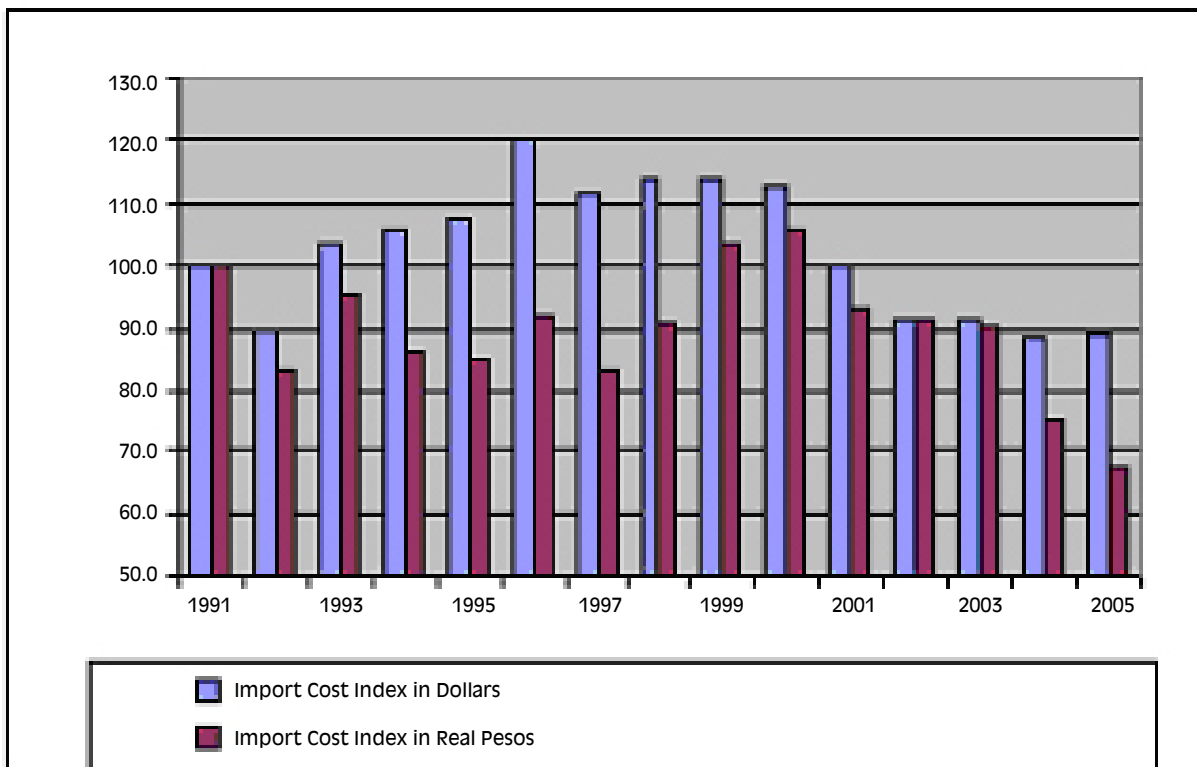
Year	National production (1)	FENALCE fees (2)	For industry purposes	Direct consumption and gleanings	Food industry for human consumption	Food industry for animal consumption
2000	1,204,471	320,545	26.6%	883,926	243,614	76,931
2001	1,191,901	317,200	26.6%	874,701	241,072	76,128
2002	1,173,845	259,853	22.1%	913,992	197,488	62,365
2003	1,208,595	360,204	29.8%	848,391	273,755	86,449
2004	1,398,723	409,895	29.3%	988,828	311,520	98,375
2005 (3)	1,544,398	424,994	27.5%	1,119,404	322,995	101,999
Average	1,286,989	348,782	27.1%	938,207	265,074	83,708
Average proportion of national production (%)				72.9%	20.6%	6.5%

Source: Calculations based on: (1) MADR, 2005. (2) AGROCADENAS, 2001³⁶; FENALCE, 2001-2005. (3) Domestic production estimated by FENALCE.

Consumption of corn tripled between 1990 and 2004, increasing from 1.2 million metric tonnes to 3.6 million metric tonnes. Domestic production under the traditional system did not adjust to the growth of consumption. In contrast, domestic production under modernized systems increased 152 per cent.

It can be deduced that the food processing industry has substituted imported corn for domestically grown corn in the production of balanced animal feeds, partly due to lower cost indexes (see Figure 7). One reason was that the volume of domestic corn production declined from 1992 to 40 per cent less in 1998. It did not return to the level of 1991 until 2004. Another reason was that domestic production of sorghum also fell, as sorghum is a replacement for corn in the fabrication of balanced animal feed.

³⁶ AGROCADENAS. 2003. Formación de precios al productor en algunos productos agropecuarios colombianos. Henry Samacá, Diego Roldan Luna. Memorando Agrocadenas No.7.

Figure 7: Cost index for imported yellow corn (base year 1991)

Source: MADR; Banco de la República and DANE

Another factor which could affect the sector's performance, given greater exposure to the external economy, would be the real rate of exchange. The behaviour of domestic production could be explained in part as a residual effect of the fluctuations in import costs in constant pesos between 1991 and 2002. After 2002, domestic production increased 3 per cent and then 16 per cent even though import costs in constant pesos was falling significantly, first by 17 per cent and then another 10 per cent.

4.4 Policy adjustments

Sector-wide changes experienced in Colombian agriculture after liberalization motivated important policy adjustments. According to MADR, it had to design and implement a system of preferential financing for the payment of credit and other obligations by agricultural producers. Other policies were also fashioned to give producers access to credit. And still other actions were taken to improve commercial financing through a repurchasing agreement programme in the agricultural exchange.

Following this package, the corn sector signed on to the national productivity and competitiveness policy (*Convenios de Competitiveness*) led by the Ministry of Foreign Trade. Some 6.3 billion pesos was assigned for research and technology transfer to the agricultural sector, of which 2 billion pesos were provided to cultivators of yellow corn and invested in a planting programme supervised by FENALCE. The harvest was destined for the food processors producing balanced animal feed and the producers were given technical training and assistance such as soil analysis on selected farms. Cultivated area increased by about 75,000 hectares following this.

The second phase began with the 20 billion peso MADR-CIAT agreement from 1998 to 2002. Scientific and technical cooperation were intended to guarantee sustainable and competitive systems of agricultural production for the Amazon region and eastern tropical plains. In total, 32 new yellow corn hybrids and 28

new white corn hybrids were developed through the programme.

The Growth Plan for Technified Corn was among the 15 social impact initiatives of MADR for the period 2002–2006. Its objective was to increase the domestically produced supply of raw material (corn, soy and yucca) for the animal feed industry, particularly poultry feed and pig feed. The aim was to increase cultivation by 85,000 hectares, production by 400,000 metric tonnes, and employment by 17,869 new jobs in the regions of Orinoquía, Córdoba, Sucre, Cesar, Tolima, Huila, Valle and the coffee growing zone.

To achieve these goals, various measures and strategies have been adopted. Technical assistance including genetic materials, soils and mechanization was provided. Economic and financial measures include price agreements, contract agriculture, advance crop sales (futures) and incentives for food processors to buy domestic production were also introduced. Other measures include modernization of machinery and equipment through provision of machinery banks, drying equipment, promotion of cooperative credit, consolidating the productive chain strategy through Competitiveness Agreements and the establishment of on-site purchasing posts.

4.5 Trade balance

Colombia had a deficit trade balance in corn throughout the period from 1990 to 2004. From 1990 onwards, imports increased continually, reaching 2,270,402 metric tonnes in 2004 at an import value of US\$328,736,539. Throughout the entire period, corn exports were minimal.³⁷

The growth of imports was due to demand for yellow corn, most of which went to the food processing industry as a key ingredient for balanced animal feed. In 2004, 94.5 per cent of the corn imported was yellow corn, 5 per cent was white corn, and 0.45 per cent was popcorn.

Changes in trade patterns generated by deregulation are primarily responsible for the corn trade deficit, together with the revaluation of the peso. Another factor behind the deficit is the dispersion of domestic corn supplies.

In the scenario of free trade with the USA it is relevant to point out the differences between the two countries (see Table 5).

³⁷ MADR 2005, Anuario Estadístico

Table 5: Differences in corn production in USA and Colombia

USA	Colombia
World's largest producer with 40% of global production and between 50% and 80% of all world exports.	Colombian production is insufficient to supply domestic demand, 63% of domestic supply comes from imports.
Corn represents 10% of agricultural Gross Domestic Product. ³⁸	Corn represents 2.5% of agricultural Gross Domestic Product. ³⁹
In 2003 imports from the USA were 286,885 metric tonnes more than domestic production.	In 2003, domestic production was 32,371 metric tonnes.
The axis of protection consists of domestic subsidies which are not under consideration in negotiations so will not be compromised in a free trade agreement.	The axis of protection consists of tariffs and controls at the border which are under consideration in negotiations so could be compromised in a free trade agreement.
Transfers to producers: Average US subsidies for the 2000-2002 period are estimated at \$55.00(US)/metric tonnes. ⁴⁰	Transfers to producers: Average US subsidies for the 2000-2002 period are estimated at \$28.00(US)/metric tonnes. ⁴¹
Transfers to producers: Average portion of producers' incomes derived from subsidies in the US was 29%. ⁴²	Transfers to producers: Average portion of producers' incomes derived from subsidies in the US was 26%. ⁴³
Production highly mechanized, permanent development of high yield seeds. In 2003, yields of 9.4 metric tonnes/hectare.	Low relative mechanization, labour-intensive systems, low access to high yield seeds. In 2003 yields of 5.5 metric tonnes/hectare.
Modern transportation system.	Road system still under development, low quality roads or no roads.
Well informed and trained producers.	Producers have poor information access and low levels of training.
Purchasing and siloing system through Commodity Credit Corporation (CCC).	Poor access to warehousing and silos, sales of wet corn in the countryside are common, uneven access to markets. Even with current systems of protection, US prices have historically been lower than Colombian prices.

4.6 Protection for Colombian corn

Protection for Colombian corn is based on both measures taken at the border and measures applied internally. The MAC and the SAFP function at the border. Implicit subsidies function internally. These include low rates of interest through FINAGRO, the exchange cover, and direct subsidies to specific producers made in 2002.

The MAC was established by *Decree 430* in 2003. It regulates imports by auctioning rights to import set quantities of grain through National Agricultural Exchange (see Table 6).

³⁸ Garay L.J. (2005). La Agricultura Colombiana Frente Al Tratado De Libre Comercio con Estados Unidos. Bolsa Nacional Agropecuaria - Ministerio de Agricultura y Desarrollo Rural.

³⁹ Ibid.

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid.

⁴³ Ibid.

Table 6: MAC functioning in 2005

Annual import rights to be auctioned	1,921,846 metric tonnes
Domestic Production to be absorbed by the auction	505,800 metric tonnes
Quota of rights assigned by auction	1,714,842 metric tonnes
Unauctioned import rights	207,000 metric tonnes
Domestic production auction participants commit to acquire	445,162 metric tonnes
Unabsorbed domestic production	60,638 metric tonnes
IBSA	3.8

Source: FENALCE

The SAFP is a tariff mechanism introduced in 1995. Its main objective is to stabilize import costs, and establish rights and tariffs in order to maintain prices above the floor and below the ceiling price of the established range.⁴⁴

SAFP has contributed to reduction of price volatility for producers and consumers, accomplishing its functions of providing protection and stability.⁴⁵ Over the course of a decade the mechanism has been changed frequently, reducing its protective aspect considerably.

The low interest rates of FINAGRO are also a form of tacit subsidy. For 1994-2004, approved credits for corn followed the overall pattern for agriculture. Credit volume fell from 1995 to 1999, coinciding with a period of high interest rates (see Table 7).

⁴⁴ Currently the range for yellow corn is between US\$126 and US\$138. The range for white corn is between US\$131 and US\$152.

⁴⁵ FENALCE, 2004.

Table 7: FINAGRO Credits (Millions of constant 2004 Colombian pesos)

Year	Corn	Total agriculture	Corn % of total agriculture
1994	31.615	586.100	5
1995	42.098	828.090	5
1996	40.808	537.910	8
1997	22.072	342.002	6
1998	9.325	234.006	4
1999	5.762	150.056	4
2000	11.913	144.983	8
2001	20.499	183.552	11
2002	14.184	193.993	7
2003	22.923	256.328	9
2004	27.681	345.867	8

Source: MADR, 2005

Access to credit is a determining factor for the adoption of technology, and therefore for farm productivity and farm income. Conversely, the use of technological packages is determined by the amount of money available to the producer.

Following the reform of 1991, there was an effort to bring agricultural interest rates in line with ordinary interest rates. Ordinary interest rates had risen during most of the 1990s, which translated into rising agricultural interest rates during that period. Agricultural interest rates rose more than 40%. Technified corn yields in this period were still positive, but their best levels were only reached once interest rates subsided after 2000.

Another indirect form of subsidy is exchange rate insurance. This form of insurance has been available only to yellow corn producers since November 2004. It protects producers against revaluation at a rate of 10 pesos for each dollar covered.⁴⁶

Colombian corn protection occurs mainly at the country's borders, in contrast to the agricultural supports of the USA which are primarily internal subsidies. This is of great importance because in all free trade agreements signed by the USA to date, with the exception of the one with Canada, internal subsidies are not subject to negotiation, but border controls are. In other words the protections received by Colombian producers may be compromised while those received by US producers may be exempt from negotiation.⁴⁷

⁴⁶ Available from www.fenalce.org

⁴⁷ Based: Garay L.J. (2005). La Agricultura Colombiana Frente Al Tratado De Libre Comercio con Estados Unidos. Bolsa Nacional Agropecuaria - Ministerio de Agricultura y Desarrollo Rural.

4.7 The environment and corn production

According to the Environmental Guide for the Cereal Sub-sector (2002)⁴⁸, effects on biodiversity from corn exist (see Table 8).

Table 8: Environmental impact matrix for corn production

	ACTIVITY	IMPACTS Description	LEVEL					
			S	B	A	E		
Soil preparation	Clearing and weeding.	<ul style="list-style-type: none"> • Removing all natural vegetation covering the soil, and burning/burying them. Impacts all levels of biodiversity. • Use of herbicides after clearing contaminates soil and water. • Erosion. • Loss of nutrient and productive soil properties. • Soil scraping reduces quality of water. • Diminished capacity of soil to hold water. • Sedimentation of bodies of water. • Compacting and pulverization of soil. 			2	2	2	2
	Conventional plowing. One or two plowings with disked furrowers, followed by flattening. Secondary plowing with heavy plow or double action plow.	<ul style="list-style-type: none"> • Damage to soil structure. Pulverization of top soil and compacting of subsoils. Lessening of filtration, increased susceptibility to erosion. 			2	2	2	2
Use of fertilizers	Manual or machine application of nitrogen (anhydrous ammonia) before and after seeding in the lateral band.	<ul style="list-style-type: none"> • Alters biochemical qualities of soil and water. • Eutrophication of water systems. • Communities of organisms in soil and water impacted. 			3	3	3	3
	Phosphorus sprayed after first plowing. Potassium sprayed after first plowing.							
Planting	Surface seeding or with mechanical seeder.	<ul style="list-style-type: none"> • Erosion. 					2	
Crop management	Manual, mechanical or chemical weed control .	<ul style="list-style-type: none"> • Manual control reincorporates pulled weeds returning organic materials to soil. • Chemical control contaminates soil and water and impacts fauna and micro fauna in soil. 			3	2	2	3
	Pest control employs different agricultural chemicals simultaneously.	<ul style="list-style-type: none"> • Contaminates soil and water with pesticides. Impacts communities of soil organisms reducing their population and altering their population structure. 			2	2	2	2

⁴⁸ MAVDT, SAC, FENALCE, 2002. Environmental Guide for the Cereal Sub-sector.

ACTIVITY		IMPACTS	LEVEL
		Description	S B A E
Harvest	Manual or mechanical.	<ul style="list-style-type: none"> • Diminishes organic material. Causes erosion. Soil biota affected. • Contaminates air with chemicals. • Contaminates water with organic waste. • Loss of soil structure and ability to filter water. Compacting by machinery. 	2 3 2 3
Grain storage	Pest control uses various.	<ul style="list-style-type: none"> • Contaminates soil and water with chemical substances and chemical packaging. Soil and water organism communities impacted. 	2 2
Food processing industry	Production of food (cereals, concentrates, etc.).		

S = Soil Biodiversity; B = Biota of the agro ecosystem; A = Biota in aquatic ecosystems; E = Biodiversity in ecosystem. Range of values: 5 very favourable - 1 least favourable.

The productive system of corn, given the high availability of conventional practices associated with the green revolution technology package, received a grade of 4.66/10 from the Environmental Guide, or “not very friendly to biodiversity”. In fact, the majority of seasonal and semi-seasonal (transitory and semi-transitory), as well as intensive and semi-intensive crops, are not favourable to biodiversity. This is due to the single crop systems used to produce them, which implies devoting large areas to the one crop, intensive and inappropriate use of agricultural machinery on tropical soils, and constant application of herbicides, fungicides and insecticides.

4.8 Agricultural biodiversity and corn production

Agro-biodiversity is accepted here as fundamental to the strategy for food security of small farm communities. Hence, it is a necessity to know the state of corn agro-biodiversity at the national level, and its relationship in general to traditional production.

According to studies that have been done in Colombia since 1957, there are 23 families of corn in Colombia.⁴⁹ Nevertheless, given the wide variations possible within a single family of corn, small farmers recognize a far larger range of corn varieties and eco-types. In all probability, different names are also used for the same variety in different regions of the country.⁵⁰

Despite the importance of “on farm” conservation practices for *in situ* agro-biodiversity, studies analyzing them are scarce. One study done by Semillas demonstrated the diversity of corn types in different regions of Colombia⁵¹ (see Table 9).

⁴⁹ Roberts et. al, 1957; Torregosa, 1957 in Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia.

⁵⁰ Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia.

⁵¹ Compiled from the following: I Encuentro latinoamericano de conservacionistas de semillas (CBDC) Buga, 2003; «Cultivando la diversidad en Colombia: experiencias locales de crianza de la biodiversidad», 2004; «Los maíces criollos: historia y diversidad en la región caribe colombiana», RECAR, 2002; Magazine Semillas 22/23 «La raza de maíz chococeno» y «Los maíces Chococito».

Table 9: Colombian creole corn diversity

Region	Organization/Community	Varieties
Caribbean	Zenú Indigenous Reserves en Córdoba, Sucre and Antioquia (Urabá).	Azulito, Berrendo, Blanco criollo, Brisa blanco, Cacho de buey, Cariaco Amarillo, Cariaco rayado, Cariaco rojo, Cuba hoja blanca, Cuba hoja prieta Cucaracho, Guajiro, Huevito, Javao, Lomo bayo amarillo, Manteca, Minga, Ojo de gallo, Negrito, Pano Piedrecita o piedrita, Pira, Pocho, Pompo, Sangre toro, Tucita amarillo, Tacaloe amarillo, Tacaloe mohoso, Vela amarillo Vela blanco, Venezolano.
	Small farmers and indigenous people of la Ciénaga Grande del Bajo Sinú (The great swamp of lower Sinú) Córdoba: Asprociq	Azulito, Berrendo, Blanco, Cariaco, Criollo blanco, Cuba criollo, Cucaracho, Huevito Mejicano blanco, Negrito Panó, Setentano amarillo, Tacaloe
Pacific	Embera Communities of Medio Atrato	Anaranjado , Blanco , Café Amarillo, Negro, Rojo
	Afro-Colombian Communities of the lower zone of the río Anchicayá	Amarillo, Blanco, Capio Cucaracho, Negrito
Andina	Small farmers of the Northwest of Antioquia: CIER	Amarillo de año o Amagaseño, Blanco criollo, Campesino, Amarillo, Caturro, Capio, Cuba amarillo, Cuba blanco, Limeño, Limoñeño, Montañero amarillo Montañero blanco, Pira, Puya amarillo Amaceño, Puya, Puya, Maderero, Caturro Blanco and Pintado.
	Small farmers of the municipalities of Riosucio and Supía(Caldas): Asproinca	Amarillo claro, Amarillo criollo Blanco puro, Caturro blanco criollo, Corn morado (cruce del blanco con amarillo) Blanco cristal, Amarillo combinado.
	Small farmers of the municipalities of Entrerios and Calarcá (Quindío): Corpocam	Amarillo claro, Amarillo criollo Blanco puro, Caturro blanco criollo, Corn morado (cruce del blanco con amarillo), Blanco cristal, Amarillo combinado.
	Small farmers of the municipality of Riofrío (Valle): Fedena	Capio, Común, Curizara.
	Small farmers in the countryside around Cali: Cordosal	Amarillo Fj 120, Blanco, Corrontillo, Diente de caballo.
	Indigenous Communities of tierradentro (Cauca): Paez Belalcazar	Amarillo patojo, Calentano común, Calentano diente burro, Capio batata, Capio Capio blanco, Capio montano, Capio propio, Montaña Amarillo, Montaña larga.
	Small farmers and indigenous people of Pasto: ADC	Amarillo, Criollo, Clavo, Capia brillante, Capia chulpe, Capia misado, Capia morado, Capia pálido, Capia rayado, Capia rojo, Capia yema de huevo Nieve, Primitivo, Amarillo de año, Chulpe, Clarito blanco, Diente de caballo rojo, Diente de caballo blanco, Gnoniso, Grandote, Granizo Candelo, Capia amarillo, Capia azul, Capia blanco, Gualmisan amarillo, Gualmisan blanco, Gualmisan rojo, Maizena blanco, Maizena amarillo, Table amarillo, Table blanco
	Small farmers of the municipality of Cerrito (Santander): Agrovida	Amarillo, Blanco, Cacaíto pequeño, Colorado, Cuarentavo Porva, Roita rojo, Toner, Roita blanco o corn de leche
	Small farmers of the municipality of Duitama (Boyacá): Fundación San Isidro	Blanco, Chitano, Porva

Source: Semillas 2004. Magazine Number 22. El cultivo de maíz en Colombia *et al*

The other conservation strategy is known as *ex situ* conservation. Since 1994, the management of genetic resources from plants have been transferred by Colombian Agricultural Institute (ICA) at the Colombian Corporation for Agricultural Research (CORPOICA) through the National Programme for Vegetable Genetic Resources, in order to be inventoried and organized in accordance with international parameters and recommendations.⁵²

ICA has 2,635 Colombian corn acquisitions and approximately 2,000 foreign acquisitions. Some duplicates exist at CIMMYT and at the Department of Agriculture in the USA.⁵³

Despite ICA's efforts to conserve and maintain corn varieties, resources are insufficient. It does not know very much about the germ plasm in the plasm banks, nor does it know which varieties farmers have, nor all the varieties and their variability that exist within the country. Chemical, biochemical, agronomic and stress analyses have not been done. Neither has research work to identify and improve domestic varieties with special industrial characteristics, higher yields, resistance to pests and plant diseases, etc.

⁵² The National Report for the International Technical Conference of the FAO on Phyto-genetic Resources is available online from: <http://www.fao.org/ag/agp/agps/pgrfa/pdf/colombia.pdf>.

⁵³ The United States produces 1,000 hybrids annually, while Colombia produces 0.5 hybrids annually.

5. Integrated assessment and findings

5.1 Government planning and scenarios

The Government of Colombia has expressed clear intention to orientate the country towards trade liberalization in the National Development Plan. The government has designed a coherent planning process with clear and concrete responsibilities for the national authorities. It has also designed a mechanism to allow participation by different sectors and the public.

Due to the presence of sustainable concerns, the planning process for TLC-USA was novel. At the same time it was designed, the AIA was seen as a groundbreaking instrument for Colombia.

However, gaps exist. The country possesses a legal framework for sustainability but does not have the framework for planning processes to incorporate sustainability. The connections among economic, social and environmental issues are not clear in the planning processes for the FTA and the AIA. Integration of the three pillars of sustainability is also missing.

Furthermore, the participation of weak, marginalized and minority groups, especially local rural communities, is weak. Despite efforts made, the process does not have a budget sufficient to permit broader participation. Additionally the timetable for consultation was very tight. Social, economic and environmental issues were considered separately, so the combined effects were not considered within the methodology of the process.

MADR has meanwhile evaluated the predictable effects of a free trade agreement with the USA for nine agricultural products including corn. It considered a base situation as the “business as usual scenario” (as between 1998 and 2002 with no FTA) and posited two additional basic scenarios of protection reduction:

1. **MADR Scenario I.** The SAFP is preserved by Colombia as a price stabilization mechanism and as partial compensation for the internal subsidies of the USA. In this case, the price received by the producer is the same as the base situation plus the simulated stabilizing rights in the long-term price range.⁵⁴
2. **MADR Scenario II.** Total elimination of bilateral trade barriers. Prices received by producers will be the cost of imports from the United States under the conditions of zero tariffs. Internal aid to farm or factory is made.⁵⁵

Both scenarios for tariff and control reduction examined by MADR have revealed unfavourable outcomes for the Colombian corn subsector (see Section 5.4).

⁵⁴ Garay L.J. (2005). La Agricultura Colombiana frente al Tratado de Libre Comercio con Estados Unidos. Bolsa Nacional Agropecuaria - Ministerio de Agricultura y Desarrollo Rural.

⁵⁵ Ibid.

5.2 Integrated assessment and integrated scenarios

In response to flawed government efforts, the IAP project has tabled the problems (and benefits) of the existing government approach (see Table 10).

Table 10: Framework for policy analysis

Elements of the planning process	Environmental, social, and economic impacts and questions	Interaction and synergy of Points of Reference for sustainability	Good management of Public Issues Criteria
	Evaluation of environmental, social, and economic impacts	Goals, principles, norms, and indicators for sustainability	Participation, transparency, responsibility, sense of propriety
1. Initiation	<p>Policy mandate oriented toward trade liberalization - NPD approved by the Congress of the Republic and established as law. Legitimate government initiative.</p> <p>AIA supported by document named CONPES. No legal framework for planning processes with sustainability criteria. Proposal for regulation of EAE not legal. Process in relation to expectations for small farmers not clear, contrary to mandate in NPD for strengthening institutionalism.</p>	<p>The FTA will consider economic social and environmental issues not clearly stipulated in a specific mandate.</p> <p>Legal framework for sustainability. No interaction among economic, social and environmental aspects.</p> <p>Issues could be complementary. Lack of integration among the three pillars of sustainability.</p>	<p>Coherent planning process with clear and concrete responsibilities for national authorities.</p> <p>Mechanism for participation of different sectors and levels of the public. FTA planning process is very novel as a trade policy instrument.</p> <p>The AIA is an innovation in policy planning. Participation of weak groups is not clear, nor is information flow.</p>
2. Analysis	<p>No information or analysis encountered in relation to environmental and biodiversity impacts.</p> <p>Identification and analysis of questions, tendencies, problems and opportunities, but without analyzing environmental links.</p> <p>Coherent policy and institutional analysis not in evidence.</p>	<p>Identification of economic and social impact goals and indicators.</p> <p>No environmental goals, beyond regulatory aspects.</p>	<p>Analysis done by strong academic and state groups. Private actors reply to institutional analyses. No participation by weaker groups.</p>

3. Strategy design and planning	Clear strategy, but three pillars of sustainability are not integrated into the strategy. Elements treated independently. There are definitions of priority for trade negotiations and for the AIA.	Hope for goals of national development stipulated for AIA. Clear goals for the productive component. No environmental goals.	Productive goals constructed with participation of economic and social elements. Environmental goals established separately. The element least developed in the AIA is the environmental element.
4. Design of actions/ Operational planning	Construction of specific policies, activities and instruments for implementation of AIA is in process. Environmental considerations were not clear in the first proposal. It takes into account water and soil resources without including any measures to conserve them. In the cattle and dairy component integration of social, environmental and economic concerns is clearer.	Environmental norms were considered to be sufficient for the sector. No new norms were proposed.	Regional workshops by sector and theme were held to identify productive alternatives, but not necessarily for the construction of policy tools. It is not clear how much participants' input was taken into account for final decisions.
5. Execution and follow-up	System for execution and follow-up are still unknown. Whether or not the system will consider sustainability is also still unknown. Follow-up within systems for national policy is anticipated.	Goal indicators established within AIA.	No participation included in definition of follow-up systems.

It would have been best if an econometric study of small farm corn production in Colombia was done. However, the lack of information concerning the differences between traditional corn production and technified corn production make it impossible to construct a data series and function for the estimation of specific parameters (see Table 11).

Table 11: Information gaps in corn subsector

	Economic	Social/Food Security	Environmental/Biodiversity
Quantitative inputs, Official reports, other sources of information.	Does not discriminate between small farm and commercial agriculture	Highly Deficient	Highly Deficient
Necessity of qualitative analysis and perception	Complementary analyses	High-Priority	High-Priority

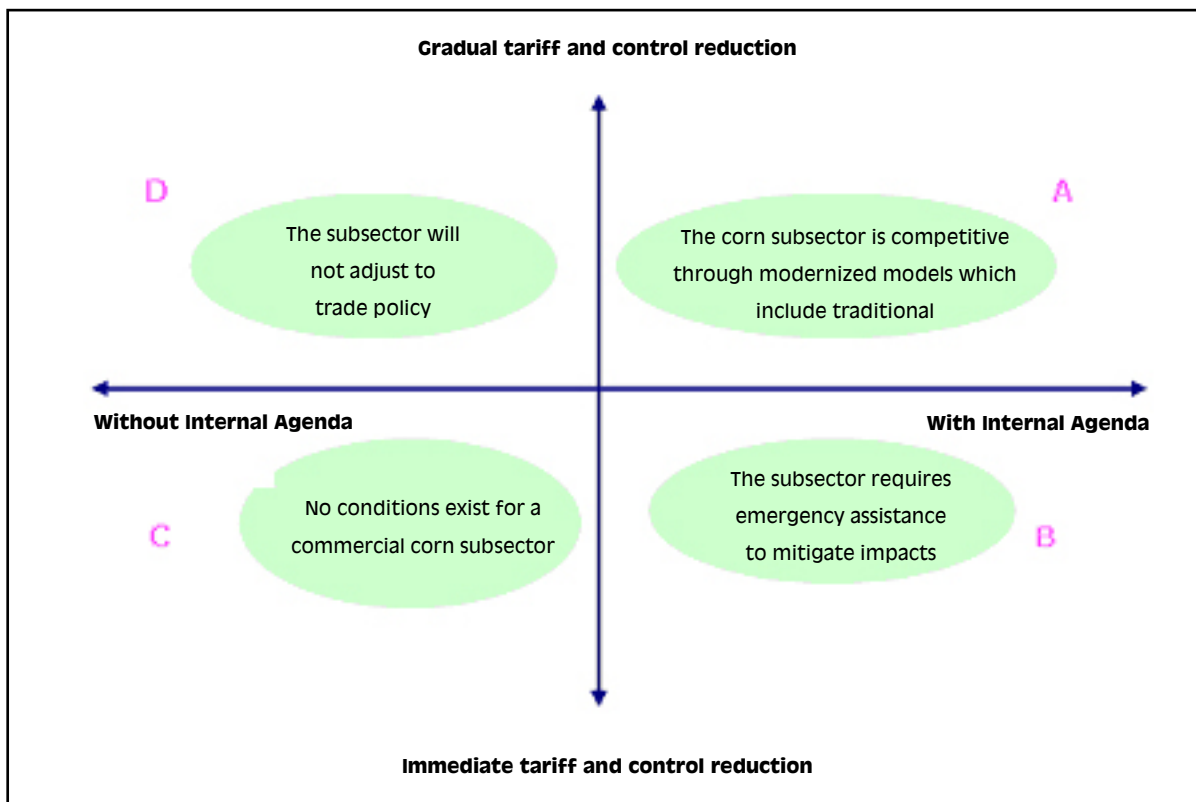
This IAP project instead opted for the alternative of constructing scenarios for corn using the Delphi method, a qualitative tool to elaborate the future from an analysis of the tendencies and connections. Taking into account that a scenario describes a future situation, the key question was, “*What economic, environmental and social alternatives will producers have within the framework of an open economy and agricultural free trade?*”

Four possible scenarios were examined by this IAP project (see Figure 8):

1. In *Scenario A*, the corn subsector achieves competitiveness through sustainable modernization. This scenario assumes the trade negotiations result in gradual tariff and control reduction, which permits domestic corn production to adapt to competitive systems. Domestic production supplies increase domestic demand with more land cultivation, with improved productivity, profitability and quality. This is the result of sustainable technological packages and the implementation of environmentally friendly cultivation practices. The diversity of crops planted on a single plot increases, and so does the number of corn varieties planted, which guarantees small farm food security.

All of these are supported by fixed policy instruments of the AIA with mechanisms to assign resources efficiently and fairly. The country faces the developmental challenges in an orderly and well-articulated manner. National planning would be coordinated with the regional level, and this turn coordinated with efforts at the local level.

2. In *Scenario B*, the corn subsector requires emergency measures to mitigate the impact of a FTA that immediately eliminates protection and tariffs. In this scenario the AIA will have to utilize important budget resources to mitigate the impact. Imported products absorb the entire demand of the domestic food processing industry. A considerable reduction of cultivated area within the country results. Maintenance of domestic commercial corn production becomes highly subject to domestic policy.
3. In *Scenario C*, the commercial corn subsector no longer has economic reasons to continue. Negotiations end with immediate tariff and control elimination. Domestic production, both modernized and traditional, is not able to count on government support to mitigate any of the social, environmental or productive impacts. In this scenario, imports absorb not only all domestic industrial demand, but also direct consumption. Areas dedicated to commercial corn cultivation are abandoned.
4. In *Scenario D*, the corn subsector does not adjust to trade policy despite having achieved gradual tariff and control reduction. The corn subsector is not able to count on domestic public policy to channel resources or direct its development toward competitive schemes. There are no other domestic support mechanisms for production. The country continues without taking advantage of abundant genetic resources for food, installed agricultural capacity, nor its cultural diversity. There is no institutional coordination. Losses of human and capital resources increase.

Figure 8: IAP scenario building matrix

5.3 Project assumptions

Scenario C (immediate elimination of tariffs and controls) was chosen as the analytical baseline. Then linkages to the environment, social and economic dimensions were constructed, based on historic trends and current conditions. The scenario also assumes the AIA is not implemented. Then, the IAP project examines the processes needed in *Scenario C*, a situation of unpreparedness for the consequences of immediate protection reeducation, to transit to a situation of *Scenario B*, where the adverse consequences are then managed by the AIA in a fair and sustainable way.

Three assumptions have been made for this analysis:

- The small farm economy is characterized by traditional systems.
- Corn production is the axis of the traditional system without considering other crops grown in rotation or association.
- Medium and large producers are characterized by modernized systems in which single crop systems and technology predominate.

Priority was given to the Caribbean region in the analysis since it produces more corn than any other region. The principal areas examined are Sucre and Córdoba, which accounted for 17 per cent of the country's cultivated corn area in 2004 and are undergoing processes of conversion from traditional production to modernized production. Other areas for reference were Antioquia and Caquetá because they have both registered significant reductions in traditional corn growing areas, and Meta because it has been identified as an area for potential expansion of corn production. Córdoba and Sucre contain extensive rural areas in which less than 20% of the original ecosystems remain. The Caribbean region also includes indigenous reservations where there are important initiatives to conserve creole corn germ plasm.

5.4 Economic impact due to FTA signing

In the two scenarios MADR constructed, the corn subsector will experience falls in domestic prices following FTA. The study determined that in response, production and areas cultivated will contract, causing a drop in employment and income for labourers and farmers (see Table 12).

Table 12: MADR cost-benefit calculations for corn producers (in 2002 pesos)

Indicators	Units	Base situation	Scenario I	Scenario II		
		without FTA	(SAFP preserved as a price stabilization mechanism or factory)	(Total elimination of bilateral trade barriers. Internal trade to farm)		
		Average observed 1998-2002	Projected changes	%	Projected changes	%
Prices	Pesos/mt	448,521	370,600	-17.4%	304,680	-32.1%
Production	Metric tonnes	1,116,983	1,025,727	-8.2%	939,814	-15.9%
Value of production	Millions of pesos	500,990	380,134	-24.1%	286,342	-42.8%
Change in gross income of producers	Millions of pesos	Unknown	-120,856	-24.1%	-214,648	-42.8%
Change in producers' surplus	Millions of pesos	Unknown	-83,544	-29.6%	-148,379	16.7%
Areas	Hectares	661,967	600,974	-9.2%	544,213	-17.8%
Employment	Person years	141,577	128,532	-9.2%	116,392	-17.8%
Workers' income	Millions of pesos	318,406	289,068	-9.2%	261,767	-17.8%

Assumes: 37 work days/year/hectare; 13,000 pesos/workday paid to labourer in constant 2002 pesos; 173 workdays/labourer/year. Source: MADR, 2005.

Retrospective analyses were also done for the periods 1991-1998 and 1998-2004 because subsector policies, particularly trade policies, changed during these periods, thus allowing effects to be projected for future trade liberalization processes (see Table 13).

Table 13: Changes registered in 1991-1998 and 1998-2004

Indicators	Units	1991	1998	2004	Changes 1991-1998		Changes 1998-2004	
					Absolute	%	Absolute	%
Domestic price							-35%	-20%
Cost of imports	Index	100	90.9	75	-9.1%			-17.5%
Production								
Traditional	Metric tonnes	973.800	498.632	730.677	-475.168	-49%	232.045	47%
Technified	Metric tonnes	299.800	268.483	668.046	-31.317	-10%	399.563	149%
Areas								
Traditional	Hectares	711.300	372.651	443.428	-338.649	-48%	70.777	19%
Technified	Hectares	110.500	88.840	171.081	-21.660	-20%	82.241	93%
Employment								
Traditional	Person years	189.132	99.086	117.906	-90.045	-48%	18.819	19%
Technified	Person years	14.691	11.811	22.745	-2.880	-20%	10.934	93%
Labour force income								
Traditional	Millions pesos	425.357	222.845	265.170	-202.512	-48%	42.325	19%
Technified	Millions pesos	33.040	26.563	51.153	-6.476	-20%	24.590	93%
Number of producers								
Traditional	Producers	237.100	124.217	147.809	-112.883	-48%	23.592	19%
Technified	Producers	7.367	5.923	11.405	-1.444	-20%	5.483	93%

Employment is calculated assuming 23 workdays/hectare/year for modernized corn, and 46 workdays/hectare/year for traditional corn. The number of producers is calculated assuming 3 hectare plots for modernized farmers, and 15 hectare plots for traditional farmers. Calculations of labour force income assume 13,000 pesos/workday paid to labourer and 173 workdays/labourer/year.

After trade liberalization during the two periods there was a significant decline in domestic corn prices, which led to a major reduction in cultivated areas. The result was a recomposition as a large number of producers ceased cultivation and left the market. Domestic prices converged towards international prices and income levels fell.

Analysis of the current situation is based on the most recent official figures available at the time of the compilation of this report, or 2004. The projected economic changes from FTA are as follows.

5.4.1 Price changes

Once price changes are known, changes in supply, production and area cultivated can be projected. These in turn result in social implications in terms of employment generated by the subsector, farm income, labour force income, and farm surpluses.

According to MADR, trade liberalization with the USA will cause a drop of 17 per cent in domestic corn prices in Scenario I and 32 per cent in Scenario II. The difference depends on the degree of tariff and control afterwards (see Section 5.1).

Policy changes in the subsector have also caused price reductions previously, including 35 per cent in 1991-1998, and 20 per cent in the period 1998-2004 (in constant pesos). Import costs fell by 9 per cent and 17 per cent respectively.

Price reductions have a direct impact on producers' incomes, and also affect incomes due to reductions in cultivated areas. Currently, about 159,000 producers are potentially at risk from a fall in prices of 24 per cent (assumed in Scenario I), and 43 per cent (Scenario II). Producer surpluses would correspondingly fall by 17 per cent and 30 per cent. The most affected would be traditional producers (see Table 14). The regions hardest hit regions will be, in descending order: Bolivar, Antioquia, Cesar, Cundinamarca and Córdoba.

Table 14: Corn producers in regions in 2004

Traditional			Modernized		
Department	2004 Hectares of corn	Estimated number of producers*	Department	2004 Hectares of corn	Estimated number of producers*
Antioquia	49,116	16,372	Córdoba	48,854	3,257
Córdoba	32,000	10,667	Meta	17,286	1,152
Meta	10,032	3,344	Sucre	16,989	1,133
Caquetá	7,095	2,365	Antioquia	10,285	686
Sucre	5,035	1,678			

*Assuming 3 hectares for traditional farms and 15 hectares for modernized farms.

5.4.2 Employment and labour force changes

For every 10 hectares lost in traditional production, there is an annual income loss of 5,980,000 pesos, and for every 10 hectares lost in modernized production, the annual income loss is 2,990,000 pesos.⁵⁶

In Scenario I, a contraction of cultivated area will cause a 9 per cent reduction of rural employment, and the Scenario II figure is 18 per cent. These changes in employment will in turn generate annual income losses of 29,338,000,000 pesos and 56,639,000,000 pesos respectively.

A study of trends from 1991 to 2005 shows that the traditional subsector's net job loss in these 14 years was 63,171 as a consequence of modernization and reduction of cultivated areas.

Employment will again be at risk as falling prices lead to reductions in cultivated areas from the FTA. MADR has calculated employment changes that follow (see Table 15).

Table 15: Projected employment changes from FTA

Traditional system		Min. Agr	IAWH	Technified system		Min. Agr	IAWH
Dept.	Area (Hectares)	Jobs	Jobs	Dept.	Area (Hectares)	Jobs	Jobs
Bolívar	66,941	14,317	17,779	Córdoba	48,854	10,449	6,495
Antioquia	49,116	10,505	13,060	Valle	24,042	5,142	3,196
Cesar	33,576	7,181	8,928	Meta	17,286	3,697	2,298
Cundinamarca	33,182	7,097	8,823	Sucre	16,989	3,633	2,259
Córdoba	32,000	6,844	8,509	Tolima	12,651	2,706	1,682
Santander	23,976	5,128	6,375	Antioquia	10,285	2,200	1,367
Magdalena	22,120	4,731	5,882	Others	40,975	8,763	5,448
Nariño	20,793	4,447	5,529	TOTAL	171,082	36,590	22,745
Huila	18,748	4,010	4,985				
Others	142,977	30,579	38,017				
Total	443,429	94,837	117,906				

Source: Calculations based on estimates of MADR: 37 hours/day average for both systems (46 hours/day for traditional, 23 hours/day for modernized).

⁵⁶ Calculations assume: 46 work days/year/hectare for traditional system, 23 work days/year/hectare for modernized system, 13,000 pesos/workday paid to laborer in constant 2002 pesos, and 173 workdays/laborer/year (MADR, 2005).

Table 16 shows projected reductions in work force income.

Table 16: Estimates of lost work force income (in millions of pesos)

Traditional system			Modernized system		
Dept.	MADR estimate	Humboldt Inst. Est	Dept.	MADR estimate	Humboldt Inst. Est.
Bolívar	32.199	40.031	Córdoba	23.499	14.607
Antioquia	23.625	29.371	Valle	11.564	7.189
Cesar	16.150	20.078	Meta	8.315	5.169
Cundinamarca	15.961	19.843	Sucre	8.172	5.080
Córdoba	15.392	19.136	Tolima	6.085	3.783
Santander	11.532	14.338	Antioquia	4.947	3.075
Magdalena	10.640	13.228	Others	19.709	12.252
Nariño	10.001	12.434	TOTAL	82.290	51.154
Huila	9.018	11.211			
Others	68.772	85.500			
Total	213.289	265.171	Total (traditional and modernized)	295.580	316.324

Source: Calculations based on estimates of MADR: 37 hours/day average for both systems (46 hours/day for traditional, 23 hours/day for modernized). Income estimated at 13,000 pesos.

5.4.3 Industrial demand changes

Industrial demand for imported corn will rise when its price falls below the price of domestic corn. In 2005, the elasticity of demand was -0.95, hence a fall in the import price will generate an increase in demand for imported corn and a simultaneous, near equal decrease in the consumption and prices of domestic corn. Imports accounted for roughly 27 per cent of demand in 2005.⁵⁷

A fall in the domestic price of yellow corn from trade liberalization scenarios will affect industries from cereals to balanced animal feeds to poultry and pork chains.

Studies confirm that yellow corn represents 42 per cent of the raw material used for chicken feed for food and 50 per cent of raw material required for chicken feed for egg production.⁵⁸

MADR's studies indicate that raw material prices, among them the price of corn, do not affect the price of animal feed, and that the price of animal feed does not affect the prices of the final products, such as chicken meat, eggs, and pork.⁵⁹ The possibility of increasing prices of chicken feed above prices of the final goods (chicken meat) reveals an imperfect market with a high degree of concentration of production. In fact, five companies that absorb 51 per cent of corn, sorghum and yucca production dominate the production of chicken feed, giving them significant market power.⁶⁰

⁵⁷ According to project calculations based on: (1) MADR, 2005. (2) The fees for 2000 are estimates; source 2001.

⁵⁸ AGROCADENAS; source for FENALCE (2002-5). (3) Domestic production estimated by FENALCE.

Percentage calculations based on information from FENAVI-FONAV 2003 in Martínez, Hector, Espinal Carlos, Acevedo, Ximena, La cadena de cereales, alimentos balanceados para animales, avicultura y porcicultura en Colombia, una mirada global desde su estructura productiva, MADR Observatorio Agrocadenas Colombia, Marzo de 2005.

⁵⁹ Ramírez et al., 2004.

⁶⁰ Ibid.

5.4.4 New genetically modified organisms as imports

The principal provider of corn to Colombia is the USA which accounted for 87 per cent of the volume of imports in recent years. Argentina accounted for 9 per cent, Ecuador for 3 per cent, and all other countries for 1 per cent.⁶¹

All corn imports to Colombia must pass through a health inspection system based on Yieldgard® and Roundup Ready® technologies to be approved as fit for use as raw materials in cereal-based prepared foods.⁶² The problem lies in the uncertainty of grain entering from the United States, since corn grown there is mixed in storage silos without separating conventional grain from genetically modified grain (GMO).

Through ICA, Colombia regulates access, use, and sales of GMOs in internal agriculture. The rules for primary imports contain requirements for prior consent based on the Cartagena Protocol on Biotechnology Security.⁶³ The problem is that approval depends on the good faith of the exporter who must reveal when GMOs are included in a shipment.

Added to this problem is the lack of well-equipped laboratories in Colombia to scientifically evaluate cargos. On the other hand, if customs officials quarantined every shipment from the United States after the FTA is signed, Colombia could face lawsuits for technical barriers to free trade.

It is important that the USA clearly understands that it must inform the Colombian authorities when transgenic material is exported during a shipment. One major worry is that cargo containing transgenic material is lost or stolen during transportation within Colombia. Internal control of transportation is extremely underdeveloped.

5.4.5 Displacement changes of traditional production

Given that:

- The substitution elasticity of domestic corn is -0.95.
- International prices of corn have historically been lower than domestic prices.
- The modernized system produces as much for industry as for direct consumption.

it follows that:

- Domestic industry may switch its demand from Colombian corn to corn from the USA as long as prices on delivery are equal or lower.⁶⁴
- Transfer of industrial demand to imports may cause a surplus of production by modernized producers in Colombia, increasing competitive pressures in the domestic market (see Table 17).
- Possible total displacement of traditionally-produced corn by modernized corn in the domestic consumer market (assuming the absence of mitigating measures).

⁶¹ FENALCE, 2004.

⁶² Available from: www.invima.gov.co.

⁶³ Law 740 2002. Cartagena Protocol on Biotechnology Security.

⁶⁴ The higher transaction costs for domestic products suggest that, at equal prices, industry will prefer to import. These high costs are related to required volume, quality control, uniformity of imported grain, etc.

Table 17: Projected changes in consumption patterns of domestic corn

Corn	2004 figures	Projected displacement due to lower international prices			
	Production (metric tonnes)	Industrial consumption (metric tonnes)	Consumer market (metric tonnes)	Industrial consumption (metric tonnes)	Consumer market (metric tonnes)
Traditional	730,677	0	730,677	-	320,782
Modernized	668,046	409,895	258,151	-	668,046
Imports	2,270,402	2,260,235	10,167	2,670,130	10,167

According to this analysis, current sales of 409,895 metric tonnes of modernized corn will be displaced from the industrial market to the consumer market by imports. The modernized corn will in turn displace equivalent sales of traditional corn in the consumers' market. Traditional corn production will decrease by 56 per cent, which will result in reductions of employment, labour force income, and the number of traditional producers (see Table 18).

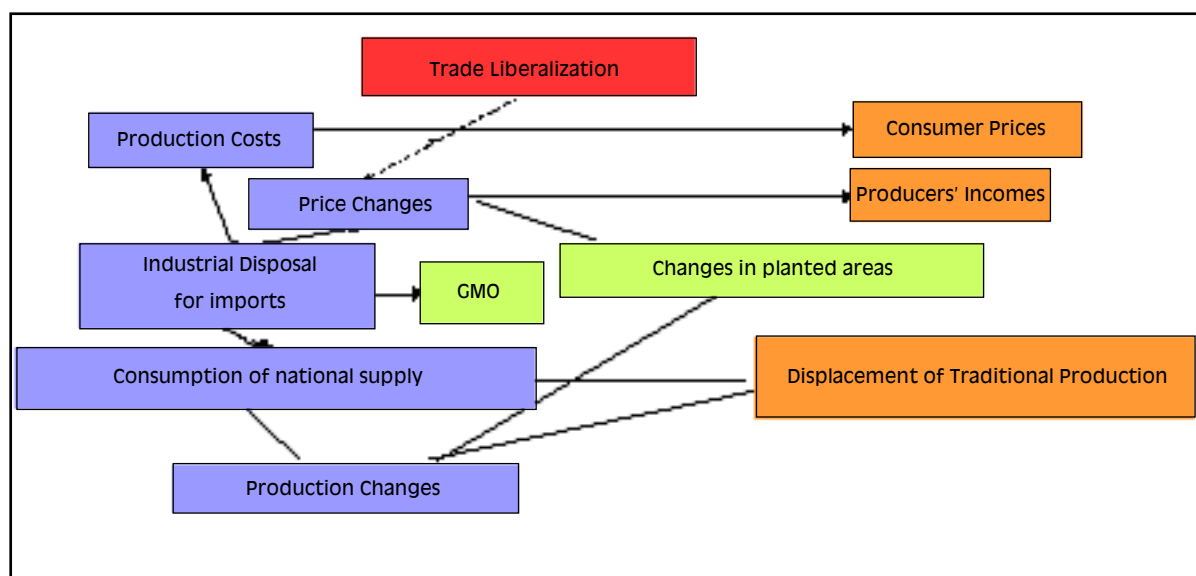
Table 18: Projected displacement of traditional corn by modernized corn, 2004

Indicator	UND	2004	Reduction	Change	%
Production	Metric tonnes	730,677	-409,895	320,782	-56%
Areas	Hectares	443,428	-256,184	187,244	-58%
Employment	Person/years	194,284	-108,989	85,295	-56%
Labour force income	millions of pesos	265,170	-153,198	111,972	-58%
Producers	labourers	147,809	-85,395	62,415	-58%

Employment is calculated assuming 46 workdays/hectare/year. Calculations of labour force income assume 13,000 pesos/workday paid to labourer and 173 workdays/labourer/year. Source: MADR, 2005.

5.4.6 Economic, social and environmental linkages

The full follow-on effects are explained in Figure 9.

Figure 9: Illustration of FTA economic impacts


5.5 Non-economic implications of FTA signing

5.5.1 Changes in soil use

A change of price will impact planting decisions. The FTA will result in reductions of areas of corn cultivation, contrary to the current policy of expanding corn cultivation. From 1991 to 1998 there was a recomposition of the sector and the disappearance of a large number of traditional corn producers.

5.5.2 Pressure on natural ecosystems

Given that the national competitiveness strategy has stressed modernized production, this may lead to new pressures on natural ecosystems. Total area planted in corn, as well as total agricultural cultivation area, however, fell by 7 per cent between 1993-2004 in Córdoba, due to more efficient modernized production. It is possible to infer that areas which had been traditionally cultivated with other crops were simply converted to corn during this period and there may not be more pressure on natural ecosystems.

5.5.3 Changes in cultivated areas

Producers are likely to reduce the areas that they plant in response to falling domestic prices. In the period 1991-1998 falling domestic prices and low import costs were accompanied by a reduction of domestic production of 40 per cent, 94 per cent of which occurred in traditional production, while only 6 per cent stemmed from a fall in modernized production. During the recovery period 1998-2004, 37 per cent of production growth occurred in traditional corn production, while 63 per cent was due to an increase in modernized production, indicating a recomposition of the corn subsector.

Small domestic corn producers now have three options:

1. Remain in corn production, perhaps modernize for competitiveness.
2. Substitute legal or illicit activity for corn production.
3. Abandon agriculture and migrate to urban zones.

These three options in turn have environmental, social and economic impacts, which are as follows:

Remain in corn production

Since some small farmers are likely to continue producing corn with the traditional system, trying to serve specific local markets, it is first necessary to identify how environmentally friendly the practices of these small corn producers are. In general, there are few, if any, small corn plots that use efficient integrated systems of production based on sustainable agriculture, recycling and home-grown farm products and by-products. Low levels of technology are in use and there is poor management of crop densities, an absence of seed selection and treatment, indiscriminate use of soil preparation equipment, and non-selective, irrational use of high cost agricultural chemicals for weed control.⁶⁵

Two types of traditional production systems were identified: (a) Campesinos⁶⁶, using technological packages of seeds and chemical inputs, with some use of machinery and low levels of diversification through complementary structures of land management (biological corridors, living fences, areas of conservation of natural vegetation between plots); and (b) Indigenous small farm communities⁶⁷, using high levels of

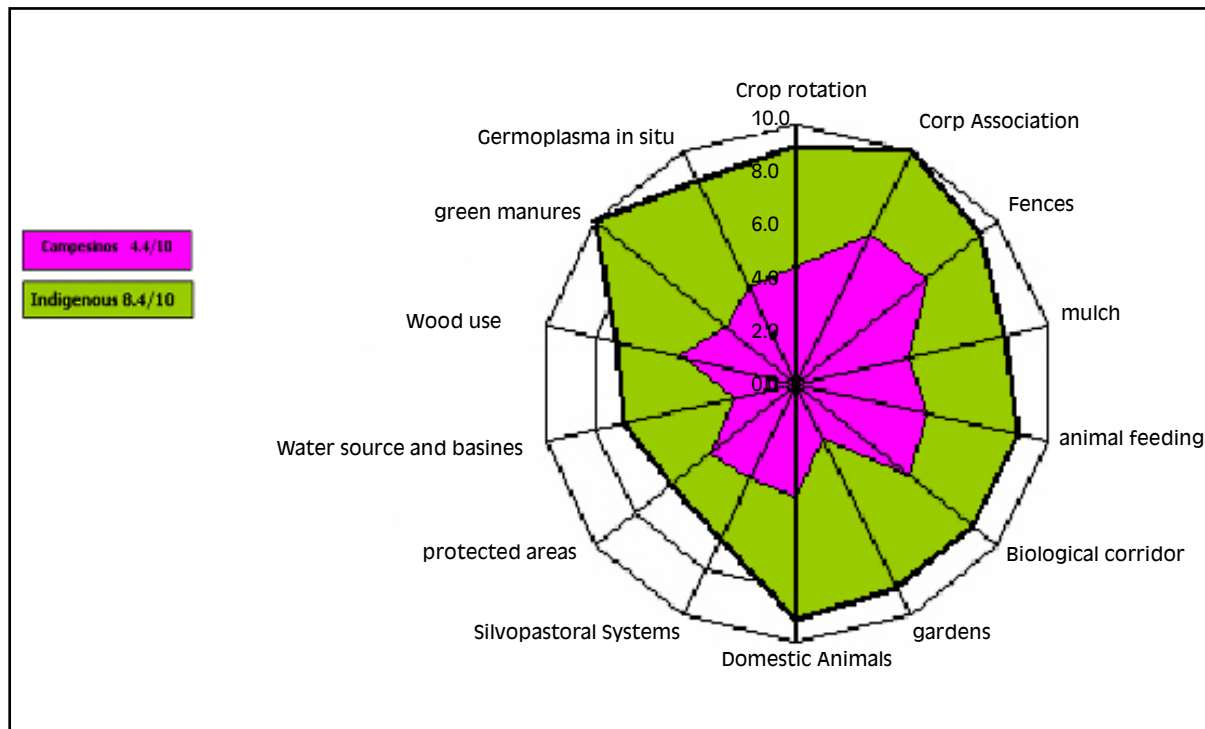
⁶⁵ Diaz *et al*, 2005. Available online at <http://www.turipana.org.co/sip.htm>.

⁶⁶ The small farmers consulted are part of FENALCE.

⁶⁷ Indigenous people of San Andrés de Sotavento with the support of the Agroecological Network of the Caribbean.

diversification of productive system, wide management of varieties and seeds, technological packages (preparation of inputs and on-site reproduction seeds), and sustainable productive systems (see Figure 10).

Figure 10: Comparing campesinos and indigenous farms



These two analyses suggest that the abandonment of environmentally sustainable practices, due to the search for competitiveness, and the use of technological packages without adequate support generate new pressures on the environment and on biodiversity.

This makes it necessary to have mechanisms to conserve knowledge associated with sustainable practices in order to improve productive behaviour, and recognize the support for conservation and sustainable use of biodiversity.

At the same time, a very small percentage of traditional lands are likely to be converted to modernized production. According to the Humboldt Institute, a maximum of 16.8 per cent was converted between 1990 and 2004. The belief is that modernized production is more likely to expand in new areas. Low conversion rates are due to the use of mountain sides by traditional methods unsuitable for modernized production, plus the poor soils which characterize a large part of the traditional lands. Economic restrictions on small farmers also play a role.

According to the NGO Semillas, when small indigenous and campesino producers try new modernized chains of production, especially in the case of corn, the outcomes have been disastrous due the inability of traditional farmers to sustainably use technological packages. In many cases economic losses are the result. Many small producers go bankrupt or are simply left with unpayable debts.⁶⁸

⁶⁸ Semillas 2004. Magazine Number 22. El cultivo de maiz en Colombia.

At the same time, the state and the private sector have been supporting the growth of modernized farms. Information found in the 2002 Environmental Guide for the Cereal Subsector is used to deepen the environmental diagnosis of the modernized system, which looks to grow. The analysis looked specially closely at the department of Sucre where modernized corn cultivation has grown by 193 per cent, while traditional corn cultivation areas have contracted by 69 per cent and total area under corn cultivation fallen by 1 per cent, due to a reorganization of the corn sub-sector. Modernized areas occupied 77 per cent of Sucre's area planted in corn, but used 91 per cent of fertilizers, 73 per cent of herbicides, 100 per cent of fungicides and 77 per cent of the insecticides.

Besides modernized systems (see next section), two other ways of remaining in tradition corn includes farm conservation, which focuses on techniques such as proper soil preparation, direct planting, minimum plowing, and crop rotation.⁶⁹ All are techniques that are valid but underused in Colombia.

Another way of remaining in corn is the adoption of transgenic technology. Colombia's tropical location is a site of great importance for biological interchanges among the ecosystems of North, Central and South America, and between the two oceans. In fact, in terms of land area, there is probably no place on Earth with greater diversity.⁷⁰

In terms of production, the use of biologically engineered corn could be beneficial for certain high yield producers, according to a study by CEGA in 2003. However, because of the varied conditions of the country, this may vary according to the agroecological zone. Meanwhile, indigenous communities have declared the Resguardo Indígena Zenú in Córdoba and Sucre to be a Transgenic Free Territory.

Accept modernized systems

The labour-intensive traditional system does not incur machinery costs while a modernized farm pays about 140,000 pesos per hectare for machinery. Some modernized farms spend an additional 40,000 pesos per hectare because of the type of soil.

According to a study by CEGA in 2003⁷¹, processes of modernization are deficient in corn cultivation given the lack of machinery and the obsolescence of existing machinery.

Traditional corn cultivation has been found to have higher costs in Sucre than modernized corn cultivation. It would seem that traditional cultivators are producing at a prohibitively high cost. However, because 60 per cent of the labour in traditional cultivation is unremunerated family labour and traditional cultivators purchase seeds only every three harvests, money costs are maintained below market income. A technological alternative will also deepen environmental and biodiversity impacts derived from turning the countryside into a uniformly cultivated single crop system.

Modernization also implies the substitution of high-yield hybrid seeds in place of creole seeds in order to improve competitiveness. Hybrid seeds are planted mostly by the modernized sector. Statistics from MADR for 1990–2004 show that hectares planted with hybrids increased by 63 per cent during this period.

⁶⁹ CORPOICA, 2003.

⁷⁰ See website: <http://www.webcolombia.com/butterfly/>

⁷¹ CEGA, 2003.

If the current trend toward technification continues, and continues to be based on the use of hybrid seeds, there will be, in the long run, progressively more uniformity of seeds. The great concern with this process is that, as has been observed with the introduction of improved animals and plant varieties in other situations, it becomes a major factor in loss of biodiversity, especially among creole varieties.⁷² Creole seeds will not be directly affected because they are not part of the conventional market distribution channels. However they are subject to cross-breeding with commercial seeds introduced by technification. This increases crop vulnerability.

Major providers of hybrid seeds are México, the United States, Brazil, Thailand and Venezuela, while minor providers include Costa Rica, Guatemala, the Philippines and Argentina.

Certified seeds however can be a basic input to guarantee agriculturally efficient production. A certification programme aims to produce basic certified material for greenhouses, commercial farms, germ plasma banks, and export. Moreover, this kind of programme can use patterns of excellence, obtain uniform crops, improve reproductive potential, and, as a consequence, improve productivity, provide better control of plant and seed health, and help achieve competitiveness.

Substitute legal or illicit activity for corn production

A third option for small producers after corn prices fall could be to change productive activity, either legally or illegally.

To identify alternative crops which could be substituted for corn (see Table 19), a prioritization exercise was developed with farmers based on the following: (a) small producers' opinions about the most likely crop after leaving corn; (b) perceptions of existing opportunities for current corn producers; (c) product categories presented as exports or potential exports by the National Planning Department; and (d) product categories presented as having potential in the domestic market; (e) product categories presented as having net imports; and (f) those proposed by MADR in the modernization plan for corn.

⁷² Vélez *et al.*, 2005. Available online at <http://www.grain.org/biodiversidad/?id=9>

Table 19: Prioritization exercise for corn substitute

Crops	A	B	C	D	E	F	G	Total	Crops	A	B	C	D	E	F	G	Total
Tobacco	1	1	1	1	1			5	Flowers			1					1
Yucca	1	1		1	1		1	5	Beans	1	1				-		1
															1		
Corn technified	1				1		1	3	Fruit trees				1				1
Banana			1		1			2	Garden vegetables				1				1
Cotton	1			1		-1		1	Ñame					1			1
Arracacha					1			1	Palm			1					1
Rice					1			1	Potatoes				1				1
Green peas		1						1	Sesame	1					-		0
															1		
Banana			1					1	Soy						-	1	0
															1		
Cacao				1				1	Wheat		1				-		0
															1		
Café			1					1	Barley						-		-1
															1		
Sugar cane (A)			1					1	Cocoa						-		-1
															1		
Sugar cane (B)					1			1	Peanuts						-		-1
															1		
Ethanol					1			1	Sorghum						-		-1
															1		

Tobacco, yucca, modernized corn and bananas were voted the products with the highest matches for all criteria. The survey with small producers⁷³ showed a 20 per cent alignment with National Planning Department's "Visión 2019"⁷⁴ on domestic market opportunities, especially identification with tobacco and yucca. These are products that are net imports, which implies that import substitution is possible but difficult.

According to surveys from the period of trade liberalization in the 1990's, cultivators who moved out of corn during that period mostly moved into cotton, beans, sorghum, tobacco and grass lands. Hence changes in productive practices are not likely to be more friendly to biodiversity than corn cultivation. Additionally, producers also choose options (see Table 20) such as cattle (18 per cent), tobacco (13 per cent), beans (11 per cent), yucca (8 per cent) and green peas (8 per cent).

⁷³ This survey was conducted among members of FENALCE in the departments of Atlántico, Cesar, Huila, Nariño, Santander, Sucre and Tolima.

⁷⁴ DNP. Presidencia de la República. (2005). Visión Colombia II Centenario: 2019 Propuesta para discusión.

Table 20: Comparing possible crop substitutions

Crops	Production growth 1990 - 2004	Regional bets of the AIA	Visión 2019	Principal Production	Mentioned by producers Zones	Environmental score	Employment per hectare
Corn	152%	Not considered	Domestic	National	Yes	4.66	0.28
Banana	30%	Not considered	Export and domestic	Antioquia, Quindío, Meta, Tolima, Córdoba	No	5.24	0.5 – 0.6
Yucca	0%	Not considered	Domestic	Bolivar, Santanderes, Sucre, Córdoba	Yes	4.75	0.66
Tobacco* -12%		Magdalena, Sucre, Bolivar, Huila	Export and domestic	Santanderes, Huila, Boyacá Tolima	Yes	4.65	1.25

*Producers did not specify types of tobaccos nor bananas.

Source: Calculations by Humboldt Institute based on MADR, 2004; AIA, Visión 2019, and Humboldt-IDEA producers' survey.

Taking into account social considerations of employment, tobacco appears to offer the best potential for rural agricultural labour, with yucca ranking second. Plátano is third, and is cultivated for export only in Antioquia, but distributed nationwide for the domestic market. Corn currently is in fourth place, with the advantage that it is grown all over the country. According to CEGA, rural poverty has grown in the last ten years, due to the crash in the coffee sector. The final result is a deficit of 370,000 rural jobs simply to maintain the living standards of the 1990s.⁷⁵ The free trade negotiations with the United States will added impact on Colombian rural employment, not only in corn, but also in other subsectors such as rice, beans, sorghum, wheat, and soy.⁷⁶

Another strategy small farmers use to compensate for lost income is to increase traditional activities of extraction of wild resources, which could impact endangered species through either home consumption or sales on the black market, and could result in a change of productive activity to either fishing or subsistence hunting. This situation has been observed in Córdoba and Sucre and will be aggravated if areas of traditional agriculture are further reduced.

Colombia is also the largest producer in the world of coca leaf and the first producer of heroin poppies in the Americas.⁷⁷ According to estimates by DANE, illicit crops represent 6.2 per cent of agricultural GDP and 0.9 per cent of total GDP, half of that of coffee. The expansion of illegal agriculture is closely related to

⁷⁵ Llorente, 2003.

⁷⁶ Garay L.J. (2005). La Agricultura Colombiana Frente Al Tratado De Libre Comercio Con Estados Unidos. Bolsa Nacional Agropecuaria - Ministerio De Agricultura Y Desarrollo Rural.

⁷⁷ According to data from the Drug Observatory, 80,350 hectares in 2004 were reported, which reflects a possible reduction. Between 2001 and 2004, 508,845 hectares were eradicated.

the expansion of the armed conflict and also with the “bankruptcy” of legal agriculture, as has recently been demonstrated by the appearance of illicit crops in the coffee zone.⁷⁸

Illegal cultivation brings with it problems including displacement of the population and armed conflicts, with subsequent undesirable effects on ecosystems and biodiversity.

The environmental impacts of eradication are also a consideration. Eradication has two principal effects: (a) direct impacts on biodiversity; and (b) displacing illegal cultivation to other areas, usually those rich in natural biodiversity.⁷⁹ Furthermore, fumigation affects not only the target zones, but also adjacent areas and their water sources, soil resources and ecosystems.⁸⁰ More scientific research needs to be done in this area.

Abandonment of agricultural production

The last option for small corn producers is to abandon agricultural areas and agricultural activity altogether. Between 1995 and 2003, due to the armed conflict in Colombia, 4.8 million hectares of agricultural land were abandoned.⁸¹ This resulted in the regrowth of natural vegetation, which in the long term could regenerate the forests. However, the socioeconomic consequences of abandonment, and the potential for appropriation of abandoned lands by armed groups at the margin of the law, make this a dubious benefit.

Historically, cases have occurred in which *campesinos* abandoned their fields to work in the coffee zone, causing irretrievable loss of valuable phylogenetic resources.⁸² The indigenous Zenú of the reserve in Urabá have suffered losses of their seeds, for example, partly due to generalized violence in the region.⁸³ Creole corn has especially high potential for total loss of varieties due to land abandonment, because it is a domesticated plant unable to survive in a tropical environment without human management. Traditional knowledge of genetic resources can also be lost if it is no longer used to cultivate crops and when the social institutions which support traditional cultivations are weakened, as happens when whole communities are displaced.⁸⁴

Reduced cultivated areas and abandonment of agriculture by small producers would place the nation’s food security at risk since these small producers supply 70 per cent of the domestic market. In terms of long run food security, there are also consequences from diminution of genetic capital and agro-biodiversity.

⁷⁸ Garay L.J. (2005). La Agricultura Colombiana frente al Tratado de Libre Comercio con Estados Unidos. Bolsa Nacional Agropecuaria - Ministerio de Agricultura y Desarrollo Rural.

⁷⁹ Vargas (2004) En Ortiz N. (2005), Cultivos de Uso Ilícito, Orden Público y Conflicto Armado, en Causas de Pérdida de la Biodiversidad. Documento Preparado para la Publicación del Informe Nacional del Conocimiento sobre la Biodiversidad.

⁸⁰ Andrade (2004) en Ortiz N. (2005), Cultivos de Uso Ilícito, Orden Público y Conflicto Armado, en Causas de Pérdida de la Biodiversidad. Documento Preparado para la Publicación del Informe Nacional del Conocimiento sobre la Biodiversidad.

⁸¹ Conferencia Episcopal de Colombia y la Consultoría para los Derechos Humanos y el Desplazamiento.

⁸² II Foro Xelajú, 2001. Available online at <http://usuarios.lycos.es/xelaju/bioparte3.htm>.

⁸³ Vélez et al., 2005. Available online at <http://www.grain.org/biodiversidad/?id=9>.

⁸⁴ Palacios O.R. Available online at: <http://www.asocars.org.co/archivos/areas/33-tlc.rtf>.

2. Based on the analysis above, the drop in domestic prices which will result from the newly negotiated treaty should cause a loss of production of between 19 per cent and 49 per cent in 5 years.
3. It may also cause a fall in cultivated corn area of between 26 per cent and 66 per cent over the next 5 years. The majority will be traditional areas.
4. If 46 annual days of work are required for each hectare planted traditionally, and 23 days are required for each modernized hectare, the impact on employment caused by reduction of planted area may be a fall of as much as 29 per cent to 76 per cent. Traditional systems will be most hard hit with a possible reduction of 91 per cent.
5. Assuming the same values for a day's labour used throughout this analysis, the changes in workforce income over the next five years may be between 29 per cent and 76 per cent. Traditional systems income will fall between 35 and 91 per cent.

5.7.1 Feedback from stakeholders

Participants in the IAP workshop, representatives of stakeholder groups, were asked to give their views on the three most important objectives of the Government of Colombia in negotiating the FTA with the USA. The objectives were:

- To improve the well being of the population by increasing employment and accelerating economic growth based on increased trade, and more domestic and foreign investment.
- To broaden foreign sales of Colombian goods and services, at least to the level of imports from a given country. Hopefully agricultural exports in particular will increase in kind and number.
- To seek precise rules on direct subsidies paid to producers in the USA so that there will be a level playing field without trade distortions. Similarly, to take clear measures about restrictive and anticompetitive trade practices that are selectively applied to one country, or a group of countries, but not to other countries.

Both positive and negative expectations were recorded (see Table 21).

Table 21: Positive and negative expectations of FTA by stakeholder groups.

FTA objective	Positive expectations (opportunities)	Negative expectations (threats)
To improve the welfare of the population through generating employment and economic growth based on expansion of trade and increased domestic and foreign investment.	<p>If negotiations are equitable we will gain everything. Economic and business growth</p> <p>Better quality of life.</p> <p>Employment Growth of production.</p> <p>Consumers will have opportunity to acquire imported goods at lower costs.</p> <p>New economic opportunities will be generated for Colombians.</p>	<p>Intellectual property rights will undermine health and health care.</p> <p>Unemployment will be caused when business cannot sustain production costs. Food insecurity will be caused by dependence on foreign products and the bankruptcy of domestic agriculture.</p> <p>Hunger.</p> <p>Decrease in the quality of life</p> <p>Economic disequilibrium.</p> <p>Economic polarization Insufficient qualified labor force to be competitive.</p> <p>More poverty.</p> <p>Loss of purchasing power by the majority.</p> <p>Worsening of the general situation.</p>
Increase exports of Colombian goods and services, at least to the level of imports from each trading partner. In particular, increase agricultural exports.	<p>Accelerate certain economic sectors.</p> <p>Opportunities for native and tropical products.</p> <p>Obtain quality products by achieving better marketing. Opportunity to develop rural and agricultural Colombia. Achieve competitiveness for businesses. Opportunity to market new, higher quality products to be able to compete.</p> <p>Biodiversity gains.</p> <p>Diversity.</p>	<p>Colombia does not have the volume of products required for export.</p> <p>Negative trade balance.</p> <p>Some Colombian firms will fail because of import competition. Developed countries will take the markets from the underdeveloped countries.</p> <p>Small producers will not have opportunities to supply products.</p> <p>Less opportunities for farmers.</p> <p>Bad business.</p> <p>Entrance of bad products to compete with domestic products.</p>
<p>Seek precise rules covering internal subsidies paid directly to producers in USA to equalize conditions and prevent creation of trade distortions.</p> <p>Obtain clear measures covering restrictive trade practices applied only to some countries.</p> <p>Promote rules to stop anticompetitive practices.</p>	<p>Equality of conditions.</p> <p>Orientation and training for producers to compete.</p> <p>Development and application of new production technologies.</p> <p>Training and Research.</p> <p>Trade Competitiveness.</p>	<p>We are not prepared, and we will not be prepared for ten years, to sign the FTA.</p> <p>We are not competitive.</p> <p>Colombia is not prepared to compete with quality products.</p> <p>Total requirement for quality products. It will bankrupt farmers (US subsidies).</p> <p>US subsidies for exploitation.</p> <p>Unfair.</p>
Outside of objectives	Production planning	<p>Loss of sense of belonging. Submitting to the USA.</p> <p>The negotiators do not know our expectations and needs.</p> <p>What will happen to the small farmers?</p>

A matrix of possible strength of interest in the FTA, influence levels, dependence on corn subsector and priority levels, partly derived from feedback from producers, is found in Table 22.

Table 22: Matrix of interested parties in FTA

Category	Parties Interested in FTA	Interested in signing	Influence on decisions	Dependence on corn subsector	Available Capital	Priority
Producers	Large producers	Low	Medium	High	Medium	High
	Medium and small producers	Low	Low	High	Low	High
	Indigenous communities	Low	Low	Low	Low	Low
Governmental Authorities	Ministry of Agriculture	High	High	Low	-	High
	Ministry of Finance	High	High	-	-	High
	Ministry of Environment	High	Medium	-	-	High
	Ministry of Foreign Trade	High	High	-	-	High
	Ministry of Interior	High	High	-	-	High
	National Planning Department	High	High	-	-	High
	Regional Authorities, city and town halls, Umataas, Local agricultural officials	Medium	Low	Medium	-	Medium
Organizations within Corn subsector	Wholesalers and distributors of agricultural inputs	High	High	Low	High	High
	Intermediaries	Low	Low	High	Medium	High
	Corn importers	High	High	Medium	High	High
	Industry	High	Medium	Low	High	High
	FENALCE	Low	Medium	High	Medium	High
NGOs and Consumers	NGOs	Low	Low	Low	-	High
	Consumers	Low	Low	Low	-	Low

6. Conclusions and recommendations

This integrated assessment can conclude that, in agreement with its linkages hypothesis, the processes of liberalization of agricultural trade now underway will have a major impact on small farm economies, natural biodiversity, agricultural biodiversity and food security.

Changes brought about in the national productive structure will affect regional biodiversity through the reduction of corn cultivation areas, possible increases in other agricultural pursuits, continued modernized corn cultivation and possible abandonment of agricultural activity.

Sector planning tools are needed so that the economic, social, cultural, environmental and biodiversity considerations can all constitute part of an agricultural agenda that will guarantee sustainability beyond just required competitiveness.

Some traditional corn cultivation systems in the areas analysed are extremely friendly to the environment and to biodiversity. However, they have practically disappeared as a result of the green revolution and modernization strategies. Both modernized and some traditional systems, however, overused and abused agricultural chemicals that are damaging to the environment.

Gradual abandonment of small farm cultivation has also meant abandonment of on farm conservation, which today is restricted to indigenous communities and a few very careful local communities. Implicit in modernization is the use of hybrid seeds, which pose bigger threats to germplasm diversity and which in fact violate farmers' rights. Modernized farming, at least at the national level, should seek a set of practices available within the country that are appropriate and adaptable to local conditions and support it with technological investment.

As has been mentioned, neither the public sector nor in the private sector has a clear programme of productive substitution. Such a programme would imply new institutional arrangements, which would have to find a way to insert the small farmers into the productive dynamic of the market economy with new and viable opportunities.

In terms of small farmers' food security, two different strategies can be adopted to minimize the economic impact of liberalized agricultural trade. One strategy will be to return to subsistence consumption of products produced on the farm. The other will be to rely more on wild resources, using them to compensate for deficiencies, especially protein deficiencies, but also as an important replacement of lost income. However, literature reviewed for Sucre and Córdoba, and preliminary results of ongoing research, indicates that small farm producers are already worried about the exhaustion of wild resources. This perception, however, does not in any way imply that the exploitation of these resources will be abandoned any time soon.

According to the opinions expressed in the IAP project's participatory regional workshops, the rural areas show a changing family market basket. Consumption of processed foods from the local markets is replacing consumption of traditionally produced primary food products due to advertising in the media. This has two important implications: (a) abandonment of local production of primary products; and (b) a decrease in traditional conservation practices which has conserved biodiversity and protected local and national food security.

6.1 Agricultural policy recommendations

The proposals presented here for the AIA focus on the small farm economy, particularly small corn farmers, in the search for equilibrium in agricultural policy based on food security and agricultural biodiversity. They would require a firm commitment by the Government of Colombia, but in no way would recommend the exclusion of modernization or adoption of sustainable technology. Instead the proposals recommend real diversification of exports and products for the domestic market in ways that reduce the vulnerability generated by dependence on a single category of products.

6.1.1 Development of a policy of internal supports for production

1. **Provide incentives for conversion and maintenance of traditional systems of agroecology.** Evaluation of the environmental friendliness of practices associated with small farm economies permits identification of process of sustainability loss. Recovering or establishing agroecological systems will have to overcome a set of barriers - new investment, access to certification schemes and market insertion. A system of incentives⁸⁷ for conserving these practices and the traditional knowledge associated with them, and for generating new market opportunities, will be required of MADR and NPD.
2. **Introduce a mechanism to guarantee Farmers' Rights.** Access to seeds is one of the limits on small farm economies' ability to improve yields. Hybrid seeds violate Farmers' Rights because they cannot be reseeded. The "kilo for kilo" programme adopted as an incentive measure to increase technological conversion has perverse consequences for farmers. The minimum requirement is to promote schemes that support quality seeds available without repurchase. Through a marketing programme for high quality seeds, producers could acquire and store high quality seeds from the rest of the country. The campesinos in cooperatives could also convert themselves into small genetic material businesses, receiving state support in the form of training to produce high quality seeds, and at the same time facilitate participatory research and development for genetic improvements on the farm. Cooperative schemes or seed producers' associations could generate a "kilo for kilo" scheme among themselves, interchanging creole materials for diversification and using seeds to improve the genetic banks. Enforcing entities would be MADR and ICA.

⁸⁷ Balcazar, A's contribution as member of the panel of experts at the first National Workshop of the project: "The structural problems affecting agricultural, and the small farm economy, are the product of an institutional model which produces an economically inefficient productive structure. The state has focused on providing incentives for profit maximization rather than the production of public goods provided by the sector. This has provided incentives for capital intensive production rather than labour-intensive production. However, capital is scarce in this sector, while labour is abundant. This creates a double problem for the small farmers who have little access to credit, and who are affected by the diminishing demand for labour. The state generates incentives for concentration of production, and disincentives for small-scale production, increasing the competitiveness of large-scale agriculture in an artificial way. This generates increased social inequality since the resources are distributed in an inequitable way favouring concentration. Lack of environmental sustainability is due to the problem of large-scale production with an inadequate technological model that results in deterioration of fragile soils, abuse of agricultural chemicals, etc."

6.1.2 Promote production of improved yields and efficient production

1. **Introduce research and development of seeds adapted to tropical and Andean local conditions.** Creole varieties are more adaptable and resistant to pests under local conditions than are imported hybrids. Participatory research should be done to develop quality seeds. There is currently low investment in seed research and development. The USA produces about 1,000 hybrids annually compared to 0.5 per year in Colombia. Small producers in the zones consulted say that they cannot find high yield resistant seed appropriate to their conditions. Two research models have been proposed according to market dynamics. One is a supply model to develop strategic products and technologies. The other is a demand model to respond to rural communities and agro businesses in different regions of the country.⁸⁸ The agencies responsible are MADR, Ministry of Finance, ICA and CENIS.
2. **Improve biotechnological research and development.** The Ministry of Finance with MADR should budget the necessary resources for a long-term research programme for bio-prospecting genetic resources for food and agriculture. The small farm economy could be an integral part of this programme.
3. **Set up a biotechnology programme for small producers.** Small farmers are mainly located in marginal zones. This affects the competitiveness of their production in formal markets. In addition they have been highly influenced by the “green revolution” model which has compromised the sustainability of their productive systems. Replicating programmes like “Participative Innovation with Small Farmers in the Andean Zone and the Caribbean” led by the Corporación PBA could bring solutions. Programmes include phyto improvement, innovation in management of crops and pests, improvements in small farmers’ quality of life, the development of biological inputs, etc. The responsible parties could be MADR, ICA and Colciencias.
4. **Introduce technology for conversion to sustainable systems.** An alternative agricultural model needs to be developed to permit survival of small producers who are less dependent on external factors and more dependent on endogenous factors. Self-management would increase productivity and yields based on factors which actually occur on the majority of plots.⁸⁹ The preliminary summary of the problem is that there is a lack of information on natural resources, soil preparation knowledge and crop management skills.⁹⁰ MAVDT and CARs, in association with the Colombian Farm Society, FENALCE, CORPOICA and other parties, could create an environmental guide for small farmers for their follow-up.
5. **Strengthen agricultural planning in the area of environment and territorial ordering.** Many macro level policy, planning and programme decisions currently ignore environmental criteria. No mechanisms and tools exist to integrate these criteria for productive dynamics with the early stages of sector and territorial planning processes. To begin, sectoral development tendencies and sustainable uses of natural resources must be identified. Then strategic environmental evaluations must be performed. Responsible agencies are MADR, Humboldt Institute, IDEAM, MAVDT and producer associations.

⁸⁸ Forero Jaime. in 1st. National Workshop.

⁸⁹ Miguel et al. Desarrollo de sistemas productivos integrados para economía campesina, CORPOICA Turipana. Consultation of December 19. Available online at: <http://www.turipana.org.co/sip.htm>.

⁹⁰ Corpoica, 2003. Available online at:

http://64.233.187.104/search?q=cache:jSUXuuTiLLsJ:www.corpoica.org.co/sitiorcorpica/planes/maiz/documentos/informes/informe_ejecutivo_2003.htm+%C3%A1reas+ma%C3%ADz+labranza+m%C3%ADnima&hl=es.

6.1.3 Improve agricultural market efficiency

- 1. Promote differentiated markets for organic products, fair trade and non-transgenic crops.** This will help to improve market opportunities for small producers since many products can be certified through this programme. An important niche market exists in Europe. There is currently a market for corn certified as non-transgenic but products must be highly traceable and certified non-contaminated to enter this market. Cooperative schemes and associations can reduce transaction costs, while MADR, MAVDT and CCI can also assist.
- 2. Further research and development for non-food uses of corn.** Currently the market for non-food uses is underdeveloped. Alternatives for food corn include corn glucose adhesives, tannins, corn starch and yeast. Another would be production of biocombustibles such as ethanol or biodiesel as a form of renewable energy and alternative to fossil fuel. MADR, Rural Development Directorate and FINAGRO can drive this initiative.
- 3. Create a national exchange for marketing small farm products.** Marketing for domestic products is weaker compared to imported corn given domestic transaction costs. Goods traded in the National Agricultural Exchange generate profits for large volume producers only. The decentralized functioning of IDEMA should be rescued. Its disappearance created a gap in the market chain of small producers, leaving the field open for intermediaries. An alternative is a decentralized exchange system specializing in small farm products that will lower transaction costs of collection and marketing, and also offer futures trading.
- 4. Value and grow local markets.** There will always be local markets where products are sold for local consumption and prices differ from nation or region-wide markets. One strategy is publicity campaigns to heighten public awareness of locally cultivated corn and initiatives to consume domestic corn should be promoted. MADR and FENALCE should lead the way.

6.1.4 Design a rural development policy mitigating effects on agricultural sectors as a result of FTA

- 1. Design a substitution programme for small farmers.** The liberalization of the 1990s took place without crop substitution and had negative effects on local agriculture. Studies are needed to identify the best crop substitutes on a region-by-region basis. This is a job for MADR and Directorate of Rural Development.
- 2. Develop alternatives in environmental services, rural tourism and agro tourism.** Tourism is the fastest growing global industry and a large employment-generating sector. Tourism has also spread the message of environmental protection. It can be a natural complement to rural income, and an important way to alleviate rural economic suffering hardship due to depressed agricultural prices. MAVDT, CCI, MADR and MCIT should show the way to raise the profile of the region, train small businesses, improve tourism infrastructure, and coordinate with the environmental agencies.
- 3. Build local programmes to conserve diversified cultivation.** Programmes to promote and develop on-farm conservation and diversification of native germplasm as a food security strategy are led by NGOs. The RESA programme for food security should be followed by MADR to promote and conserve native germplasm.

4. Build a productive information system specifying actors and food security. One of the major weaknesses encountered during the IAP project was the poor availability of information about small farmers, rural nutrition, and agro-biodiversity associated with food security. Information tools and systems are insufficient or non-existent.⁹¹ MADR, DANE and FENALCE should perform socioeconomic studies of corn cultivation, build a monitoring system and set down ways to exchange information from studies that have been done, etc.

6.2 Environment and territorial development policy recommendation

Set up a mechanism to control and monitor GMOs. There is no mechanism to control the entrance of GMOs into the country through the poultry and pork production chains. Secure transport for these materials between ports and processing plants also do not exist. If customs authorities were to quarantine all shipments from the USA after the FTA has been signed, Colombia could be sued for raising technical barriers to trade. Article 11.3 of the Biological Security Protocol determines national legislative oversight over entry of GMOs but Article 11.6 encourages developing countries like Colombia to develop the regulatory framework. MAVDT, MADR, ICA and the Customs Bureau should see into this.

6.3 Internal matters recommendation

Set up a mechanism for protection of indigenous communities. Indigenous communities like the Zenúes feel threatened by the entrance of transgenic material. Currently they conserve more than 25 varieties of *creole* corn and have a broad and diverse culinary culture based on this sacred food. They consider themselves to be “the children of the corn” (*hijos del maíz*). As a signatory to the Convention on Biological Diversity and the Cartagena Protocol on Biotechnology Security⁹², Colombia should have a regulatory and control mechanism to balance environmental obligations and obligations under the FTA with the USA.

6.4 Final considerations

This integrated assessment does not end with the delivery of its results, but should be seen as a permanent inter-institutional dynamic to enable a process of continuous improvement to current policies. The Humboldt Institute would like to see wide distribution and discussion of these results among the stakeholders. The Institute will also propose permanent links with the entities who collaborated in the study and who can provide support for the recommendations made above.

At the same time, the Institute will react to the proposals made by the AIA. It will seek to partner FENALCE in joint research projects into corn cultivation. To put the recommendations above in motion will require clear commitment from MADR and its partners. Assistance from international agencies, especially UNEP, will be needed for future evaluations.

⁹¹ Corpoica, 2003. Available online at: http://64.233.187.104/search?q=cache:jSUXuuTiLLsJ:www.corpoica.org.co/sitiocorpoica/planes/maiz/documentos/informes/informe_ejecutivo_2003.htm+%C3%A1reas+ma%C3%ADz+labranza+m%C3%ADnima&hl=es

⁹² Law 740 2002. Cartagena Protocol on Biotechnology Security.

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