



Global Food Security and Agricultural Natural Resources

Role and Views of Argentina, Brazil, Paraguay and Uruguay

EDICIONES DE YEUG



GRUPO DE PAÍSES PRODUCTORES DEL SUR

Contribuyendo a la producción global sustentable de alimentos

Contribuído à produção global sustentável de alimentos

Contributing to the global sustainable food production

SEPTEMBER, 2013

This document has been prepared by GPS, *Grupo de Países Productores del Sur*, made up by non-governmental organizations and leaders from the food and agricultural industry in Argentina, Brazil, Paraguay and Uruguay.

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Unión de Gremios de la Producción



Federation of Industries of the State of São Paulo



Consejo Uruguayo para las Relaciones Internacionales

Institutions that joined:



Marco Polo describes a bridge, stone by stone.

"But which is the stone that supports the bridge?," Kublai Khan asks.

"The bridge is not supported by one stone or another," Marco answers,

"but by the line of the arch that they form."

Kublai Khan remains silent, reflecting. Then he adds:

"Why do you speak to me of the stones? It is only the arch that matters to me."

Polo answers:

"Without stones there is no arch."

Italo Calvino "Invisible Cities"

The four Countries participating in this Project are the stones building up the line of the arch.

Horacio A. M. Sánchez Caballero
Project Leader



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Foreword

This document is the first product of a Regional initiative organized by seven non-public organizations of Argentina, Brazil, Paraguay and Uruguay. It is the result of the work and contributions of a large number of people organized in a complex network, in response to their commitment to participate and contribute in the construction of a world that is capable of producing food for everybody in a sustainable manner.

During the last decade, in part as a consequence of the food crisis the world experienced in 2007 and 2008, there has been growing concern about the ability of the world to meet the increasing food demand at reasonable prices and in a sustainable manner.

These concerns have also raised social and political awareness with respect to the growing economic scarcity of natural resources and the difficult political economic issues that the world will face in the coming years. These concerns have also driven the International Community to propose new mechanisms to increase global governance to improve the efficient and sustainable use of natural resources.

In response to these concerns and proposals, the Argentine Council for International Relations (CARI), together with the Getulio Vargas Foundation (FGV), the Brazilian Agribusiness Association (ABAG) and the Federation of Industries of The State of Sao Paulo (FIESP) in Brazil, the Development in Democracy (DenDe) and Union de Gremios de la Producción (UGP) in Paraguay and the Uruguayan Council for International Relations (CURI) have organized a joint effort to analyze the potential contributions that the four countries can make to the global food supply and to put forward ideas and proposals concerning the major issues that are being considered in the international agenda in the areas of food security and agricultural natural resources.

In addition to the convening Institutions represented by Adalberto Rodríguez Giavarini, José María Lladós and Martin Piñeiro (CARI), Roberto Rodrigues (FGV),

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Luiz Carlos Correa Carvalho and Eduardo Soares de Camargo (ABAG), Antonio Carlos Costa (FIESP), Alberto Acosta Garbarino (DenDe), Héctor Cristaldo (UGP), Sergio Abreu (CURI), a large number of people participate and contribute to this long-range effort organized in a network structure under different organizational mechanisms including a Leaders' Forum in Argentina.

The initiative is chaired by Horacio Sánchez Caballero, with the collaboration of a support team of Luis Bameule, Raúl Fiscalini, Jorge Forteza, Martín Fraguío, Martín Piñeiro, and Eduardo Serantes.

The convening Institutions would like to express their special appreciation to the following persons: Luís Enrique Arrellaga, Juan Balbin, Alejandro Bartolomé, César Belloso, Gerardo Berton, Gastón Bordelois, Mariano Bosch, Miguel Calvo, María Cassarino, Jorge Cazenave, Roberto Codas, Daniel Correa, Rafael Delpech, Jorge dos Santos, Ciro Echesortu, Enrique Elena, Antonio Ezpinosa, Mario Fioretti, Enrique Gobbée, José Gobbée, Gonzalo González Piedras, Miguel Gorelik, Gustavo Grobocopatel, Marcos Guigou, Julio Hang, Alexander Harper, Francisco Iguerabide, Nicolás Jorge, Juan Julianelli, Mohan Kohli, José María Lázara, Juan Linari, Juan Pablo Lohlé, Gustavo López, Juan Llach, José María Lladós, Paula Marra, Francisco Matturro, Alfredo Molinas, Alberto Morelli, Néstor Niell, Ricardo Negri (h), Gustavo Oliverio, Pedro Otegui, Diego Payssé, Félix Peña, Carlos Perez del Castillo, Francisco Perkins, Fernando Petrella, Juan Peyrou, Luiz Antonio Pinazza, Alejandro Preusche, Alejandro Quentín, Álvaro Ramos, Milton Rego, Marcelo Regúnaga, Joaquín Secco García, Agustín Tejeda, Eduardo Trigo, Víctor Trucco, Ismael Turban, Galdós Ugarte, and Ernesto Viglizzo.

The first product of the initiative is this document: "Global Food Security and Agricultural Natural Resources: Role and views of Argentina, Brazil Paraguay and Uruguay". The Document deals with three main subjects: a) it describes the food production capacity of the region, its extraordinary potential, the significant progress made in technological and organizational matters, as well as some of the weaknesses we need to work on; b) the international conditions that need to be attained in order to make this potential a reality; and c) our ideas and proposals in connection with some of the main global governance initiatives that are being

considered in the specialized international fora.

The Document is the result of a collective effort and builds on information and previous studies that were contributed by the participating organizations and individuals. The main author of the paper has been Marcelo Regúnaga with substantive contributions by Martín Piñeiro. Other main contributors are: Eduardo Trigo, Eduardo Serantes, Paula Marra, Gustavo Grobocopatel, Gastón Bordelois; Nicolás Jorge and Agustín Tejeda from INAI; Ricardo Negri (h) from AACREA; César Belloso from AAPRESID.

The draft paper was discussed in a workshop held in São Paulo - Brazil, in July 19th, 2013, involving participants from the four countries as well as experts from international institutions. Participants from Argentina were: Luis Bameule, César Belloso, Jorge Forteza, Martín Fraguío, Francisco Iguerabide, Juan Pablo Lohlé, Paula Marra, Hernán Maurette, Francisco Pini, Martín Piñeiro, Marcelo Regúnaga, Adalberto Rodríguez Giavarini, Rodolfo Rossi, Guillermo Rozenwurcel, Horacio Sánchez Caballero and Ernesto Viglizzo. Participants from Brazil were: Joao de Almeida Sampaio Filho, Gislaine Balbinot, Eduardo Camargo, Luiz Carlos Correa Carvahlo, Antonio Carlos Costa, Mario Sergio Cutait, Benedito Ferreira, Mario Fioretti, Catarina Maria Cristina Gevai Pedrosa, Rafael Kalaki, Christian Lohbauer, Raquel Magossi Rodrigues, Francisco Matturro, Ronaldo Luiz Mendes Araujo, Julio Flavio Neves, Milton Rego, Roberto Rodrigues, Pietro Rodrigues, and Luiz Antonio Pinazza. Participants from Paraguay were: Alberto Acosta Garbarino, Gerardo Berton, Hector Cristaldo, Luis Cubilla, Alfredo Molinas, Miguel Noto, and Ramón Sánchez. Participant from Uruguay was: Carlos Pérez del Castillo. Participants from international institutions were Rob Bailey from Chatham House, Alan J. Bojanic from FAO, Manuel Otero from IICA, Máximo Torero from IFPRI, and Achim Zickler from the University of Bonn - Germany. Michel Petit from FARM Foundation could not attend but sent his comments on Chapter IV. The participants' suggestions were included in the final version of this document.

Finally, the convening Institutions would like to express their sincere appreciation to all those individuals who provided institutional and material support to make this initiative possible.

Summary

Addressing the challenge of food security and natural resources sustainability

During most of the second half of the 20th century, the world enjoyed a structural oversupply of food: demand growth rate was lower than the potential growth of supply. As a result of such scenario, international prices of major commodities declined in real terms; public investment in agricultural infrastructure and in Ag. R&D was limited; restrictions were imposed on some innovations which could have had a high impact on productivity and on the efficient use of land and other resources, limiting the incentives for private R&D. In addition, many leading countries implemented protectionist policies and subsidies that distorted trade. During the 1980s and the 1990s, agricultural production issues involving a more productive and efficient use of natural resources did not receive a high priority in public policies and in the development programs implemented by international organizations. All these factors resulted in low productivity growth rates for major agricultural commodities and in lack of progress in the conservation and better use of natural resources, a situation that will impact on projected food production for future decades, as has been highlighted by FAO, OECD, IFPRI and other international organizations.

By contrast, since the beginning of the 21st century, the world food security scenario has changed entirely. The increase in food demand growth rate, led by emerging countries, and the demand for biofuels based on food products (mainly cereals and oilseeds) exceeded an insufficient food supply growth rate, which resulted in declines in grain and oilseed stocks and in world food price increases, aggravated by high price volatility. Currently, the world is facing a significant challenge in addressing the food and energy needs of a growing population with rising demands. However, the food security situation varies substantially between different regions and countries.

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Most of the dynamism of food demand growth during recent decades has been driven by the developing world; however, production growth rates did not reach the same levels in many developing countries, associated with their resources endowments and production capacities. Addressing sustainable food production growth and self sufficiency in countries facing hunger and food security problems should have a higher priority for international cooperation than Food Aid, because agricultural production significantly contributes to increase income and employment in many developing countries in Africa, Asia and Latin America, where a high percentage of the poor and undernourished population relies on agriculture. For such countries, sustained high domestic food prices (which should be distinguished from volatility and price spikes) provide incentives to invest in infrastructure and to adopt production and conservation technologies that are already available in other regions, which could result in production growth, improved food security and economic growth.

The challenge of achieving world food security and natural resources sustainability has a high priority. The world must start now to produce more food using available natural resources efficiently and sustainably, including a reduction of post-harvest losses and waste and developing a more resilient agriculture to climate change. These purposes will require a careful and integrated approach to the efficient use of land, water and energy, scaling up innovative solutions aimed at increasing productivity, particularly those that foster a more efficient and effective use of natural resources along the value chains.

South America has a proven track record of growth and innovation and could be a critical contributor to addressing the world's growing food needs

The region has contributed significantly to addressing the growing world food needs during the last two decades. Agricultural production per capita in Latin America and the Caribbean (LAC) grew 80% more than the world average during the first decade of the 21st century, 350% more than USA + Canada, and

significantly more than other industrialized countries (Europe, Australia + New Zealand). Regional production, led by Argentina, Brazil, Paraguay and Uruguay (ABPU), grew at higher rates than consumption, and in recent years the region became the largest net food trade exporter. In addition, it has a high growth potential, based on its natural resource endowments and on proven technological and business models innovations.

■ **Natural resources endowment and available human capital.** The region will play a strategic role in global food security during the next decades because production can expand based on the availability of land, water and human capital, and on its potentially high productivity growth. According to a recent World Bank report on potential contributions of LAC to global food security, about 123 million hectares of land that could be suitable for the sustainable expansion of cultivated area is located in Latin America, most in ABPU (land with high agro-ecological potential, that is not forested or protected, and with a population density of less than 25 per hectare). In addition, the LAC region has about one third of total renewable water resources worldwide; on a per capita basis, LAC has the highest water endowment among developing countries, similar to Australia + New Zealand and higher than North America.

■ **Regional production potential and impact on world trade.** The role of ABPU on future world food security is very important because, in addition to the potential area that could be devoted to food production, current productivity is already higher than in other developing countries, its institutional framework is developed and farmers adopt very fast the new technologies that become available in the market, as has been the case during the last two decades. Studies and simulation models developed by INAI on Argentina, Paraguay and Uruguay, and by ICONE-FIESP on Brazil, indicate that ABPU production growth rates projected for the next decade for most agricultural products almost double those projected for the world average in the OECD-FAO Agricultural Outlook 2012-2021. ABPU annual average export growth rate projections for 2021 are substantially higher than total world forecasts in most commodities (oilseeds: 3.1% vs 1.8%; protein meals: 3.9% vs 1.6%; vegetable oils: 5.0% vs 2.1%; meats 5.0% vs 1.4%; sugar 2.5% vs 2.0%; biofuels 18.0% vs 10.9%). In the case of cereals, most of

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the regional production growth will be allocated to meat and dairy production destined to local consumption and exports. It should be noted that regional production and export shares of food products are expected to continue to grow, despite the increase in biofuel production projections; and the region will be the leading world exporter of most the mentioned food commodities, except for some cereals. The region's export leadership is not limited to the products detailed before; this is also the case of many other food products, such as coffee, fruits, juices, sugar, tobacco, and other food preparations.

The region's production systems and business models are economically efficient and environmentally friendly

■ **Competitive and efficient business models.** During the last two decades, the countries of the region have experienced significant organizational reforms and innovations in the agricultural production system. Horizontal and vertical networks have been developed, which improved upstream and downstream linkages and resulted in economies of scale, increasing business efficiency and productivity along the value chains and reducing transaction costs. The new organization of primary production in networks implies a differentiation and specialization process, which resulted in a very efficient system, with different agents involved in "on-farm" production (producers, as well as input and services providers), similarly to what happens in the rest of the world with many dynamic integrated manufacturing industries. This evolution contributed to the creation of a structure of competitive medium-sized agents as services providers, living in small towns, instead of employees of large vertically integrated corporations; such process has been important not only in terms of economies of scale and productivity, but also for local and regional development (emerging local middle class providing agricultural services).

■ **Environmentally friendly production systems.** Another strategic change in the region's agriculture has been the massive implementation of production systems which are environmentally friendly, including the no-till production

strategy associated with crop rotations and sanitation; precision farming; improved seeds, including genes for herbicide, insect- and disease-resistance (which imply a lesser use of agrochemicals per hectare); new chemical molecules in agrochemicals; integrated plague control; intensive use of information and communication technology; satellite-image support; logistic innovations like silo bags; post harvest management; precision nutrition; etc. The no-till strategy (Southern Cone style) integrates a production system that reduces soil erosion and improves rainwater storage in the soil (strategic water management). It is a tool designed to maximize productivity in a sustainable manner, by improving the use of natural resources, minimizing the number of tilling operations, and reducing oil consumption and GHG emissions. The soil is covered by stubble; a carbon management strategy is implemented (fostering carbon sequestration), and a crop fertilization strategy is adopted that is based on a soil nutrition and structuring concept, rather than on the soil fertilization approach. This approach improves the soil biotic load and its sanitary conditions. After several years of implementation of such strategy the soil conditions improve substantially.

The situation of global agricultural natural resources has aggravated some political economy issues related to their ownership and use

■ **New interest in and demand for the long-run control of agricultural land.** The four countries are well endowed in agricultural natural resources, and worldwide interest in the control of such resources is to be expected: a) land-right acquisitions by foreign governments, directly or through state controlled enterprises, has been very limited or non-existent in the four countries. Furthermore, given present legislation on foreign investment in land and the political statements that national governments of the region have made in connection with these issues, it seems quite unlikely that they will occur in the future; b) the figures available on recent land-rights acquisitions by foreign individuals or firms suggest that it is not quantitatively very significant in the region, and given the existing restrictive legislation, it will not increase

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substantially in the future. It is important to note that most foreign investment in land in the region is by firms located in Argentina and Brazil; thus, it may be seen as a regional integration process of primary production, with some minor vertical integration along the production chains.

■ **Concentration in land use.** Land use concentration has occurred in a significant way in the four countries during the last 20 years, mainly as a result of the acquisition of land rights by local individuals and corporations. The result has been a significant decrease in the number of farms or operating units and an increase in the average size of farms. The impact of this process on the efficiency of land use, technical innovation and overall production has been positive: very substantial increases in production and total factor productivity in recent years. However, they also have a number of economic and social consequences, such as rural urban migration and changes in the social structure of rural territories, which are only partially balanced by the growth of middle-class service providers. Governments in the region have developed policies and programs to protect and enhance the economic viability of small farming, and to gain political legitimacy with those constituencies. The issue needs to be carefully considered, focusing on the obvious trade-offs that exist between the greater efficiency and productivity of the large mechanized agribusiness firms which characterize a substantial portion of the production system of the region, and the social advantages of a more balanced agrarian structure, with a much larger share of total production controlled by small holders.

■ **Forest land.** Another important issue has been the use of pasture and forest land for agricultural production. These processes have increased over the last 20 years, especially in the Northern part of Argentina, and more widely in Brazil and Paraguay. Some of them, particularly the improved use of pasture land in the Brazilian Cerrado involving innovations in tropical beef and crop production, have had a positive impact on both types of production. In the case of forests, during the last decade Argentina, Brazil and Paraguay have passed new legislation on deforestation and protected areas, which substantially limited the annual rate of deforestation and contributed to future better conservation and management of natural resources and biodiversity.

Regional views and perspectives: key issues for the international agenda on food security and natural resources sustainability

Argentina, Brazil, Paraguay and Uruguay have a major role to play in future world food security and in natural resources sustainability. In our view, the world needs to address and take appropriate actions in connection with a number of issues that affect production and trade, which are summarized in the following paragraphs:

a. Strengthening world research and development aimed at increasing productivity and at achieving a more efficient and sustainable use of natural resources. World food security and natural agricultural resources sustainability rely very much on a more efficient use of available natural resources. However, during the last decades, public investment intensity in agriculture R&D declined in most countries, and the weakness of public research had a serious impact not only on productivity growth rates, but also on the production of public goods such as a better knowledge on the sustainable use of natural resources. In addition, private sector investment has been very limited in most of the developing countries of Africa, Latin America and Asia, and regulations that are not based on scientific evidence have limited the global private research and use and /or increased the cost of some new technologies, such as GMOs. The result has been the reduction of the potential impact of such developments on increased productivity, on a more efficient use of scarce resources and on a lesser use of herbicides and other pesticides through resistant and tolerant seeds. Lower productivity growth results in a higher requirement of land and other resources to comply with demand growth. The challenge for the coming decades is to produce more food using available natural resources more efficiently and sustainably: producing more using less will result in affordable costs for human consumers. For such purposes, public and private investment in agricultural R&D should be promoted and substantially increased to scale up technical solutions. The role of investments by public national and international organizations in agricultural R&D should receive a high priority because the new challenge

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is more complex; research should reconcile both objectives productivity and sustainability, and develop crops more resilient to climate change. It should be noted that food security and natural resources sustainability issues are global and not limited to small farms; therefore, the attention and priorities given by the CGIAR and a number of other international organizations to world food security issues, which have largely focused in increasing production in poor smallholder farm units in developing countries, should be extended to cover the needs of medium and larger scale farm production systems, such as for example those of ABPU countries, which can make a significant contribution to a more food secure world.

- b. Technical assistance to developing countries, including North-South and South-South cooperation.** Most of total world investment in agriculture R&D is concentrated in industrialized countries. For this reason North-South technical cooperation continues to be a major challenge to improve global food security, as well as to promote a better management of natural resources. A deeper assessment of the best ways to conduct such cooperation should receive more attention, both at private and public level. On the other hand, the ABPU countries have a number of interesting experiences on technical cooperation outside the region, but funding has been limited. It is therefore proposed to increase South-South technical cooperation through additional funds provided by international public sources and from NGO's.
- c. Increasing investment in infrastructure and innovation along the value chain to reduce post-harvest losses and waste.** The world is producing much more food than what is actually consumed. Post-harvest losses and waste represent a high share of primary production, resulting in a much higher demand for natural resources than what is strictly needed. International cooperation must tackle the lack and poor quality of infrastructure along the value chain, including storage capacity, transportation systems and other logistics that are responsible for most of existing losses. Lack of education and knowledge of post-harvest management are also major problems in developing countries. That kind of innovation along the value chain has not received a high priority in the world agriculture research system because it is

less relevant for developed countries; therefore, it is an urgent need to increase R&D with such an approach.

d. Rational expansion of new agricultural areas. Unlike what happens in many industrialized countries and in some developing countries, where agriculture is very intensive in capital and in input use, production systems in ABPU countries are less intensive and more environmentally friendly. While in other regions the challenge is how to reduce the excessive use of inputs that damage the soil, the ground water and the environment, the production systems developed in the region during the last two decades have shown that there are alternatives to continue increasing production while improving soil conditions (the “no-till” integrated strategy described above). There are no single solutions to world food security and the sustainable use of resources; a rational expansion of cultivated area in some regions could be part of the solution. This is the case of ABPU countries.

e. Removal of trade barriers. The danger of new non-tariff barriers, such as environmental, labor and other private standards. Global food security and sustainable production could be improved substantially based on food supply growth in regions and countries that have a high potential for sustainable production without subsidies and other trade distortions. However, trade flows have been limited by different kind of regulations and barriers to trade. The countries of the region are seriously concerned about the lack of progress in the Doha Round trade negotiations and believe in the urgent need to find solutions within the framework of the WTO. New non-tariff barriers, such as environmental, labor and other private standards, are creating additional production and trading costs, which result in higher food prices for consumers and lower incentives for producers. They are limiting efficient production and trade growth, and they also create market uncertainties; in many cases, they increase volatility in international prices. Improved trade conditions through the removal or reduction of trade barriers –both on exports and on imports– should be a target to balance food supply shortages and for a better use of natural resources. A smooth and efficient trading system could play a strategic role in tackling long term food supply and demand imbalances, and also in

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reducing the impact of unexpected short-term events affecting food security in some countries and regions.

f. Sound economic policies in developing countries are key factors to promote investment and production growth. The lack of such policies in some developing countries with abundant natural resources is limiting domestic economic growth and their potential contributions to global food security.

g. Improving pricing mechanisms in spot and futures markets. In many developing countries the poor performance of domestic spot markets and the lack of futures markets create serious limitations for local food production development and for sub-regional food security. The lack of good information systems and the low investment in infrastructure (transport, storage and other logistics) are important barriers to improving the pricing mechanisms and to developing domestic spot and forward agricultural markets. Therefore, while we expect an improved performance of leading countries' futures markets (used as world reference prices), which have recently been assessed by the regulatory agencies of the respective countries, it should be noted that it is in the interest of developing countries to develop transparent and efficient local spot, forward and futures markets. International technical and financial assistance aimed at promoting forward and futures market development and at increasing investment in infrastructure should receive a high priority in the world food security agenda.

h. Biofuel production in the region. Biofuel production and consumption has been a growing priority in Argentina, Brazil and Paraguay in connection with economic, energy supply and environment driving forces. There are several factors supporting the increase of biofuel production and consumption in the region: i) Projected total production growth rates of the main crops in the region for the next decade are substantially higher than regional and global food demand growth rates; ii) the social and economic contributions that such additional production could provide to regional development and job creation, including energy supplies (biofuels and biogas), and beef / dairy production in areas in which such production is currently not sufficient to supply local

demand; iii) the development of alternative energy markets making it possible to diversify total food demand and the risks associated with agricultural production and exports; iv) the reduction of excessive dependence on imported fossil fuels, and the opportunity to diversify the energy supply matrix through local biofuel production; v) the positive impact on the environment associated with the substitution of fossil fuels with the biofuels produced in the region, based on low input production systems (substantially different from those implemented in the European Union and the USA).

Global perspective: addressing food security and agricultural natural resources governance issues

Fears of resource scarcity are not new, but recent food price surges have re-kindled the discussion about the world's capacity to feed itself with new intensity and urgency. The Malthusian trap image is at the forefront once again. These images and the pressing political problems that have emerged, such as food insecurity and related political unrest in some poor countries, have resulted in a number of initiatives and proposals that seek to address the urgent need for more and better global governance mechanisms that could promote global food security while preserving resources for future generations through the environmentally responsible and sustainable use thereof. The collective production capacity of the four countries, Argentina, Brazil, Paraguay and Uruguay, is an important part of any possible global solution. For these reasons, their views on the existing initiatives on the international agenda should be given serious consideration. These views are discussed in the following paragraphs.

■ **Food Security.** Two main global governance mechanisms have been created which we find useful: the Committee of Food Security (CFS) and the High Level Task Force (HLTF). Both provide a basis for the development of coordinated actions at the global level and represent an important opportunity. However, it is suggested that, in order to attain its potential the CFS needs to fully involve high-level decision making officials in charge of food security issues from the respective

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countries; governance requires decision making and unless those who attend the CFS have this authority, nothing will happen. Private sector participation should be promoted, and the number and importance of participating NGOs should be revisited. In addition, in recent years the nutrition component has gained special attention, and one expression of this attention is the Scaling Up Nutrition (SUN) movement created under the aegis of the UN Secretary General. The magnitude of the effort provides SUN with some elements of a global governance mechanism.

■ **Very high volatility of food prices.** The recently increased and very high price volatility of major food commodities has created great concern and a number of proposals have emerged. Three of them are especially relevant: i) **AMIS**, which is an information system on food production, stocks, commercial policies and food security conditions and has proved to be an important creation. Compliance is still a major issue to be resolved. The correct functioning of AMIS is in the best interest of all concerned partners and the GPS initiative supports its development; ii) **Enhanced regulation of commodity futures markets:** individual countries where commodity futures markets operate have taken some additional regulatory measures, but collective action at the global level seems to be unfeasible; iii) **International reserve initiatives:** there is general agreement that the creation of stocks with the purpose of regulating international price volatility is expensive to maintain and has not been an effective solution to resolve global price volatility and food security in previous decades. It is also difficult to find a practical and feasible solution based on virtual stocks held by exporting countries. It seems that the existing options on food stocks (physical or virtual) should be restricted to domestic stocks and, in some cases, small regional stocks to face emergencies, especially in situations where poor physical infrastructure makes the rapid distribution of food in emergency situations difficult. The financing of such national and regional stocks could be part of the international strategy to reduce hunger and to improve short-term food security problems in low income countries. The creation of small regional stocks to support rapid response actions when food shortages appear and threaten the food security of poor social sectors is particularly relevant to ABPU countries. There is a standing offer by the Government of China to contribute funds to such an initiative. The governments of the region have not taken an official position on this matter and need to do so.

■ Formation of a specialized forum on agricultural natural resources.

A proposal for a new global governance mechanism has been advanced by a Chatham House report. The main idea has been to create a new association of the world's principal resource producing and consuming countries, where governments and stakeholders could address and agree on proposals for the sustainable use of natural resources. In our view the creation of such a Forum is unnecessary; we believe that the efficient and sustainable use of natural resources is very much a sovereign decision of the countries that have them. In addition, other forums such as the G20 and the CFS already exist and have the capacity to delve into these issues. The CFS has been identified as the highest political forum to deal with world food security issues, and it should coordinate all existing world food security initiatives and provide leadership towards a more food secure world. It is our view that the CFS should prepare an annual report on the 'State of the World's Agricultural Resources', and to launch an international resources data bank to standardize the collection and sharing of data on resource endowments, stocks, production and trade figures in a transparent manner, with a view to increasing the capacity of governments, civil society and local communities to monitor the use of natural resource at global and local level. In considering the need for a stronger collective action for the efficient and sustainable use of agricultural natural resources, the countries of the Region make a commitment to work within the GPS initiative to promote our views and needs in the international arena. These actions could be a first step in the construction of a wider coalition.

■ Foreign investments in agricultural land and agricultural production.

Investment in land by governments outside the region has not been a significant activity. However, there is considerable evidence that in other regions -mainly in Africa- there are investments in land associated with large agricultural production projects, where the benefits for the recipient countries and the local communities have not been evident. These situations suggest that there is the danger of a potential problem emerging and that there is a need for a mechanism to allow transparency and global governance in connection with foreign land acquisition projects. A first step has been taken with the Voluntary Guidelines for Land Tenure, approved last year by the Committee of Food Security (CFS). But guidelines for land acquisitions by foreign governments are still lacking.

Summary

■ **Innovation and international technology transfer to less developed countries.** The international transfer of available technology to the developing world is determined, to a large extent, by the actions of the private sector that uses intellectual property rights to protect its innovations from unauthorized use, and charges royalties to recover the cost of investment and obtain earnings for its work. The collection of those royalties limits access to innovations by poor farmers in less developed countries, where no institutional and technological base exists for the appropriate protection of intellectual property rights. The pressing need for a global increase in food production calls for collective action aimed at accelerating access to and use of technology in less developed countries that have a significant endowment of natural resources. One possibility is the creation of an International Forum organized jointly by FAO, CGIAR, WTO and WIPO, where governments and the private sector could evaluate, negotiate and agree on mechanisms to obtain a more complete and effective use of innovation opportunities in less developed countries.

■ **Private Standards.** In recent years trading companies and retail supermarkets have started to apply specific quality and/or safety requirements that have not been negotiated by governments within the context of existing multilateral or bilateral trade agreements. Most of these private standards are unilateral decisions and represent a new challenge for exporting countries; they became new non-tariff barriers limiting trade and increasing food costs without generally accepted scientific support. This issue needs to be considered at the multilateral level and should be included as a special matter in the WTO.

■ **Elimination of perverse subsidies.** Some production subsidies not only distort prices and markets, but have a perverse environmental impact, by promoting excessive use of natural resources and inputs. In the long run, these subsidies will have a negative effect on the global productivity and sustainability of agriculture.

■ **Biofuel production and consumption in the region.** ABPU countries consider production of biofuels a legitimate economic activity that can have a favorable impact on rural development and employment and on the trade balance of energy-importing countries, as long as biofuel production and trade is

governed by free market rules. As regards regulatory proposals, **ABPU** countries do recognize that: i) the growing importance of biofuel production and its close association and interrelation with food markets and prices makes it necessary to closely monitor market performance; ii) clear global agreements need to be established with respect to statutory frameworks that regulate their mandatory use in regular fuels; and iii) the need to impose limitations on production and export subsidies. However, it seems that no special global governance mechanism is necessary, and that existing institutions should assume the responsibility for implementing these three items.

I. Introduction



I. Introduction

During the last 15 years, the world has witnessed unusual economic growth and the emergence of an expanding middle class in many countries of the developing world. One major consequence of the global increase in purchasing power is the growth in the demand for food and for other agricultural products, including bio-fuels and other non-food uses of agricultural products. These consumption increases have made evident a growing demand for natural resources including energy, minerals and agricultural natural resources (such as arable land, water and forests), and have brought back the specter of resource scarcity and food insecurity. Furthermore, the fundamentals that have led to the present situation are most likely to remain in place for the next decade, or for an even longer period. Fears of food insecurity and resource scarcity are not new, but recent food price surges brought back with new intensity and urgency the discussion about the world's capacity to feed itself in the long term. The Malthusian trap image has come back to the forefront. These issues have raised the importance of agriculture on the international agenda, and the pressing political problems that have emerged have resulted in a number of initiatives and proposals that attempt to address the urgent need for more and better global governance mechanisms to promote global food security while preserving natural agricultural resources for future generations.

The food security outlook varies substantially in different regions. Most of the dynamism of food demand growth in recent decades has been driven by developing countries; however, production growth rates have not reached the necessary levels in some of these regions and have created a global imbalance.

South America has a proven track record of growth and innovation, and could be a critical contributor to addressing the growing world food needs. The region has already contributed significantly to addressing the growing world food demand during the last two decades, increasing production at an annual rate that doubles

I. Introduction

the respective world average, based on its resource endowments and on proven and sustainable technological and business model innovations.

The present and future importance of Argentina, Brazil, Paraguay and Uruguay in the world supply of agricultural commodities highlights the relevance of regional views and perspectives in connection with the key issues on the international agenda.

The purpose of this document is to analyze the potential contributions that the four countries can make to the global food supply, and to share the views of the seven convening non-governmental institutions from the four countries on existing initiatives on the international agenda that seek to improve global governance.

II. World Food Security: the Challenges Ahead

The world is facing a significant challenge in addressing the food needs of a growing population with rising demands.



II. World Food Security: the Challenges Ahead

1. The international food security scenario has changed substantially, from a structural oversupply situation during the 20th century to short-term food shortages and uncertainties about food security for the next decades. During most of the second half of the 20th century, the world enjoyed a structural oversupply of food: the rate of growth of demand was lower than the potential growth of supply, which was based on large productivity increases associated with innovations in major food commodities, and on additional land and other resources devoted to production. As a result of such scenario, world prices of major commodities declined in real terms.
2. In part as a result of these structural conditions of oversupply, many leading countries implemented protectionist policies and subsidies which distorted trade; there was a decline in public investment in agricultural infrastructure and in Ag. R&D; restrictions on some innovations which could have had a potentially high impact on productivity and efficiency in the use of land and other resources (such as some biotech seeds) were imposed, limiting the incentives for private R&D. In brief, during the 1980s and the 1990s, agricultural production issues involving a more productive and efficient use of natural resources did not receive a high priority in public policies and in the development programs implemented by international organizations (such as the World Bank, the IADB, and others). All these factors resulted in lower productivity growth rates of major agricultural commodities and in lack of progress in the conservation and better use of natural resources, a situation that will impact on food production projected for future decades, as has been highlighted by FAO, OECD, IFPRI and other international organizations.
3. By contrast, since the beginning of the 21st century, the food security scenario has radically changed. The increase in the food demand growth

II. World Food Security: the Challenges Ahead

rate, and the emerging demand for biofuels based on food products (mainly cereals and oilseeds) faced an insufficient food supply growth rate, which resulted in declines of grain and oilseed stocks and in increases in world food prices. In addition to the above-mentioned medium and long-term trends, during recent years, the tight supply and demand situation has been affected by short-term production shortages, associated with unexpected weather events, which resulted in price spikes and high food price volatility, affecting the social and economic environment of low income, net food importing countries. Such situation had serious implications on poor and hungry people in less developed countries, who could not adjust to price spikes and rapid shifts in food supply conditions.

4. Most specialized sources project a high growth rate for food products and by-products demand for the next decades, associated with: a) a relatively high global economic growth rate, particularly driven by the main emerging countries, which have low per capita consumption rates of edible oils, meats and dairy products; b) the change in consumption patterns associated with emerging countries' urbanization processes, which are increasing demand for the above-mentioned food products; c) the Euro and some Asian currencies are expected to continue at high levels vis-à-vis the US Dollar when compared with the prevailing exchange rates during the 1990s; d) despite the fact that average world population growth rates are projected to decline during the coming decades, the higher rates will continue in some developing countries, which will be the driving force of food demand growth; e) the sharp increase in oil prices¹ and other strategic and environmental concerns related to the use of fossil fuels promoted the use of biofuels.
5. Biofuel demand has grown dramatically during last decade, and it is projected to continue growing during the next decade², associated with public policies aimed at reducing the impact of fossil fuels on global

1 Such situation could eventually change if the supply of shale oil and gas at competitive prices enters into the market in the medium term. But the date when this could happen is still uncertain.

2 OECD-FAO Agricultural Outlook 2012-2021; USDA Baseline Projections 2013-2022; and other sources.

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warming and at limiting the strategic dependence on fossil fuels in some of the major economies (such as the US, the European Union and Brazil). Recently developed technologies allow the production of biodiesel, jet-fuel and other fuels from sugars and biomasses. However, it seems that second-generation biofuels will not be in the market at competitive prices in the short term, and their production during the next decade will thus be based on agricultural products, resulting in higher growth rates of total demand for such products. Billions of dollars are being invested in several parts of the world towards these technologies.

6. At the same time, the world is facing restrictions on the growth rates of food supply, associated with the following factors: a) productivity growth rate projections for the next decade are lower than those of previous decades³, and they are lower than projected growth rates of total demand⁴; b) global warming concerns, scarcity and degradation of natural resources, as well as competition for land and water for non-agricultural purposes are imposing growing restrictions on the current use of such resources and on the potential increase of land and water devoted to food production in many regions, particularly in Europe, Asia and North America⁵; c) most of the world's best arable land is already under cultivation, and the lack of appropriate R&D aimed at improving efficiency in the use of natural resources and at producing under biotic and a-biotic restrictions, poses limits to future sustainable expansion to some new areas in some countries which could be available for food production; d) during the last two decades, most leading public and private national and international organizations have invested very little in R&D to reduce post-harvest losses along the value chains and in improving the efficient use of natural resources; e) severe deficiencies in infrastructure,

3 It should be noted that such low growth rates projected nowadays are influenced by insufficient R&D in the last two decades, when there was an oversupply scenario, and by restrictions not based on scientific evidence on some innovations, such as biotechnologies.

4 Actually, such imbalance should result in high prices to reach a new balance.

5 This is not the case in South America, where there is abundant availability of land and water that could be used to increase production in future decades.

II. World Food Security: the Challenges Ahead

in commercial structures and in technical and financial support in many developing countries, particularly in Africa, limit local production growth in areas with high potential; f) trade barriers limited production growth in many developing countries; g) difficulties created by some environmental laws that restrict the use of productive areas in many countries; and h) increasing restrictions associated with lack of labor availability and high costs due to the enforcement of labor laws and regulations in several producing countries.

7. Under current circumstances, the outlook for food supply and demand for the next decades poses many uncertainties about future global food security and the sustainability of natural resources. However, the food security situation varies substantially between different regions and countries, depending on their resource endowments, production systems, economic development and culture, as well as on changes in their food consumption patterns associated with their growing per capita income.
8. Most of the countries with alarming hunger scores are located in Sub-Saharan Africa and South Asia. According to 2011 IFPRI Global Hunger Index (GHI) estimates, twenty six countries still had hunger levels that were alarming or extremely alarming. The countries with extremely alarming GHI scores in the 2011 report were located in Sub-Saharan Africa: Burundi, Chad, the Democratic Republic of Congo and Eritrea. The 2012 GHI estimates show that the number of countries with extremely alarming or alarming levels of hunger declined to twenty, and were located in Sub-Saharan Africa, South Asia and in The Caribbean (Haiti). The last report mentions that global GHI estimates declined 26% from 1990 to 2012, from an average percentage of 19.7 to 14.7. This information is consistent with a 2011 FAO report, which mentions that the share of undernourished people declined between the mid 1990s and 2006-2008, but the absolute number of undernourished people increased⁶.
9. It is interesting to highlight that the above-mentioned improvement in the world global hunger situation occurred in a period during which world

⁶ The GHI and the FAO estimates of the share of undernourished are relative indexes.

II. World Food Security: the Challenges Ahead

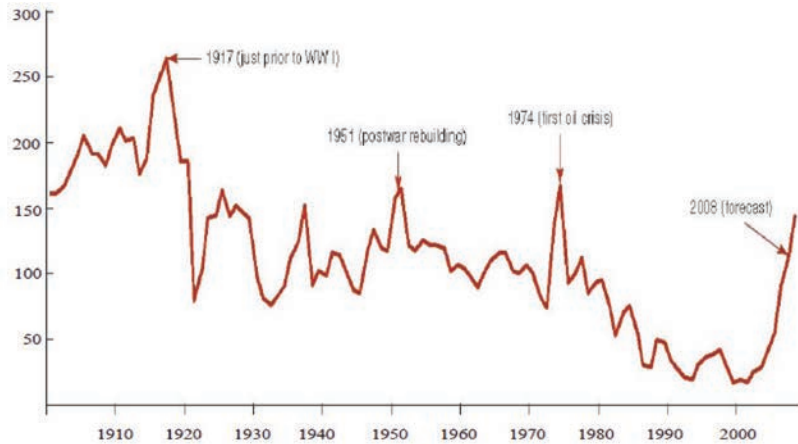
food prices increased, and when global food security uncertainties grew⁷. However, despite decades of effort and rhetoric, the world has failed to eradicate hunger and to reach the Millennium Goals, particularly in some less developed regions. Addressing sustainable food production growth and self sufficiency in countries facing alarming hunger problems should have a high priority for international cooperation, more than food aid, because agricultural production could also be an important way of improving income and employment in less developed countries. Actually, a high percentage of the poor and undernourished people in many developing countries in Africa, Asia and Latin America rely on agriculture. Therefore, it is essential to increase and diversify global productivity and production, in order to raise the number of developing countries that increase their food self sufficiency and improve the management of their natural resources with low-input sustainable technologies implemented in other regions.

10. For such countries, sustained high domestic food prices provide incentives to invest in infrastructure and to adopt production and conservation technologies that are already available in other regions, such as Argentina, Brazil, Paraguay and Uruguay, which could result in production growth, improved food security and economic growth. Low food prices during the 1980s and 1990s and food aid have limited the long-term agricultural production growth strategy of many developing countries. Therefore, it is important to distinguish between high prices and extremely high volatility: the high average prices seen during the first decade of the 21st century create incentives to invest in R&D and to adopt technology, including practices involving sustainable and more efficient use of resources (such as no till, drip irrigation, etc.), while price spikes and extremely high volatility have a negative impact on urban and as well as on rural population. In any case, it should be noted that current prices in constant terms are similar to those registered in previous peaks several decades ago (Figure 1).

7 Because hunger depends more on income distribution than on the level of world food prices and the global food security situation.

II. World Food Security: the Challenges Ahead

Figure 1. Non-energy commodity prices in constant terms
(index 1977-79 = 100)



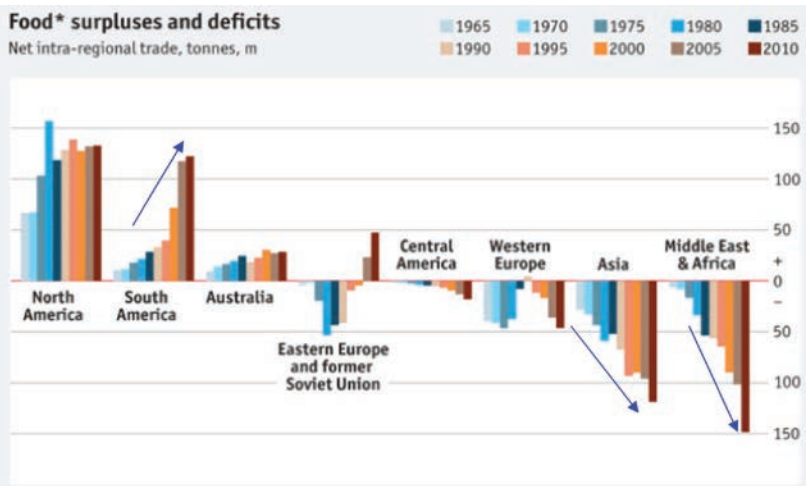
Source: A draft report by the FAO –HLPE project team– June 8, 2011

- 11.** The food security challenge is clear: sustainably feeding 3 billion additional middle class consumers expected to be in the global economy, involving people in emerging countries with higher consumption patterns than those currently prevailing in such countries. Such challenge implies that it is an absolute must that we start now to produce more food using the available resources efficiently; and it is also strategic to use harvests better, reducing losses and waste. These purposes will require a careful and integrated approach to the use of land, water and energy, scaling up innovative solutions to increase productivity, particularly those that foster more efficient and effective use of natural resources along all the value chain. High food prices will contribute substantially to such purposes. They will also require a sound macroeconomic and institutional environment to promote investment, social development and the efficient use of natural resources.

II. World Food Security: the Challenges Ahead

12. Most of the dynamism of food demand growth during recent decades has been driven by the developing world; however, production growth rates did not reach the same levels in many of such countries. Figure 2 shows the evolution of the main net food exporters and importers. During the last two decades, South America has emerged as the most dynamic exporting region, and Asia, Africa and Middle East have been the driving importing areas. Despite the fact that agriculture and food production growth rates in Asia and Africa were very high during the last two decades, they were not sufficient to meet their dramatic consumption growth rates.

Figure 2. Food surpluses and deficits in selected regions. 1965-2010
(million tons)



Source: *The Economist*, May 2012.

Note: *Cereals, oilseeds, meals, edible oils, feed equivalents of meats.

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13. Trade flows have already played a relevant role in balancing food supply deficits. However, it should be highlighted that improved trade conditions through the elimination or substantial reduction of trade barriers –both on exports and on imports- should be a target, to balance food supply shortages and for a better use of natural resources. A smooth and efficient trading system could play a strategic role to tackle long-term food supply and demand imbalances, and also to reduce the impact of unexpected short-term events affecting food security in some countries / regions.

III. The International Role of Argentina, Brazil, Paraguay and Uruguay



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III.1. Review of past performance

14. South America has a proven track record of growth and innovation and could be a critical contributor to addressing growing world food needs. The region has already contributed significantly during the last two decades, based on its resource endowments and on proven technological and business model innovations. Regional production grew at higher rates than regional consumption, and in recent years, South America became the largest net food trade exporter. Table 1 shows the per capita agriculture production growth during the last five decades, highlighting the significant increases seen in Latin America and the Caribbean (LAC) during the 1990s and the first decade of the 21st century¹. LAC grew 80% more than the world average during the first decade of the 21st century, 350% more than USA + Canada, and significantly more than other industrialized regions (Europe, Australia + New Zealand). It should be noted that population growth during the last two decades has been also higher in LAC than in the other regions mentioned above; accordingly, information on a per capita basis is more relevant in terms of total production.

1 It should be noted that, within de LAC region, the Southern Cone is the leading area, while the Andean and the Caribbean countries did not grow significantly in per capita terms during recent decades.

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Table 1. Total agriculture per capita growth in selected regions. 1960s to 2000s
(average annual per capita growth rate during each decade)

Regions	1960s	1970s	1980s	1990s	2000s
World	0.6	0.6	0.6	0.8	1.0
Latin America-Caribbean	0.4	0.7	0.4	1.5	1.8
USA + Canada	0.8	1.7	0.0	1.3	0.4
European Union	1.1	1.8	0.4	-0.2	-0.7
Australia + New Zealand	1.4	0.7	-0.4	1.9	-1.3
Asia	0.9	0.8	2.0	2.5	1.8
Africa	0.7	-1.2	0.1	0.8	0.6

Source: Diaz Bonilla, E. et al. (2012) with FAOSTAT data.

15. Table 2 shows that LAC also grew very fast in per capita food production during the last two decades, adding value and quality to agriculture production. And the region could be a significant contributor to food demand growth in other regions of the world during coming decades. However, it should be highlighted that tariff escalation along the value chain and other non-trade barriers imposed by many importing countries limited the increase of regional food product's exports.

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Table 2. Total food per capita growth in selected regions, 1960s to 2000s
(average annual per capita growth rate during each decade)

Regions	1960s	1970s	1980s	1990s	2000s
World	0.7	0.6	0.6	0.9	1.1
Latin America-Caribbean	0.8	0.8	0.6	1.7	1.8
USA + Canada	1.1	1.7	0.1	1.3	0.4
European Union	1.2	1.8	0.4	-0.2	-0.6
Australia + New Zealand	1.5	1.2	-0.7	2.3	-0.9
Asia	0.8	0.9	2.0	2.6	1.8
Africa	0.5	-1.0	0.2	0.9	0.8

Source: Diaz Bonilla, E. et al. (2012) with FAOSTAT data.

III.2. Natural resources endowment and available human capital

16. South America will play a strategic role in global food security during the next decades because production can continue to grow based on abundant land and water availabilities, on a well-developed institutional framework, and on potential productivity increases associated with innovations which could be rapidly adopted, particularly in Argentina, Brazil, Paraguay and Uruguay, as has been the case during the last two decades. FAO estimates of potential increase in arable land during future decades show that Latin America is the region with highest potential growth, followed by Sub-Saharan Africa (Figure 3).

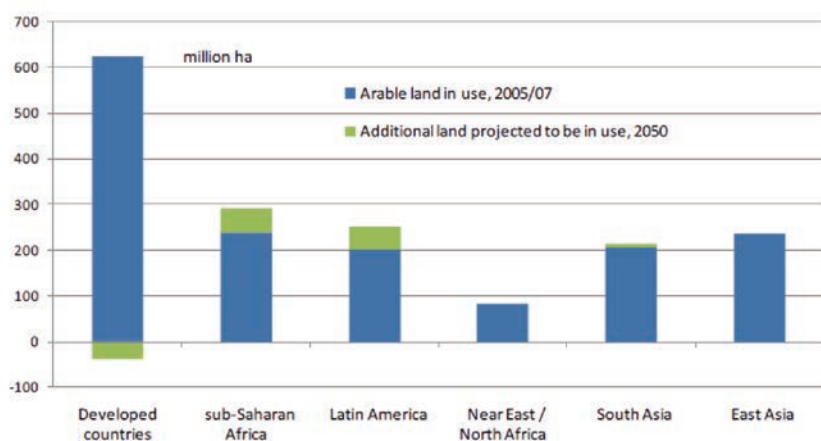
17. According to a recent World Bank report on LAC potential contributions to food security, about 28 percent (123 million hectares) of total land worldwide² that could be suitable for the sustainable expansion of cultivated area (land

2 Of the approximately 446 million hectares worldwide, according to the World Bank report using FAO data. World Bank, LAC units. "High Food Prices. LAC Responses to a New Normal". 2012.

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with high agro-ecological potential that is not forested or protected, and with a population density of less than 25 per hectare) is located in Latin America, more than in any other region except Africa (which has 45 percent, but with lower productivity and more restrictions). LAC's potential is even more significant if accessibility is included in the equation: the region has 36 percent of the 263 million hectares of land suitable for expansion worldwide that is within 6 hours of travel time of the closest market.

Figure 3. Additional arable land which could be in use in 2050 in selected regions
(million ha)

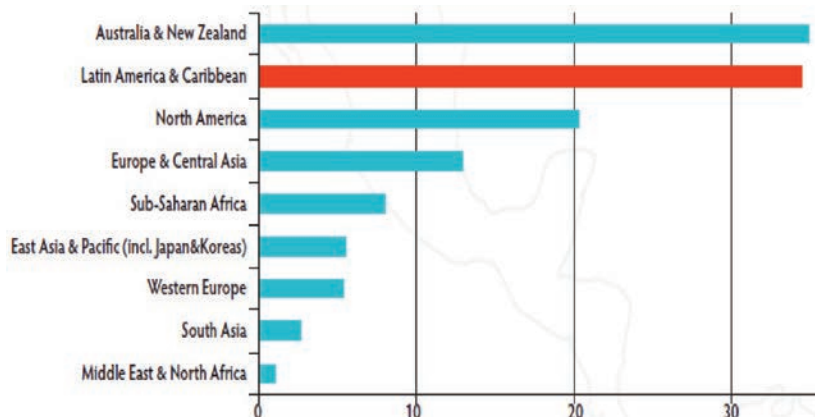


Source: Van der Mensbrugghe, D. FAO. IADB and CIAT Seminar, March 2012.

18. In addition, the LAC region has about one third of total renewable water resources worldwide. On a per capita basis, LAC has the highest renewable water endowment among developing countries, similar to Australia + New Zealand and higher than North America (Figure 4).

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Figure 4. Annual renewable water resources per capita (thousand cubic meters per year)



Source: World Bank, LAC units. "High Food Prices. LAC Responses to a New Normal". 2012.

19. The role of South America in future world food security is very important because, in addition to the potential area that could be devoted to food production, current productivity is already higher than in Africa and other developing countries which also have additional available land, and because farmers adopt very fast the new technologies available in the market. The regions' potential for increasing production is associated with its relatively high levels of technology and human capital, as well as with its institutional framework. This places LAC, and particularly ABPU, in a very good position not only to increase production in the region, but also to transfer knowledge to other regions, notably Africa.
20. Perhaps the leader in progress in production technology is Brazil, where technology developed mainly by the public research institute EMBRAPA, and rapidly adopted by farmers, transformed the Cerrado (a Savannah-like biome) into a highly productive area, through improved crop varieties and

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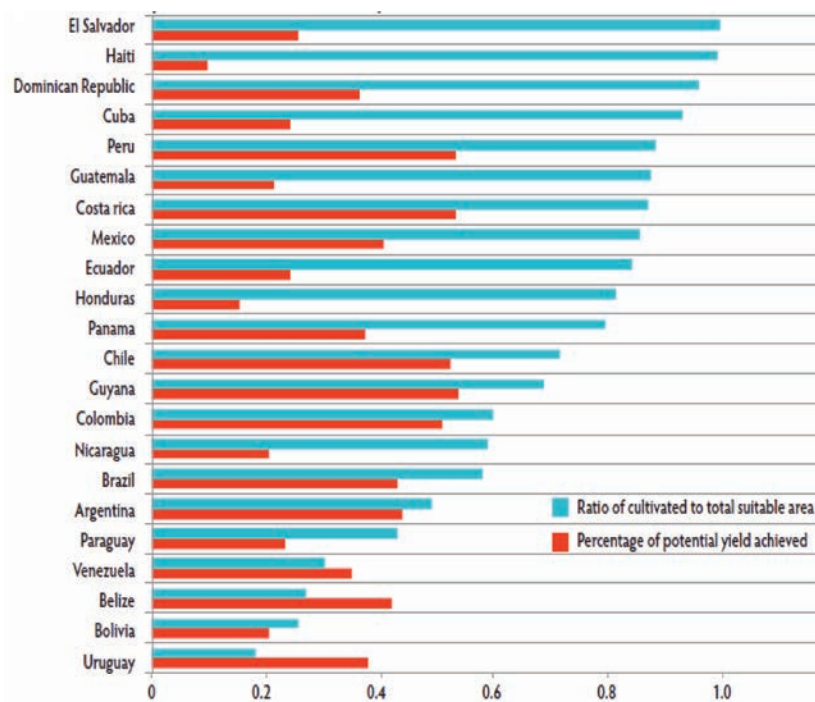
environmentally-friendly soil management practices (e.g., no-tillage). Similar comments could be mentioned concerning the development of the new business model for crop production in Argentina implemented during the last two decades, including not only sustainable production systems (rotations, no-till practices, improved seeds, reduced use of chemicals, etc.), but also organizational innovations based on networks which improved efficiencies along the value chains.

21. ABPU countries can scale up production, both by increasing the area being farmed in environmentally sustainable ways, and by improving productivity. The LAC countries with the greatest potential can be grouped broadly into two categories: i) those with a relatively high percentage of suitable land that is currently uncultivated, particularly those with a high ratio of land / rural inhabitant: this is the case of Argentina, Brazil, and Paraguay³, which could expand production increasing productivity and bringing land into production in a sustainable way (avoiding deforestation and destruction of biodiversity, over-exploitation of water resources, and other environmentally-destructive practices); ii) those with a large gap between current yields and the level that might be attainable with better production technology which could raise productivity per hectare: this is the case of Ecuador, Bolivia, and some countries in Central America. Figure 5 shows the potential growth in selected LAC countries, based on both alternatives (land expansion and productivity increases by reducing the yields' gaps). It should be noted the large potential of Argentina, Brazil, Paraguay and Uruguay in both growth options because most of the additional land availability is located in such countries when measured in absolute terms.

3 In the case of Uruguay, crop expansion could result from land currently devoted to livestock production.

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Figure 5. Land availability and yield gaps in selected LAC countries (ratios 1=100%)

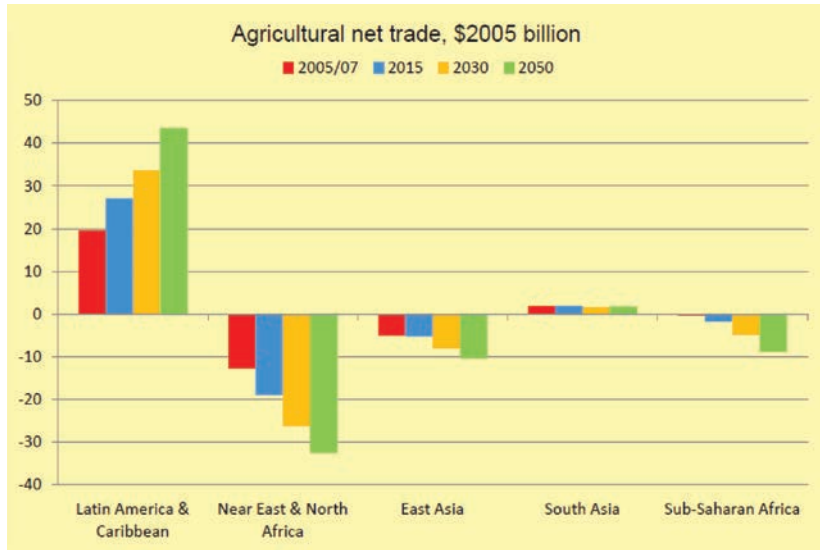


Source: World Bank, LAC units. "High Food Prices. LAC Responses to a New Normal". 2012. Based on Deininger, K. et. al. "Rising Global Interest in Farmland. Can it Yield Sustainable and Equitable Benefits?" Washington DC, World Bank. 2011.

22. Figure 6 shows the strategic importance of Latin America in future global food trade, associated with the high growth potential in cultivated area and in yields. This is the case of Brazil, Argentina, Paraguay and Uruguay. Therefore, a better understanding of the realities and needs of this region to achieve such purposes should receive a high priority.

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Figure 6. Net agricultural trade forecasts in selected regions (constant 2005 billion US dollars)



Source: Van der Mensbrugghe, D. FAO. IADB and CIAT Seminar, March 2012.

III.3. Production projections and impact on world trade

23. Looking forward, ABPU have the resources and the capabilities to confirm their role as the most dynamic foodstuff and processed food supplier of the world. The following projections for potential production growth confirm this outlook.
24. Based on studies conducted by INAI on Argentina, Paraguay and Uruguay, and by ICONE-FIESP on Brazil, simulation models were developed for production

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and trade for the countries of the region⁴. Table 3 includes the baseline projections for selected food products for the group of four countries during the 2011-2021⁵ period and the respective annual growth rates for the main products, as they have been specified in the OECD-FAO Agricultural Outlook.

Table 3. Baseline production projections for ABPU. 2011-2021

(million tons; annual growth in %)

Products*	2011 A (million ton)	2021 B (million ton)	Total growth B - A (million ton)	Annual growth 2011-2021 (%)**
Cereals	141.18	184.79	43.61	2.7%
Oilseeds	126.63	183.76	57.13	3.7%
Total grains	267.81	368.55	100.74	3.3%
Protein meals	58.32	85.02	26.70	3.8%
Vegetable oils	15.65	22.63	6.98	3.7%
Meats	31.70	40.32	8.62	2.4%
Sugar	38.76	51.27	12.51	2.8%
Cotton	2.29	2.69	0.40	1.7%
Biofuels	22.75	50.10	27.35	8.2%

Source: Data from INAI, "Escenario continuación al 2022-23"; FIESP-ICONE "Outlook Brasil 2022".

Data from CAPECO-PY, SENACSA, CADELPA and CAP for Paraguay.

*Notes: * Products as specified in OECD-FAO Agricultural Outlook. Total grains include cereals and oilseeds. Meats include beef, pork and poultry. Biofuels include ethanol and biodiesel. ** Cumulative annual growth rate.*

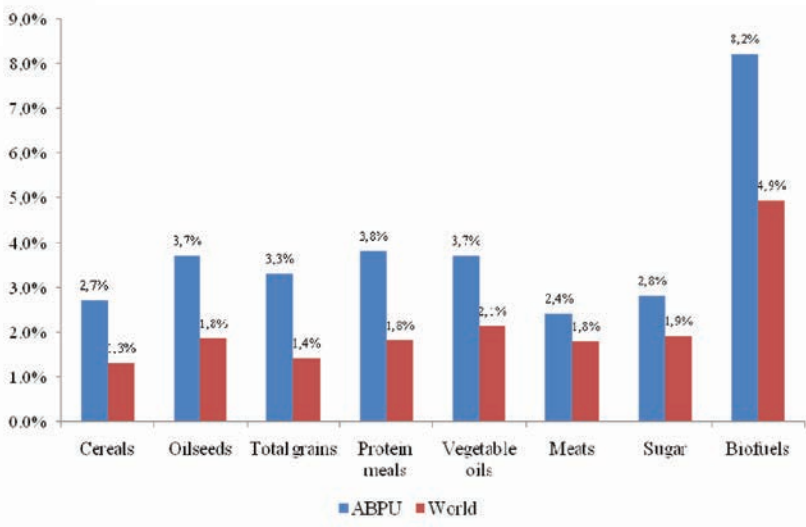
4 INAI projections use the PEATSim-Ar simulation model, adapted from the PEATSim model developed by Pennsylvania University and ERS-USDA (www.inai.org.ar). ICONE-FIESP projections use the BLUM-Brazilian Land Use Model (www.fiesp.com.br/outlookbrasil) and similar scenarios as the FAPRI-ISU World Agricultural Outlook 2012. In the case of Paraguay the information was adjusted with data from CAPECO-PY, SENACSA, CADELPA and CAP.

5 Despite the fact that the region's projections are for the period ending in 2022, the period 2011-2021 was selected for comparison with the available OECD-FAO projections "OECD-FAO Agricultural Outlook 2012-2021".

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25. Projected production growth rates for the region are substantially higher than the OCDE-FAO average projections for the world. Similarly to what happened during the last two decades (Tables 1 and 2), ABPU countries' annual growth rates estimates for the next decade included in Table 3 almost double those projected for the world average in the OECD-FAO Agricultural Outlook 2012-2021 for most products (Figure 7). Regional growth rates result from increases both in productivity and in cultivated areas (the last factor is a major difference from the rest of the world).

Figure 7. Total world and ABPU production growth projections for the period 2012-2021 (annual growth rates in %)



Source: OECD-FAO Agricultural Outlook 2012-2021 for total world; and INAI, FIESP-ICONE and CAPECO-PY, SENACSA, CADELPA and CAP for ABPU

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- 26.** Table 4 and Figure 8 include the export projections for ABPU and for the world total during the next decade. Annual average export growth rates for ABPU are substantially higher than those projected for the world, except for cereals. The reason for the lower ABPU growth rates of cereal exports is that most of its production growth (which is twice the world growth rate - Figure 7) is projected to be consumed in the region to supply local demand and to increase regional exports of meats and dairy products. It should be noted that in the case of meats' exports, projected annual ABPU growth rates reach 5% per year, while total world projected growth rates are only 1.4% per year; for such reason the region's total meats export shares increase substantially during next decade (Figure 13).
- 27.** ABPU countries are also very relevant producers and exporters of many other food products, such as coffee, fruits, juices, vegetables, tobacco, cotton, dairy products, etc. They have not been included in Table 4 and Figure 8 because most of them are not available in the OECD-FAO agricultural outlook projections⁶, limiting the comparisons between the region and the world average. However, we have included Table 6 listing the main products in which the region is the leading exporter or the second one.

6 In the case of dairy products we do not have the forecasts available in the models used including the four countries.

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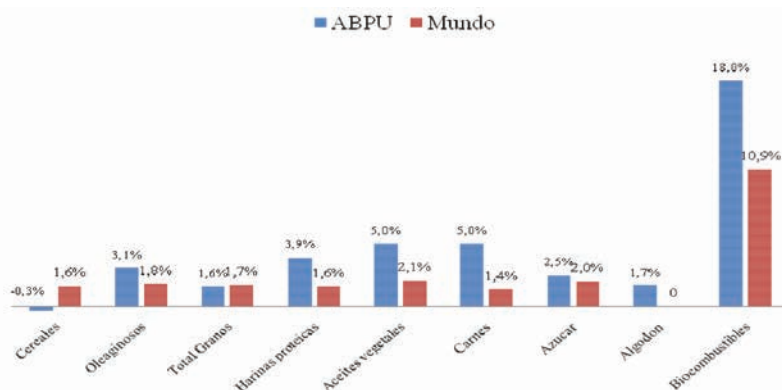
Table 4. Total world and ABPU export projections for the period 2011-2021
(million tons; annual growth in %*)

Products	ABPU			
	2011 A (million tons)	2021 B (million tons)	Total growth B - A (million tons)	Annual growth 2011-2021 (%)
Cereals	42.21	41.23	-0.98	-0.3%
Oilseeds	46.71	63.03	16.32	3.1%
Total Grains	88.92	104.26	15.34	1.6%
Protein meals	43.28	63.13	19.85	3.9%
Vegetable oils	6.59	10.79	4.20	5.0%
Meats	6.96	11.35	4.39	5.0%
Sugar	25.89	33.82	7.93	2.5%
Cotton	0.90	1.08	0.18	1.7%
Biofuels	2.05	10.79	8.74	18.0%
Products	WORLD			
	2011 A (millones ton)	2021 B (millones ton)	Crecimiento total B - A (millones ton)	Crecimiento anual 2011-2021 (%)
Cereals	289.3	341.10	51.76	1.6%
Oilseeds	112.87	133.20	20.33	1.8%
Total Grains	402.20	474.30	72.09	1.7%
Protein meals	77.80	90.96	13.16	1.6%
Vegetable oils	62.07	77.14	15.07	2.1%
Meats	28.44	32.27	3.83	1.4%
Sugar	53.95	63.65	9.70	2.0%
Cotton	-	-	-	-
Biofuels	5.43	12.64	7.21	10.9%

*Source: OECD-FAO Agricultural Outlook 2012-2021 for total world; and INAI, FIESP-ICONE and CAPECO-PY, SENACSA, CADELPA and CAP for ABPU. Note: * Cumulative annual growth rates.*

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Figure 8. Total world and ABPU trade growth rate projections for the period 2011-2021
(annual growth rates in %)



Source: OECD-FAO Agricultural Outlook 2012-2021 for total world; and INAI, FIESP-ICONE and CAPECO-PY, SENACSA, CADELPA and CAP for ABPU.

28. Table 5 and Figures 9 to 15 show the increases in ABPU world trade market shares projected for the period 2011-2021. ABPU production growth projected for the next decade contributes to increase significantly its absolute exports and its market shares in the oilseeds complex (oilseeds, meals and oils), in meats (beef, poultry and pig meat), sugar and biofuels.

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Table 5. ABPU net food exports and world trade shares (million tons and %)

Products	Net Exports (million ton)		World trade share (%)		Share growth (%)
	2011 (A)	2021 (B)	2011 (C)	2021 (D)	2011-2021 ((D-C)/C)
Cereals	42.21	41.23	14.6%	12.1%	-17.1%
Oilseeds	46.71	63.03	41.4%	47.5%	14.7%
Total grains	88.92	104.26	22.1%	22.0%	-0.5%
Protein meals	43.28	63.13	55.6%	63.4%	14.0%
Vegetable oils	6.59	10.79	10.6%	14.0%	32%
Meats	6.96	11.35	24.5%	35.2%	43.7%
Sugar	25.89	33.82	48.0%	53.1%	10.6%
Biofuels	2.05	10.79	37.8%	85.4%	125.9%

Source: OECD-FAO Agricultural Outlook 2012-2021 for total world; and INAI, FIESP-ICONE and CAPECO-PY, SENACSA, CADELPA and CAP for ABPU.

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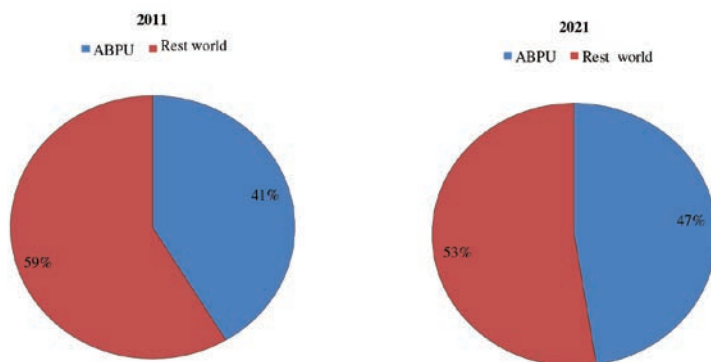
Table 6. Main food products in which ABPU countries were leading exporters in 2010

Product	First exporter	Second exporter
Bovine meat	x	
Poultry meat	x	
Meat preparations		x
Canned meat	x	
Soybean	x	
Groundnuts shelled		x
Soybean oil	x	
Sunflower seed oil		x
Groundnut oil	x	
Oilseeds cake meals	x	
Maize		x
Sugar	x	
Coffee	x	
Orange juice	x	
Lemon juice	x	
Pears	x	
Pulp fruit feed	x	
Garlic	x	
Honey	x	
Tobacco	x	

Source: FAO, FAOSTAT data.

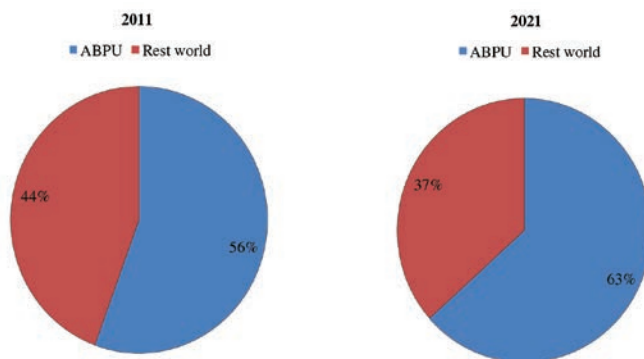
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Figure 9. Oilseeds. ABPU share in world trade in 2011 and in 2021



*Source: INAI, FIESP – ICONNE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021.
Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.*

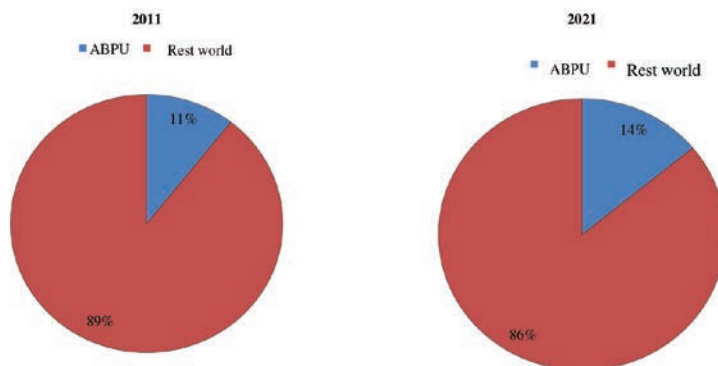
Figure 10. Protein meals. ABPU share in World trade in 2011 and in 2021



*Source: INAI, FIESP – ICONNE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021.
Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.*

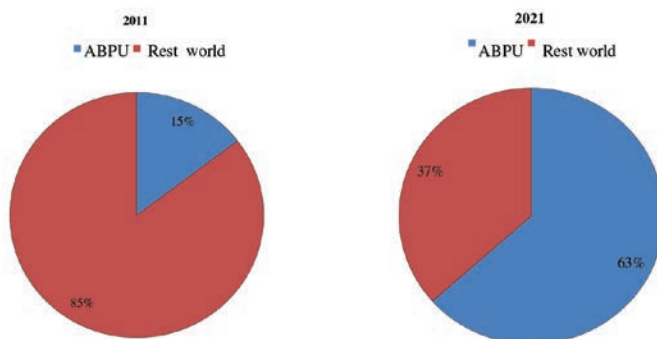
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Figure 11. Vegetable oils. ABPU share in world trade in 2011 and in 2021



*Source: INAI, FIESP – ICONE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021.
Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.*

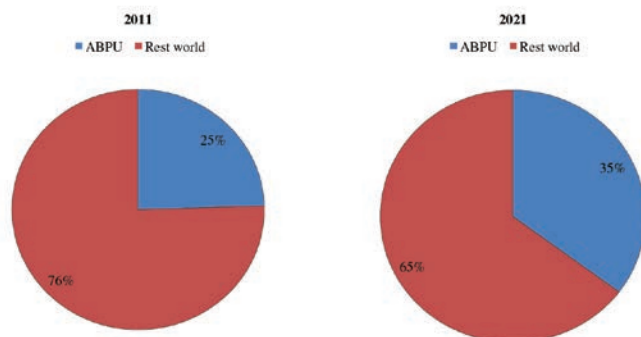
Figure 12. Cereals. ABPU share in world trade in 2011 and in 2021



*Source: INAI, FIESP – ICONE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021.
Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.*

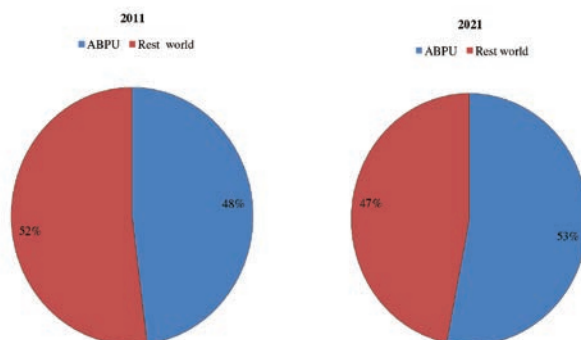
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Figure 13. Meats. ABPU share in world trade in 2011 and in 2021



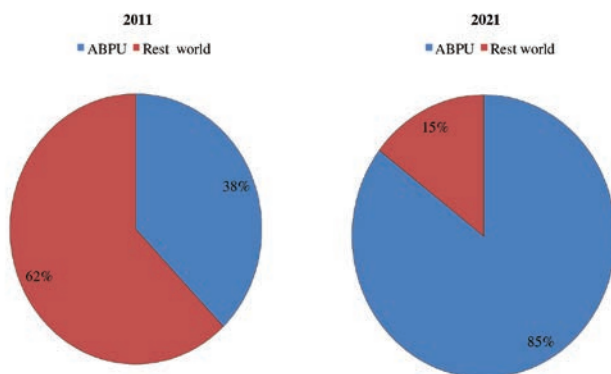
Source: INAI, FIESP – ICONE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021. Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.

Figure 14. Sugar. ABPU share in world trade in 2011 and in 2021



Source: INAI, FIESP – ICONE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021. Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.

Figure 15. Biofuels. ABPU share in world trade in 2011 and in 2021



Source: INAI, FIESP – ICONE Outlook Brazil 2022 – FAO – OCDE Ag. Outlook 2012-2021.
Data from CAPECO – PY, SENACSA, CADELPA and CAP for Paraguay.

Regional production estimates could grow substantially more than baseline projections

29. The production estimates included in Table 3 represent baseline projections, based on recent and projected trends but without assuming any substantial shift in the main variables (yields, areas, local economic and trade conditions)⁷. Such simulations include increases in yields and cultivated areas that are substantially lower than the potential yields and areas available for agricultural production in the region if other assumptions are selected. Just to have a rough idea of the potential production growth if other assumptions are selected, additional analyzes were conducted for

7 In the INAI model, the baseline projections are called the “continuation scenario” (escenario de continuación). In the Argentine case this scenario assumes that export taxes and other export restrictions continue without change during the decade, limiting the potential production growth.

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the case of Argentina, using the INAI PEATSim-Ar model already described (used for the baseline projections).

30. Table 7 includes the production estimates for 2022 simulated in the INAI baseline projections for Argentina as well as other estimates using different assumptions on crop yields. Two new assumptions on yields have been selected: i) one based on the potential elimination of existing yield gaps between producers that adopted innovations already available in the country and the average national yields for the main agricultural products. Such gaps have been determined for each crop based on a national survey conducted by the National Research and Extension Service of Argentina (INTA)⁸; ii) a second alternative including the results of another survey conducted by Trigo, E. (2012)⁹ on seed companies and researchers on the estimated yields of new varieties / hybrids that are in the pipeline and will be available in the market during the current decade. In both new assumptions, the additional costs associated with the new technologies have been included.

8 INTA "Perfil Tecnológico de la Producción Agropecuaria Argentina". 2008.

9 Both assumptions are described in Eduardo J. Trigo "Potential productivity increases in the Argentine agri-food production". CARI (2012)

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Table 7. Alternative production projections for Argentina based on different yield assumptions for 2022

Products	2012 production Million tons	2022 baseline projections Million tons	2022 projections reducing yield gaps		2022 projections with new varieties	
			Million tons	(% increase*)	Million tons	(% increase*)
Cereals	51.3	62.3	71.3	14.5	82.5	32.3
Oilseeds	58.1	73.7	82.7	12.2	92.9	26.1
Total grains	109.5	136.0	154.0	13.3	175.4	29.0
Prot meals	32.2	45.8	46.5	1.6	47.3	3.4
Veg. oils	9.0	12.7	12.9	2.1	13.2	4.5
Cotton	0.54	0.91	1.3	13.5	1.18	29.7
Sugar	2.35	2.84	3.13	10.2	3.51	23.2
Beef	2.60	3.09	3.11	0.4	3.13	1.1
Poultry meat	1.94	3.18	3.18	0.1	3.18	0.2
Pork meat	0.35	0.43	0.43	0.1	0.43	0.1

Source: INAI simulations based on PEATSim-AR model. 2013.

*Note: * Percentage increase with relation to 2022 baseline projections.*

31. Total grain (cereals+oilseeds) production projections for 2022 reach 154 million tons, assuming that yield gaps are eliminated, and 175 million tons if the potential yields of new varieties that will be in the market during the current decade are included. The first assumption results in a 13.3% increase (or additional 18 million tons) in total grain production with respect to the baseline projection for 2022; and the second assumption results in a 29.0% increase (or additional 39.4 million tons) with respect to the baseline projection for 2022. Similar increases result for cotton production projections (13.5 and 29.7%) and for sugar production projections (10.2 and 23.2%).

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- 32.** The baseline scenario assumes the continuation of current policies, including the export barriers. There we also conducted other simulations assuming that current trade barriers (export taxes and export restrictions) imposed by the Argentine government are eliminated and the current overvaluation of the currency is reduced. In such scenario, Argentine 2021 livestock production estimates are almost 20% higher than the baseline scenario.
- 33.** AACREA (Asociación Argentina de Grupos CREA), one of the most famous and respected private organizations of Argentine agriculture, specializing in technology development and transfer, has recently conducted a study of the total net acreage that could be devoted to crop production in each province of Argentina, according to a sustainable and productive use of the soils (based on weather and soil conditions), and deducting the areas that are subject to provincial land use regulations. The total potential crop area resulting from such study is 60 million hectares¹⁰. Such maximum potential crop area is 63% higher than the planted area estimated in the INAI baseline projections for 2022 (36.9 million hectares). These figures show that the potential increase in planted area for the next decade could have a higher impact on total crop production than the maximum assumption on yield growth included in Table 7; actually, the potential impact of land expansion is more than twice the potential growth in grain yields for 2022 (63% vs 29%). Assuming both effects (yields and area) the potential total grain production could double the INAI baseline forecast for Argentina in 2022.
- 34.** The exercises described in previous sections (30 to 33) show that sustained high prices of major commodities, improved economic and trade environment, and additional efforts on R&D and technology transfer in the region could have a major impact on food supply for the next decades (substantially higher than OECD-FAO and regional baseline projections).

10 This potential crop area is similar to the area calculated in another previous study conducted by INTA with an alternative methodology (the traditional capacity of land use classification).

III.4. The production systems and business models of the region are economically efficient and environmentally friendly

Competitive and efficient business models

- 35.** During the last two decades, the countries of the region have experienced significant organizational reforms and innovations in their agricultural production systems, developing horizontal and vertical networks which improved upstream and downstream linkages, increasing business efficiency and productivity along the value chains and reducing transaction costs. The main transformation process in crop production in the region during the last two decades is the emergence of new organizational production and distribution models based on larger operations and networks, which have partially replaced the traditional family farming system. It is estimated that most of the soybean and corn production of the region (60 to 70%) is currently produced according to very competitive business models involving medium sized and large farms with specialized managers, who are implementing different kinds of horizontal and vertical networks, in which contracts play a key role. There is not just a single model and production strategy in the region; however, there are some organizational changes which are common to the new production models.
- 36.** The main characteristics of the new models are: a) the size of the farms is larger; b) part of the land is rented, and production firms assume the risks and the benefits of the business, and pay rent to the owners of the land; c) they diversify the production portfolio, including rotations of winter and summer crops involving cereals and oilseeds, and pastures for livestock production in some areas; d) to reduce meteorological and other natural risks, some production firms purchase and/or rent land in different locations, since they do not have the rigidity of a specific farm of their own; e) part of the operating capital is provided by input providers (seeds, fertilizers, and chemicals) and by trading and crushing firms (forward sales, barter programs, etc.). Such

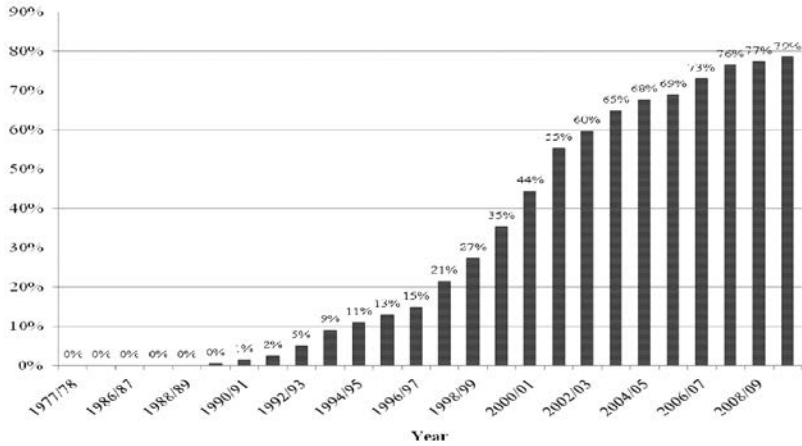
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relationships imply the development of networks between producers and the rest of the value chain, resulting in a limited demand for credit from the institutional system, and reducing transaction costs.

37. Production firms involve different kinds of managers: i) owners of land who rent additional acreage to increase scale and to diversify risk producing in different locations; ii) owners of machinery who used to be contractors, and also act as producers; iii) specialized teams (usually technicians) who manage funds provided by different kinds of investors, involving mainly private initiatives, but also public local and foreign funds (they are usually called managers of “planting pools”).
38. Not all farmers own the production equipment. Some on-farm operations are implemented with a network of service providers: i) for tilling and sowing; ii) for crop defense; iii) for the harvest. Some of these service providers were formerly small farmers.
39. Production firms organize production and are responsible for the technologies used. Such role has been very important for the massive use of improved technologies, such as the package RR soybean-glyphosate-no till planting, which has been adopted in most of the main producing areas of the region.
40. Technical assistance is usually provided by specialized teams hired by the production firms. The concept of the need for extension services has been replaced by a new producer behavior, in which farmers are “proactive users” of innovations provided by input distributors. Figures 16, 17, 18, 19, 20 and 21 show this new farmers’ culture: during the last two decades, they rapidly adopted the main innovations associated with soil management and some other key inputs / technologies. The massive use of these new technologies resulted in sharp increases in the productivity of the countries of the region.

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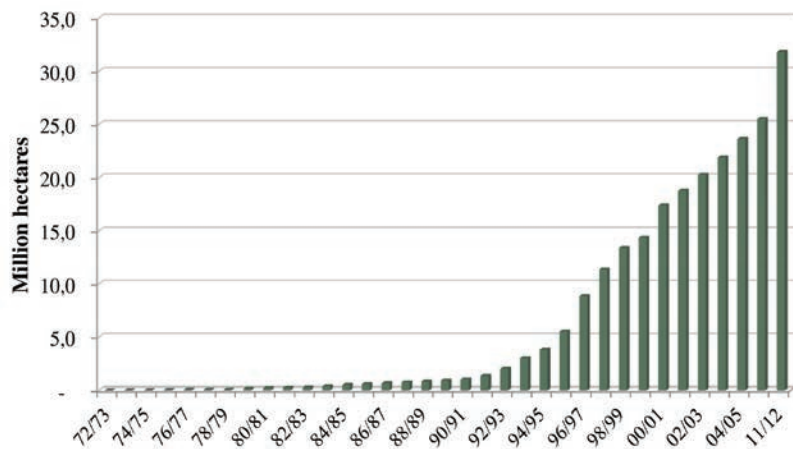
Figure 16. Quick adoption of a strategic soil conservation technology in Argentina: evolution of no-till planting (percentage of total cultivated land under no-till)



Source: AAPRESID, 2012.

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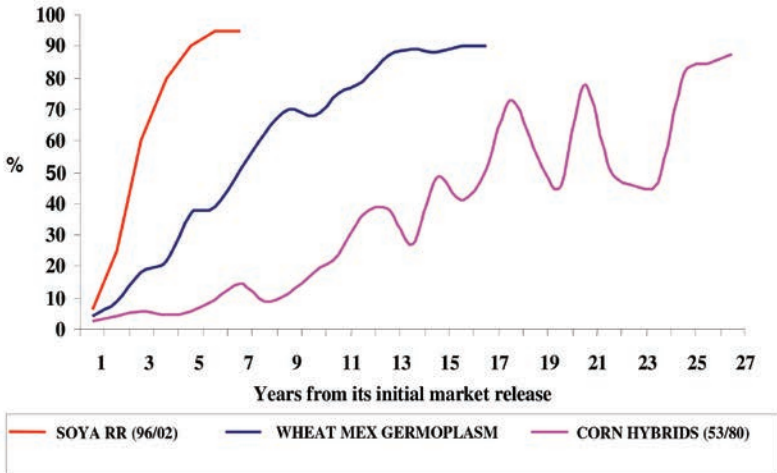
Figure 17. Quick adoption of a strategic soil conservation technology in Brazil: evolution of no-till planting (million hectares)



Source: Markestrat, with National Federation of No-tillage in the Straw (FEBRAPDP) and Conab data (2012).

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Figure 18. Quick adoption of RR soybean in Argentina during the period 1996-2002 (percentage of total area planted with each crop)

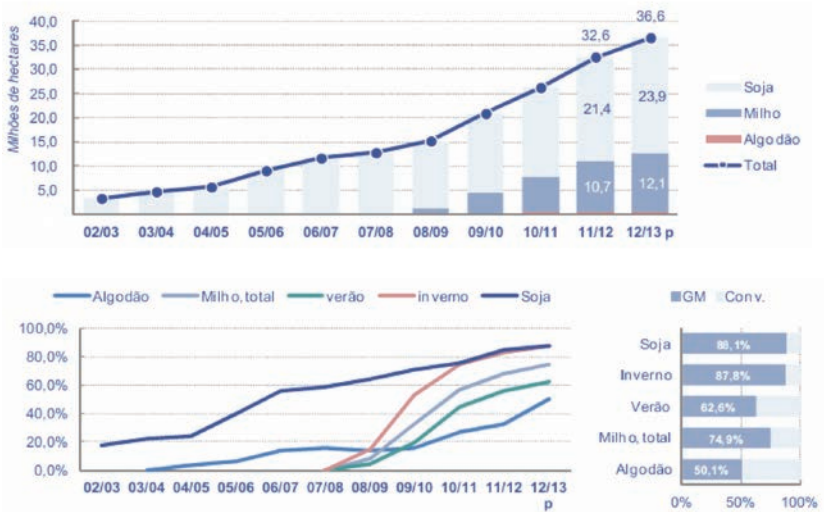


Source: Regúnaga, M. et al. "El impacto de los cultivos genéticamente modificados en la agricultura Argentina. Facultad de Agronomía. Universidad de Buenos Aires. 2003.

Note: RR soybean was massively adopted much faster than previous innovations, such as high-yielding wheat (during 1973-1989), and hybrid corn (during 1953-1980).

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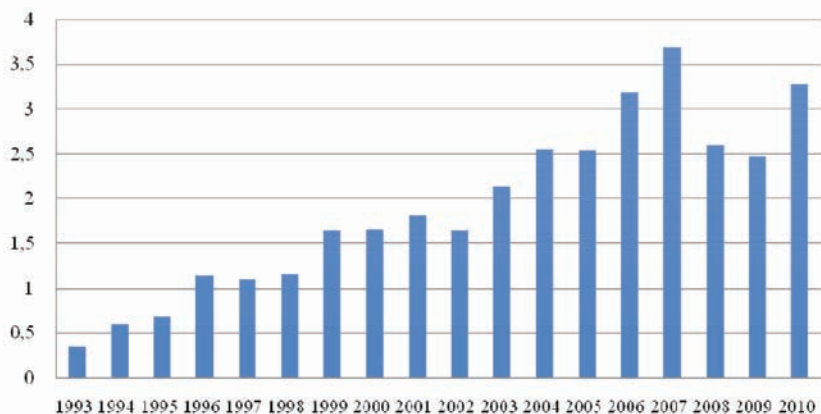
Figure 19. Evolution of the area planted with GMOs in Brazil (million ha planted with GMOs and % of total cultivated area)



Source: Céleres Consulting.

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Figure 20. Fertilizer consumption in Argentina. Period 1993-2010 (million tons)

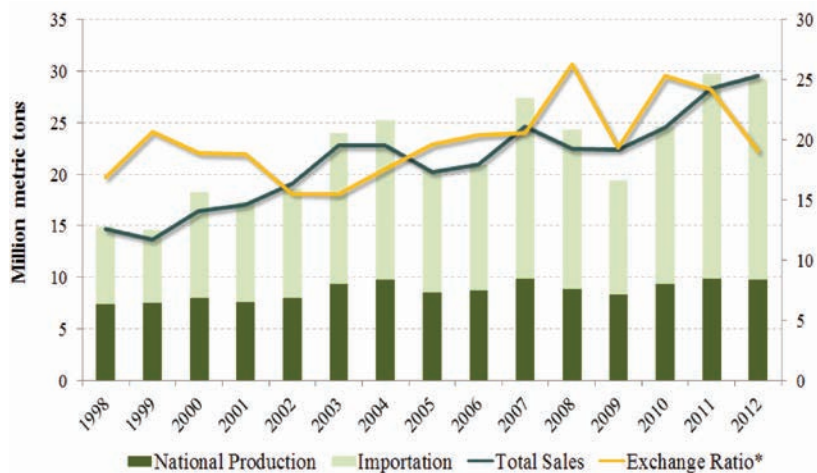


Source: Asociación Fertilizar data.

Note: The dramatic increase in fertilizer consumption is associated with the implementation of the no till practice and the use of improved seeds.

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Figure 21. Fertilizer production, imports and total sales in Brazil. Period 1998-2012
(million tons)

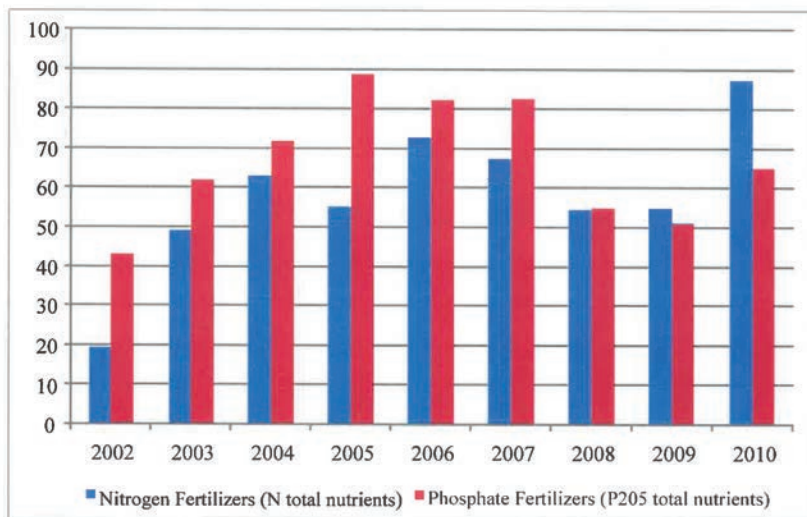


Source: Markestrat, with National Association for Fertilizers Diffusion (ANFA) data.

*Amount of soybean (60kg. bags) necessary to purchase one ton of fertilizer.

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Figure 22. Nutrient use on arable and permanent crop area in Uruguay. Period 2002-2010
(tons of nutrients per 1000 Ha)



Source: *FAO (FAOSTAT)*.

- 41.** The increased use of new technologies in the region such as GMO seeds (genetically modified organisms) is mainly due to the availability of improved varieties in the market adapted to different areas of the respective countries. In addition, producers have good information and perception about the direct and indirect benefits resulting from such innovations. The four countries use GMOs regulated and monitored by the respective biosafety organizations created in each of them for such purpose¹¹. Thus, the four countries have a safe and supervised use of genetically modified organisms, and provide the certifications required by the main importing countries.

¹¹ CONABIA in Argentina, the National Technical Commission on Biosafety (CTNBio) in Brazil, and the respective sanitary areas of Paraguay and Uruguay.

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42. Another crucial factor supporting the adoption of new technologies has been the favorable economic returns associated with innovations, which encouraged producers to invest in technologies that promote productivity gains, such as improved seeds, fertilizers and other chemicals. The increase in sales of fertilizers in Argentina, Brazil and Uruguay shown in Figures 20, 21 and 22 is associated with the improved economic returns resulting from fertilization, which is more critical in the case of Brazil.
43. Large and medium sized production firms of the region also develop agreements with trading and crushing companies, to better manage logistics, to guarantee the quality of production, and to implement forward sales for risk management purposes. Vertical coordination is a key tool for efficient management. Some of them also use futures markets to mitigate price risks. Traders and crushers also invest in cereal and oilseed production (managed by their own firms or by specialized production firms). However, the size of such production is small (usually less than 10%) when compared with their total crushing/trading operation.
44. The new organization of primary production in networks implies a differentiation and specialization process resulting in a very efficient system, with different players involved in “on-farm” production (farmers as well as input and services providers), similarly to what happens in the rest of the world with many integrated manufacturing industries. This evolution contributed to the creation of a structure of competitive medium-sized agents as services providers, living in small towns, instead of employees of large vertically-integrated corporations; such process has been important not only in terms of economies of scale, but also for local and regional development (emerging middle class providing agricultural services). Organizational innovations require very good links among the participants in the networks. Farm managers are not expected just to conduct production, but also to organize and manage the networks, developing clusters. Production firms rely very much on input and service providers, and they are therefore expected to assist them in the improvement of their technical capabilities, as well as in their capitalization.

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45. As a result of all these processes, the current crop production value chains involve many independent players carrying out activities in the interior of the respective countries. The reduction in the number of farmers and the concentration process in the primary production stage have been partially balanced by the creation of a large number of new small and medium-sized firms that specialize as input distributors and services providers. All of them create value in much more sophisticated and efficient production and distribution value chains.
46. Summing up, the region has developed competitive advantages based on the scale of the production units (Tables 8 to 16) and on major technical and organizational innovations. There is strong competition among farms; and the traditional farming model in which the owner of the farm conducts most operations is being replaced, because the new production systems require a sophisticated management of networks and technical packages, which are systematically changing from year to year, as a result of innovations emerging from biotechnology, information technology, precision technologies, new products, increasing consumer requirements including quality, social and environment certifications, etc. They require specialized teams and very good management of networks for vertical and horizontal coordination, which contribute to a more efficient and competitive production and distribution system.
47. Table 8, based on data of the National Agriculture Census of Argentina, shows that during the last five decades, there has been a concentration process in the Argentine farming sector, as has been the case in many other countries in the rest of the world. This process involved changes in the number and size of the farm units, contributing to economies of scale and greater competitiveness at the primary production level.

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Table 8. Number and average size of farms in the National Agriculture Census of Argentina

Census years	Number of farms ¹² (thousand units)	Average size of the farms (total hectares / unit)
1952	565	354
1969	538	391
1988	421	421
2002	334	524
2008*	274	560

Source: INDEC National Agriculture Census. www.indec.gov.ar.

*Note: *Data for 2008 are preliminary, not officially published.*

48. Concentration is more important when production is considered, because many owners prefer to rent all or part of their farms, particularly in the case of land devoted to annual crops. In the Argentine case, the information on first soybean sales during 2007, provided by ONCCA (national service responsible for agricultural trade control) made it possible to estimate the stratification of soybean producers included in Table 9. It shows that 63% of production involves a reduced number of farms of the two largest size strata (around 7,500 units), which plant more than 330 hectares with soybeans annually¹³. At the other end, there are a large number of farmers of the three smaller-size strata (near 50,000) who plant around 50 hectares of soybeans each, and contribute only 13.5% of total soybean production¹⁴.

12 The information in Table 8 is for all kinds of farms (including livestock). Average size for crop farms is usually smaller, but it is difficult to estimate because many farms involve several activities (crops, livestock and others).

13 It should be noted that most farmers plant several crops, and therefore total acreage planted with crops is around 60 to 80% higher than the soybean acreage.

14 It should be noted that the size of these family farms is still large when compared with other countries' production structures (from Asia, Africa and Europe).

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Such farmers are less competitive, and at present they do not raise enough “on-farm” income to meet their family needs; some of them became service providers to other farms to raise their family income.

Table 9. Stratification of soybean producers in Argentina in 2007

Categories	Number of farmers (units)	Volume sold (thousand tons)	Percentage of total farmers (%)	Percentage of total production (%)
1 to 60 ton	18,897	578	25.72	1.51
61 to 150 ton	16,767	1,689	22.82	4.41
151 to 300 ton	13,644	2,942	18.57	7.67
301 to 450 ton	6,963	2,568	9.48	6.70
451 to 600 ton	4,164	2,168	5.67	5.65
601 to 750 ton	2,664	1,783	3.63	4.65
751 to 1000 ton	2,900	2,508	3.95	6.54
1001 to 1500 ton	2,901	3,537	3.95	9.22
More 1500 ton	4,577	20,569	6.23	53.65
Total	73,477	38,341	100	100

Source: ONCCA, 2008. www.oncca.gov.ar.

49. Table 10 shows the evolution of the number of farms and their size in the case of Brazil, according to the information of the Agricultural Census. In this country, the expansion to new areas in recent decades contributed to an increase in the number of farms.

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Table 10. Number and average size of farms in Brazil

Census years	Number of farms (thousand units)	Average size of the farms (total hectares / unit)
1920	649	270
1950	2,065	112
1970	4,924	60
1975	4,993	65
1980	5,160	71
1985	5,802	65
1995	4,860	73
2006	5,176	64

Source: IBGE (Brazilian Institute of Geography and Statistics) - Agricultural Census.

50. However, Tables 11 and 12 show that the concentration of land increased in Brazil. Table 11 refers to the Gini index, which measures the degree of concentration. The last Agricultural Census conducted in 2006 shows that the Gini index increased, and that it remained stable between 1985 and 1995. Table 12 shows the evolution of the stratification of properties in Brazil between 1975 and 2006. The participation of properties with over 1,000 hectares was the only one that increased, while that of properties with less than 10 hectares and between 100 and 1,000 hectares decreased.

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Table 11. Evolution of the Gini index in Brazil – Period 1985-2006

Census years	Gini index*
1985	0.857
1995	0.856
2006	0.872

Source: IBGE (Brazilian Institute of Geography and Statistics) - Agricultural Census.

Note: values close to 1 of the index represent the highest concentration level; and index close to zero shows low concentration.*

Table 12. Stratification of farm areas in Brazil – 1975/2006

Categories (hectares)	1975		1985		1995		2006		Growth rate 1975/2006
	000 units	(%)	000 units	(%)	000 units	(%)	000 units	(%)	
Total	323.9	100	374.9	100	353.6	100	333.7	100	3%
Less than 100 ha	69.2	21	79.6	21	70.6	20	70.7	21	2%
• Less than 10 ha	9.0	3	10.0	3	7.9	2	7.8	2	-13%
• 10 to less than 100 ha	60.2	19	69.6	19	62.7	18	62.9	19	5%
100 to less than 1,000 ha	115.9	36	131.4	35	123.5	35	112.8	34	-3%
1,000 ha and more	138.8	43	163.9	44	159.5	45	150.1	45	8%

Source: IBGE (Brazilian Institute of Geography and Statistics) - Agricultural Census.

51. In Paraguay, small farms are very significant in terms of total number of production units. 83.5% of total units have less than 50 hectares (Table 13). However, most land and cultivated area is concentrated in farms of 100 or more hectares. Similarly to what happens in Argentina and Brazil, production concentration is still greater when export crops, such as soybean, are considered (Table 14).

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Table 13. Stratification of total farms in Paraguay

Size of strata	Number of farms (thousands)	% of farms		Average size (hectares)
		per stratum	cumulative	
Less than 5 ha	118.0	40.7	40.7	2
5 to 10 ha	66.2	22.9	63.6	6
10 to 20 ha	57.7	19.9	83.5	12
20 to 50 ha	22.9	7.9	9.4	27
50 to 100 ha	6.9	2.4	93.8	67
100 to 500 ha	10.5	3.6	97.4	219
More than 500 ha	7.5	2.6	100	3,719
TOTAL	289.7	100		

Source: Investor Economía, with 2008 National Agricultural Census.

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Table 14. Stratification of soybean producers in Paraguay

Size of strata	Production units		Cultivated area	
	Total in stratum	% of total	000 ha in stratum	% of total
Less than 1 ha	10	0,0	3	0,0
1 to 5 ha	2,336	9,0	3,68	0,2
5 to 10 ha	5,129	19,7	16,40	0,7
10 to 20 ha	6,408	24,6	39,84	1,8
20 to 50 ha	4,888	18,7	85,87	3,8
50 to 100 ha	2,327	8,9	112,79	5,0
100 to 200 ha	1,900	7,3	196,50	8,8
200 to 500 ha	1,730	6,6	395,72	17,7
500 to 1.000 ha	695	2,7	337,76	15,1
1.000 to 5.000 ha	575	2,2	692,98	31,0
5.000 to 10.000 ha	63	0,2	210,75	9,4
More than 10.000 ha	29	0,1	146,48	6,5
Total Paraguay 2008	26,090	100	2,239,78	100

Source: Investor Economía, with 2008 National Agricultural Census.

52. Uruguay has also experienced a concentration process of the production units in recent decades and the average size of farms is relatively large (Tables 15 and 16). In 2011 45% of total farms had more than 100 ha. Similar to what has been mentioned for the other countries part of the crop land is rented and therefore agriculture production is still more concentrated in medium sized and large farms. In 2011 in Uruguay most of the productive land (66% of total) was destined to beef production; 13% was destined to cereals and oilseeds crops; 8% to forestry production; 5% to dairy production; and 5% to ovine production.

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Table 15. Number and average size of farms in the National Agriculture Census of Uruguay

Census years	Number of farms	Average size of the farms (total hectares / unit)
1990	54,816	288
2000	57,131	287
2011*	44,890	361

Source: National Agriculture Census (DIEA-MGAP).

**Preliminary information.*

Table 16. Stratification of farms by size in Uruguay (% of total farms)

Size of strata	1990	2000	2011*
1 to 19 ha	33%	36%	27%
20 to 99 ha	28%	27%	28%
100 to 500 ha	24%	23%	27%
More than 500 ha	14%	14%	18%
Total	100%	100%	100%

Source: National Agriculture Census (DIEA-MGAP)

**Preliminary information*

Environmentally-friendly production systems

- 53.** A strategic change in regional production, associated with the new business models, has been the implementation of environmentally friendly production systems, such as the convergence of various technological innovations implemented: no-till strategy, crop rotations and sanitation; precision farming; improved seeds including genes for herbicide, insect, and disease-resistance

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(which imply a lesser use of agrochemicals); new chemical molecules in agrochemicals; integrated plague control; intensive use of information and communication technology; satellite-image support; logistic innovations like silo bags; post harvest management; precision nutrition; etc.

- 54.** No-till (Southern Cone style) integrates a production system that reduces soil erosion and improves rainwater storage in the soil (water management). It is a tool designed to maximize productivity in a sustainable manner, by improving the use of natural resources, minimizing the number of tilling operations, and reducing oil consumption and GHG emissions. The soil is covered by stubble; a carbon management strategy is implemented (fostering carbon sequestration), and a crop fertilization strategy is used that is based on the soil nutrition and structuring concept, rather than on the soil fertilization approach. It improves soil biotic load and its sanitary conditions. After several years of such practices the soil conditions improve substantially, totally different to what happens with the widespread input intensive agriculture.
- 55.** This new agriculture, based on the knowledge provided by the bioeconomy approach, includes the integration of different scientific disciplines such as ecology, eco-physiology, genomics, biotechnology, nutrition and protection against biotic and non biotic constraints. In such context, good agricultural practices have a strategic relevance, because they are the tools that make it possible to adapt and implement the new agricultural knowledge and innovations. There are two key good practices, among others: crop rotation and the associated nutritional plant and soil management.
- 56.** It should be highlighted that most of current world crop production is conducted under production systems which use high amounts of fuel and fertilizers, which have deteriorated the natural resources and contributed to global warming. It is estimated that 92% of total world crop production is conducted under such input intensive production systems. Only 8% of world crop production is under the “no-till management strategy” and most is located in South America. A pragmatic alternative to cope with sustainable global food security is not to move from input intensive production systems

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to the “greening agriculture” strategies promoted by several NGOs which will reduce dramatically food supply, but to look seriously and to give a high priority within the CGIAR and other R&D institutions world-wide to develop “no-till management strategies” (which promote production growth while preserving natural resources) adapted to different environments.

III.5. Agricultural natural resources in Argentina, Brazil, Paraguay and Uruguay: political economy critical issues

57. In previous chapters it has been argued that: a) since the beginning of the 21st century, there has been a rapid increase in the demand for food and other products derived from agriculture, which has resulted in a significant increase in the price of the main agricultural commodities; b) with the right policies, investment and production strategies, the world could feed itself in the foreseeable future. This positive view, however, does not eliminate the fact that agricultural natural resources are under growing pressure and that new and complex political economy issues are emerging with respect to their use. The issues have global, regional and individual country implications and create the need for new governance mechanisms at all levels.

New interest in and demand for the control of agricultural land

58. The growing economic scarcity of agricultural natural resources and the resulting higher agricultural prices have created two different, but symmetrical, economic and political phenomena that have resulted in an increase in the demand for agricultural land. On the one hand, the higher prices of the main agricultural commodities, and the prospects that they will remain high, have created new incentives and interest of the private sector in increasing production and consequently, in the acquisition of land rights. On the other hand, net importing countries have developed concerns about the potential difficulties of obtaining adequate supplies of food and have

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implemented new strategies to secure their growing future food needs. These strategies include, in certain cases, the acquisition of land rights outside their borders.

- 59.** A natural consequence of both of these processes has been a growing interest in the control of agricultural land and water. This interest has a number of different manifestations, with considerable differences in how it is translated into specific market and investment behaviors, which have different impacts on the political economy processes, both worldwide and within individual countries.
- 60.** The following sections will look into these processes within the limited scope of what is happening in the four countries of the region. The present and future importance of these four countries in world supplies of agricultural commodities, as shown in previous sections of Chapter III, make this matter particularly important, not only for those countries, but from an international perspective.

Facts and figures in the four countries: Argentina, Brazil, Paraguay and Uruguay

- 61.** The four countries are well endowed in agricultural natural resources and they should be expected to attract worldwide interest in the control of these resources. Three main processes by which land rights are secured have been identified. These processes are different in their political economy implications: a) land rights acquisitions¹⁵, involving countries with structural food deficits (China, Korea, Saudi Arabia and others) where their governments intervene directly or through state controlled enterprises; b) land rights acquisitions by private foreign firms, including firms controlled by regional capital; and c) changes in the agrarian structures as a consequence of land rights acquisitions by large firms within their own countries.

¹⁵ Land rights acquisitions include buying, renting and other types of contractual arrangements that allow the investor to control the use of the land.

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- 62.** Land rights acquisitions by foreign governments, directly or through state controlled enterprises has been very limited or non-existent in the four countries. In Argentina, only two cooperation agreements between foreign states or state-owned companies have been negotiated (Piñeiro and Villarreal, June 2012, for more details on these agreements¹⁶). One was signed in 2010 between the government of Rio Negro province and the Chinese Government-owned Heilongjiang Beldahuang State Farms Business Group; and a second was negotiated between the Chaco provincial government and the Al-Khorayef Group (a company linked to the Government of Saudi Arabia). In both cases, the main objective of the foreign governments was to improve their secure access to food. Social unrest created by these agreements and the political intervention of the federal government ended in their demise. In the other three countries, Brazil, Paraguay and Uruguay, there are no reports of successful negotiations between local government authorities and foreign governments or firms under their direct control.
- 63.** Legislation that has existed for over 40 years in Brazil and one recently-approved law in Argentina (2011) have established clear barriers for the acquisition of large tracts of agricultural land by foreigners. It is important to note, however, that Argentine legislation does not prohibit leasing and or production by contract or agreements, such as the one entered into between the Rio Negro authorities and the Chinese-owned enterprise. Brazil's legislation is the only one, of the four countries, that also limits the renting of land to foreigners, but the implementation of such restriction has been weak.
- 64.** Land rights acquisition by foreign individuals or private firms has been an intensive process in all four countries for the last two centuries, when foreign farmers and investors occupied the agricultural space that was sparsely populated and provided very good production opportunities. These processes have followed different paths and speeds in the four countries, and have responded to economic opportunities provided by market conditions,

16 Piñeiro and Villarreal (2012). Foreign investment in agriculture in MERCOSUR member countries. TKH Report. IISD.

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domestic policies and progressive occupation of the best land. This historical process has taken a new profile and different characteristics starting in the 1990s, when the economic policy in the region was liberalized and international markets improved slowly but steadily. This initially slow process accelerated during the last 10 years, as a result of the significant increase in the international prices of the main commodities produced in the region.

- 65.** Two different land acquisition methods have been used by foreigners: a) buying the land; and b) renting and other forms of contracts that provide access to the use of farmland. As mentioned in previous sections of Chapter III, there are many different kinds of contracts and some of them involve several participants that provide different types of inputs necessary for the production process, or what is known as contract farming¹⁷.
- 66.** In Argentina there are no official records of total farming land bought by foreigners; a problem that may be resolved with the new legislation. According to estimates provided by Murmis and Murmis, 2013¹⁸, 6.7 million hectares are owned by large foreign corporations, and 8.8 million hectares if the figures include land jointly owned by foreign companies in association with local firms. On the other hand, contract agriculture has expanded at a phenomenal rate, particularly after 2002. The National Agrarian Census (CAN 2002) shows that 50% of grain production is conducted under contract farming; and recent estimates have raised that figure to around two thirds. Most of these contracts are executed by local firms, such as producers looking to increase their size, and service providers and investment funds managed by agribusiness experts. Foreign capital participates in contract farming in different ways. It manages production activities directly under

17 The term Contract Farming in the southern cone generally does not include, as in other latitudes, vertical integration with the processing of agricultural products. It refers to different contractual arrangements for the production of primary commodities. For a description and discussion of this subject, see Piñeiro and Villarreal (2012), and Manciana, Trucco and Piñeiro (2009). Large scale acquisition of land rights for agricultural or natural resources-based use: Argentina. Retrieved from: [www. Grupo Ceo, / papers/papers ceo-013 pdf](http://www.GrupoCeo.org/papers/papers_ceo-013.pdf).

18 Murmis and Murmis, 2013. Land concentration and foreign land ownership in Argentina in the context of global land. *Canadian Journal of Development studies* 33:4,490-508.

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contract farming arrangements; it also participates in local funds that provide capital to other farmers, etc. However, foreign capital participation in this venture is considered to be small, and no estimates on its quantitative importance are available.

- 67.** In Brazil, in spite of more restrictive legislation in connection with the purchase of land by foreigners, a similar process has taken place. As Wilkinson et al. point out, the implementation of such restrictive legislation has been weak, especially after 1995. The situation has changed again in recent years and more controls are being imposed. Arable land purchases by foreigners have been estimated at 4.3 million hectares or about 1.7% of total arable land (Wilkinson, Reydon and Di Sabbat, 2010¹⁹). Of this area, about 73% is owned by individuals, and the rest by corporations. Most of this land owned by foreigners is located in the Cerrado and in the South Eastern sugarcane-producing states. Mato Grosso is the state with the largest area in such situation, with 19.9% of the total area owned by foreigners. The relative importance of contract agriculture and other forms of direct investment in agricultural production in Brazil is less significant than in Argentina, and the participation of foreign capital is unknown. Contract farming in Brazil involves Argentinean interests, mainly a few large agribusiness companies that expanded their operations to neighboring countries, and became regional transnational corporations. Unconfirmed estimates suggest that these Argentinean firms planted more than 700,000 hectares during the 2010-2011 harvest, a significant figure, but still very small in relation to the total area sown.
- 68.** The acquisition of land by foreigners in Brazil has grown since 2008. This led the Attorney General of the Union (AGU) in 2010 to re-interpret the country's legislation aimed at limiting the access of foreign landholdings in Brazil (Hage; Peixoto; Vieira Son, 2012²⁰). In Brazil, foreigners who own land are

19 Wilkinson, J., B. Reydon y A. di Sabbato (2013) Concentration and foreign ownerships of land in Brazil in the context of global land. *Canadian Journal of Development Studies*. 33:4, 417-438.

20 Hage, F.A. M. Peixoto y J.E. Ribeiro Vieira Filho (2012). Aquisicao de terras por estrangeiros no Brazil: una evaluacao juridica e economica. *Textos para discussao* 114. Núcleo de estudios e Pesquisas do Senado, Brazil.

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subject to the same environmental and legal regulations that affect Brazilian rural producers. Law 5,709 (October 7, 1971) regulates land acquisition and leasing by foreigners in Brazil; it limits the acquisition or leasing of land by foreigners to 50 fiscal modules (250 to 5000 hectares) for individuals, or a maximum limit of 25% of the municipality territory (and individuals of the same foreign nationality may not own more than 10% of the area of a particular municipality), or 100 fiscal modules (500 to 10,000 hectares) for legal entities. With the new interpretation adopted by AGU the LA-01, 2010 was extended to Brazilian legal entities in which most of the capital is held by foreigners. The same limitations apply to foreign legal entities that are authorized to operate in Brazil, as well as to sovereign wealth funds constituted by foreigners. This prohibition does not apply to foreign publicly traded companies whose shares are traded on the stock exchange in Brazil or abroad. Besides the limitation on land, this new interpretation addresses new duties, such as the presentation of a land exploration project and the physical and financial schedule of the company. The owner must also report whether the public funding will be partial or total, and show that the person has logistic viability to store or transport production.

- 69.** Paraguay is by far the country that has received more foreign investment for the purchase of land. For many decades, the country has shown a clear interest in attracting foreign investment for agricultural colonization. Figures from the 2008 Census indicate that about 7.88 million hectares of land, or around 19.4 % of the national territory, are owned by foreigners. Of these, more than half are owned by Brazilian nationals or companies, mostly in areas adjacent to Brazil (Glaser, 2009²¹). However, according to Galeano (Galeano 2011²²), other nationalities, including German, Japanese and Portuguese, also play a role. On the other hand, foreign direct investment in agricultural production, including contract agriculture, in Paraguay is not as significant as in Uruguay and Argentina. However, there are no official

21 Glaser, M. (2009) *Extrangerización del territorio paraguayo*. BASE, investigaciones sociales, Paraguay.

22 Galeano L.A. (2012) Paraguay and the expansion of Brazilian and Argentinean agribusiness frontiers. *Canadian Journal of Development Studies* 33:4, 458-470.

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estimates of their quantitative importance. In any case, most of the foreign direct investment in agricultural production is made by Argentinean, Brazilian and Uruguayan interests.

- 70.** It should be noted that, since 2002, Paraguay has changed its colonization strategy dramatically, and has passed new legislation that limits sales of public land for agricultural production to foreigners (according to the “Estatuto Agrario 2002”). Three years later, Law 2,532/2005 established a Border Security Zone where individuals or legal entities in which Argentine, Brazilian and Bolivian citizens have an interest of more than 50% are not allowed to own or produce on farmland located less than 50 km. from the borders of their respective countries²³.
- 71.** The situation of Uruguay has some particular characteristics. During the period 2000–2010, 6.4 million hectares were sold, a figure equivalent to 39% of total agricultural land (D. Piñeiro, 2012²⁴). How much of this land was bought by foreigners is difficult to determine. Available data make it possible to identify land bought by foreign individuals but not by foreign corporations. This is a particularly serious shortcoming, because more than 50% of total hectares sold were acquired by corporations. Informal reports suggest that about 1.8 million hectares are owned by foreign corporations, most of them from Argentina. On the other hand, direct investment for agricultural production through leasing agreements and other types of contract agriculture has increased rapidly during the last decade, and stands at about 70% of the total area under cultivation. Estimates suggest that about half of the land that has been rented is controlled by foreigners, mainly from Argentina and Brazil.

23 Law N° 2.647/05 established that the above-mentioned limitation referred to new acquisitions but not to previous purchases.

24 D. Pineiro (2012). Land grabbing: concentration and “foreignisation” in land in Uruguay. *Canadian journal of development studies*, 33:4, 471–489.

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72. In addition to these processes leading to the acquisition of land rights by foreigners²⁵, in the four countries there has been a concentration in land use as a result not only of foreign investment, but also of the acquisition of land rights by local individuals and firms. The result has been a decrease in the number of farms or operating units and an increase in the average size of farms. Tables 7 to 11 in a previous section of Chapter III show such processes in Argentina and Brazil.

Political economy critical issues

73. Increasing worldwide resource scarcity makes it ever more necessary that effective governance mechanisms and good economic policies be designed and applied at the global and national levels, in order to improve efficiency in their use and to ensure their long-term sustainability. Under scarcity conditions, there are dangers that the ways in which appropriation and use of these resources are decided may not result in the efficient use thereof, and consequently their contribution to world food needs is below its potential. In addition, resource scarcity, if accompanied by inefficient use, may generate social conflicts both at the global and individual country levels. Governance mechanisms and clear legal frameworks need to be developed and implemented, to avoid these potential conflicts, and collaborative responses need to be organized that take into consideration different views, needs and interests.

74. The description of the economic processes that have taken place in recent years in the world in connection with land right acquisitions suggests that three main critical political economy issues need to be analyzed: a) the economic and political consequences that land acquisition by foreign states, directly or through firms under their control, could potentially have in the host countries; b) the consequences that the acquisition of land rights by large foreign firms may have on the social and political fabric of

25 It should be noted that in most of the cases in the Southern Cone, foreign investment has been mainly a strategy of national firms to increase their scale and to diversify risks in neighboring countries.

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the countries receiving the investment; c) the impact of the observed land use concentration on agrarian structures, the efficiency of land use and the livelihood of small producers. In the particular case of Argentina, Brazil, Paraguay and Uruguay, these issues have different and specific dimensions.

75. As regards the first critical issue, it has been shown that land acquisition by foreign governments has not taken place in any one of the four countries. Furthermore, given present legislation and the political statements that national governments have made in connection with these issues, it seems quite unlikely that they will occur in the future, with the potential exception of Paraguay, where restrictive legislation still does not exist.
76. With respect to land acquisition by large foreign firms, the figures suggest that it is not quantitatively very significant in Argentina and Brazil, and that given the existing restrictive legislation in both countries, it will not increase significantly in the future. In Uruguay and in Paraguay, the significance of such processes is greater and may continue in the future. However, it is important to note that foreign investment in land in these two countries comes mainly from firms located in Argentina and Brazil. Thus, it may be seen as a regional integration process of primary production, with some minor vertical integration along the production chains. In practical terms, it has been a major source of modernization and technological innovation in the host countries, with positive effects on productivity and total agriculture production. Furthermore, it could represent the initial step of a wider economic integration in the region along the main agricultural production chains, a process that already has an important dimension in the meat sector. A larger regional integration in agricultural production, where the four countries are important international players and are highly competitive, could provide a basis for a stronger regional presence in international markets.
77. The third critical issue is the most complex. There has been significant land use concentration in the four countries during the last 20 years. The impact of these processes on land use efficiency, technical innovation and overall

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production has been positive, as explained in Chapter III. The literature, and the very substantial increases in production and total factor productivity during recent years are clear and wider evidence of such positive impacts (see Trigo, 2011; Sain and Ardila, 2009 and Dias Avila and Evenson²⁶).

- 78.** On the other hand, it has also resulted in a decrease in the number of farms in most countries except in Brazil, and in an increase in the average size of existing ones. This process has a number of economic and social consequences, such as rural-urban migration and changes in the social structure of rural territories. The issue needs to be carefully considered focusing on the obvious trade-offs between the greater efficiency and productivity that exist in the large mechanized agribusiness firms which characterize a substantial portion of the production system of the region, and the social advantages of a more balanced agrarian structure, with a much larger share of total production controlled by small holders. In the four countries both production models coexist; large commercial firms are very competitive and are the basis for most export activities, while family farms are mainly integrated into the domestic market (nearly two thirds of food consumed in the region is produced by family farms)²⁷.
- 79.** Family farming is very important in the four countries, because most of the farms are family farms. They play an important role both in food production and in the economy (since they are large employers of manpower, and they contribute to the generation and distribution of income, as well as to social development). For such reasons, the governments of the region have developed special policies and programs aimed at protecting and enhancing the economic viability and production of small farming, and to gain political legitimacy with those constituencies. The four countries also

26 Trigo, E. Fifteen Years of Genetically Modified Crops in Argentine Agriculture, 2011, Argenbio; Sain G. y J. Ardila, Temas y oportunidades para la investigación en América Latina y el Caribe, PROCISUR IICA, 2009; Dias Avila, F. y R. Evenson, "Total factor productivity. Growth in agriculture: The role of technological capital", Handbook of Agricultural Economics, vol.4, Elsevier, Burlington, 2010.

27 Actually it is hard to make a clear differentiation among the kinds of firms, because family agriculture is not a homogeneous group and on many occasions there are "continuums".

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have specific institutional frameworks for such policies²⁸ and the MERCOSUR has recognized and defined family agriculture as a specific group to be taken into consideration in public policies. It should be noted that family farming in ABPU is not a synonym of poverty as in other countries, because most of such farms are active participants in the market (they are distinguished by the fact that manpower is provided by the family), and the policies implemented are therefore not limited to poverty reduction.

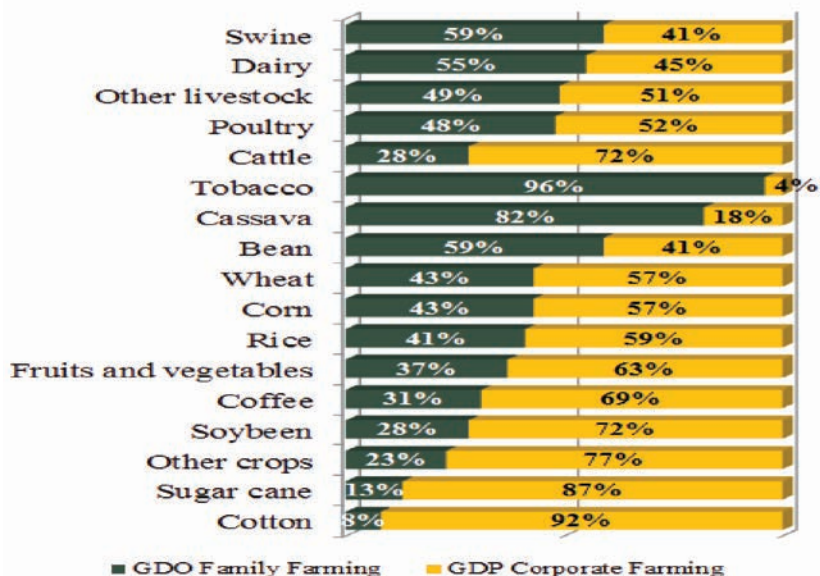
- 80.** According to the 2006 Brazilian Census of Agriculture, family farming accounts for 75% of jobs in the countryside, involving about 12 million people. In relation to the number of farms, family farming accounts for 84% of total rural production units, or approximately 4 million properties. In addition, family farmers account for about 10% of gross domestic product and for 38% of total value produced by the agricultural sector. Family production is geared towards domestic supply and accounts for 70% of the food consumed by the Brazilian domestic market²⁹.
- 81.** In the case of the Brazilian government, the Secretariat of Family Agriculture (SAF), which is part of the Ministry of Agrarian Development (MDA), has about 20 specific programs to support and develop family farming. Family farming is important in the production of some agricultural products, such as tobacco, where 96% of Brazilian production comes from family farming, and also in other crops such as cassava (89%), beans (59%), pigs (59%), and milk (55%), among others, as shown in Figure 23. Similar comments could be made for Argentina, Paraguay and Uruguay, which also have specific projects and programs financed by national and international funds.

28 Ministerio de Desarrollo Agrario de Brasil (MDA); Secretaría de Desarrollo Rural y Agricultura Familiar del Ministerio de Agricultura de Argentina; Dirección General de Desarrollo Rural y Agricultura Familiar del MGAP de Uruguay; Programa Nacional para la Agricultura Familiar del MAG de Paraguay.

29 In Brazil, according to Law 11,326 (2006) a family farmer is defined as the one who carries out projects or activities in rural areas, predominantly using manpower of his own family in economic activities and in an area of up to four fiscal modules (5 to 110 ha – depending on the municipalities).

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Figure 23. Share of family farming and corporate farming in the respective gross product of selected productions in Brazil



Source: Guilhoto et al., 2007.

82. The development of cooperatives, which have a long history in Europe and other developed countries, is one of the existing alternatives available to small farmers to cope with their disadvantage vis-à-vis large operations, to improve their access to capital, to inputs, to product markets, and to technology. Agricultural cooperatives have played an important role in Argentina, Brazil, Paraguay and Uruguay for many decades, and they have contributed substantially to balancing the market power of different sizes of farmers which characterize the rural sector in these countries.

83. In Brazil, according to the Organization of Brazilian Cooperatives (OCB), in 2010 there were approximately 943,000 producers associated in 1,548 farming

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cooperatives. Also according to data from the 2006 Brazilian Census of Agriculture, agricultural farms associated with cooperatives represented 7.6% of total production units (74% of farms associated with cooperatives are smaller than 50 hectares). However, those farms accounted for 35% of agricultural income, showing the importance of Brazilian cooperatives in value added and income generation in agriculture. In terms of area, the total area of the farms associated with cooperatives represents about 17% of total cultivated hectares in Brazil. The performance of cooperatives is similar to that of other private companies of Brazil; they have developed strongly in the South and Southeast, and continue to be concentrated in traditional agricultural regions, while their presence in agricultural border areas is still limited³⁰.

- 84.** In recent years, the government of Paraguay has promoted the development of cooperatives; according to the organization responsible for the regulation and control of cooperatives in Paraguay (INCOOP, Instituto Nacional de Cooperativismo), there are currently 142 production coops in operation, and they have an important role in the agricultural sector: they concentrate 50% of agricultural production, 90% of dairy production and 50% of total agricultural exports.

Forest land issues

- 85.** A special case of land appropriation and concentration is related to the incorporation into agricultural production of pasture and forest land. These processes have increased during the last 15 years, especially with respect to forest land in the Northern part of Argentina and more widely in Brazil and Paraguay. It must be noted that some of the good land available in the region is still pasture land and natural forest. In many cases, the best species have been already cut for wood and energy production, and therefore a good understanding of the current situation is very important, considering that, for several decades, land devoted to agriculture used to be forest land.

30 For example, in the Southern region 38% of total rural production units are associated with cooperatives, while in the Midwest the share is only 18%, still higher than the national average of 15%.

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- 86.** During the last decade Argentina, Brazil and Paraguay have passed new legislation on deforestation and protected areas, which substantially limited the annual rate of deforestation occurred in previous years and contributed to better conservation and management of natural resources. Figure 24 shows that the annual deforested land declined dramatically after the new legislation was implemented in Argentina in 2006.
- 87.** The cumulative deforestation of Legal Amazon from 1988 (when official measurements began) to 2012 shows an increase of 17 times in the deforested area (Figure 25). However, when annual deforestation rates are analyzed, the fall in deforestation rates is evident, especially after 2004, reflecting a tightening of environmental legislation and the increase of Brazil's awareness and commitment in relation to this issue.
- 88.** Brazil has Environmental Legislation that may be considered one of the strictest of the world. The Brazilian Forest Code was created in 1934 and edited in 1965. Over the years, the Code has undergone some changes, and the most recent that is in force today is Law 12,651 of 2012 and the provisional measure adopted on May 25, 2012. Despite amendments to the "new" Forest Code, it still maintains the assumptions and objectives of Law 4,777 of 1965. Two main sources of environmental protection are defined in this Code: the Permanent Preservation Areas and Legal Reserves.
- 89.** Permanent Preservation Areas (PPA) are native vegetation areas of rivers, lakes and spring banks. Lowlands of Pantanal are areas of restricted use and open to specific economic activities. Other activities may be permitted when authorized by the state. The native vegetation required on the banks of rivers and other watercourses must meet the following PPAs (Table 17):

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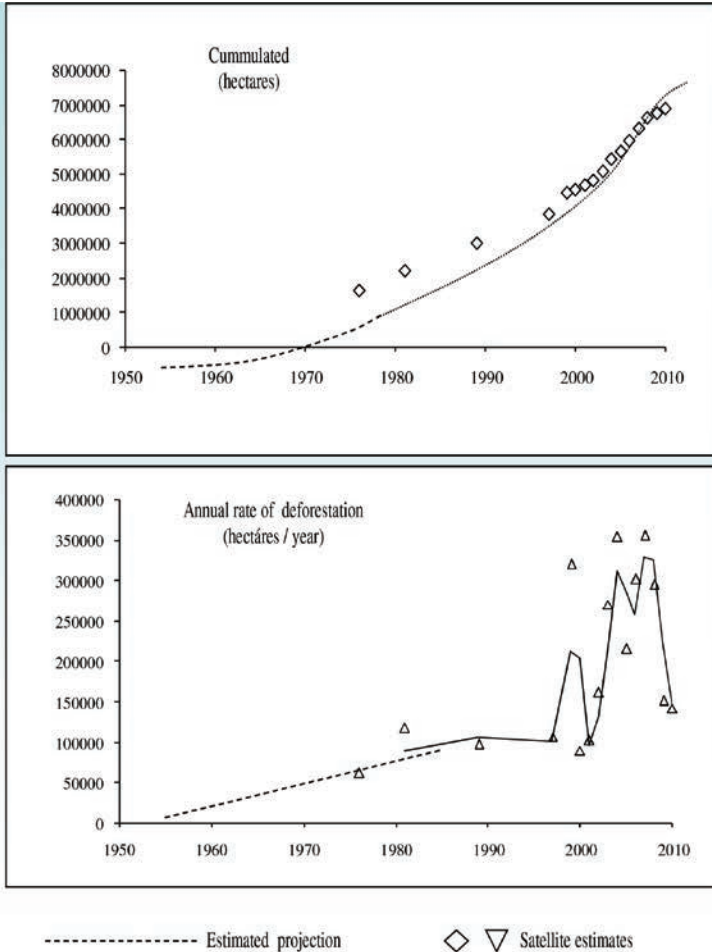
Table 17. Minimum size of the permanent preservation areas along river banks

Width of rivers	PPA
Up to 10 meters	30 meters
Between 10 and 50 meters and around springs of any width	50 meters
Between 50 and 200 meters	100 meters
Between 200 and 600 meters	200 meters
In excess of 600 meters	500 meters

Source: Law 12,651 of 2012.

90. Legal Reserve refers to areas of vegetation that represent the natural environment of the region. These reserves must be equivalent to at least 20% of the total area of the properties, except for Cerrado biome, where the share is 35%; and for Legal Amazon where the share is 80%. The calculation of the Legal Reserve, according to the new Forest Code, allows the sum of the Permanent Preservation Areas (PPA). Economic exploitation of the legal reserve is allowed as long as the property is registered with the Rural Environmental Registry (CAR – acronym in Portuguese) and that the activity is authorized by the appropriate authorities (SISNAMA).

Figure 24. Evolution of deforested area in the Northwest of Argentina

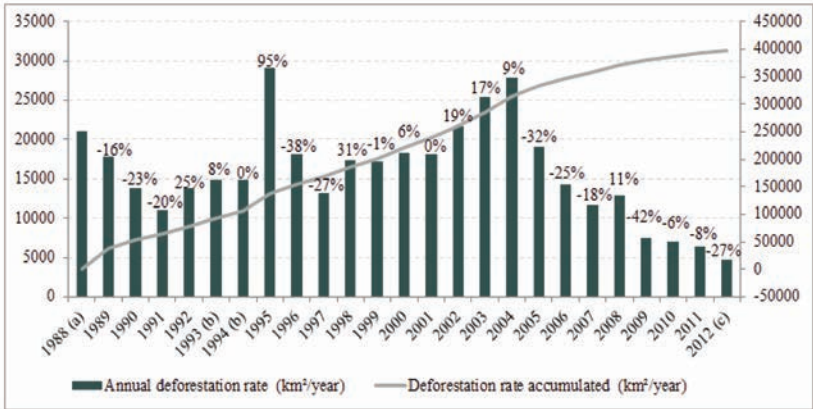


Source: Vigizzo, E., based on Volante et al. 2011.

Note: Cumulative deforestation and annual rate of deforestation in the Northwest of Argentina during the period 1950-2008.

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Figure 25. Annual and cumulative deforestation rates in the Legal Amazon. 1988 to 2012 (in square km per year and in annual %)



(a) Average between 1977 and 1988; (b) Average between 1993 and 1994; (c) Estimated Rate.

Source: Markestrat with INPE (National Institute for Space Research) - PRODES (Estimation Program Amazon Deforestation) data.

91. Covering 850 million hectares, Brazil is a country of continental proportions. 40% of all this land is considered arable land, which means that around 340 million hectares could be used for agriculture and livestock production. The other 510 million hectares include: i) 80% of the Amazon Rainforest area, which is protected by law; ii) other conservation areas such as river banks, wetlands and reforestation areas; iii) cities, towns and roads; iv) lakes and rivers. Table 18 summarizes the use of the land in the country.

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Table 18. Use of land in Brazil and possibilities of expansion – 2007 (million hectares and %)

Brazil	Million ha 850	% of total land	% arable land
Total preserved areas and other uses (60%)	510		
Total Arable land (40%)	340		
Cultivated land: all crops	63,1	7,4%	18,6%
• Soybeans	20,6	2,4%	6,1%
• Corn	14	1,6%	4,1%
• Sugarcane	7,8	0,9%	2,3%
Sugarcane for ethanol	3,4	0,4%	1,0%
• Oranges	0,9	0,1%	0,3%
Pastures	200	23,5%	58,8%
Available land (agriculture and livestock)	77	9,1%	22,6%

Source: ICONE and UNICA, based on IBGE, CONAB and UNICA data.

Climate change and the carbon footprint

92. Climate change is a source of increasing concern within the scientific community in South America. Various recent investigations based on long-term (1950-2010) trends in rainfall records tend to show a more wet weather effect on the plains of the Argentine Pampas, Southern Brazil and Uruguay. It is predicted in this extensive and very important production region with increased precipitations and a growing risk of extreme events and floods. On the other hand, there are perceptible and large-scale drying trends on vast areas of Central and Western Argentina (Andean mountains, Cuyo and Western Patagonia); however these areas are not the main producing crop areas of Argentina (Dai, 2013)³¹.

31 Dai A. (2013). "Increasing drought under global warming in observations and models". *Nature Climate Change* 3:52-59

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- 93.** The carbon footprint of food production is directly associated with the emission of greenhouse gases (GHG) at all chains along the life cycle of a given product. A recent investigation from UNEP (2010)³² demonstrates that the carbon footprint per capita of food production is highly associated with the economic expenditure of the analyzed region. Thus, regions with high expenditure per capita (high-income economies) tend to show a larger carbon footprint than mid and low income economies. The main food producing countries in South America (Argentina, Brazil, Paraguay and Uruguay) show figures of carbon footprint that have a mid position between those of the high and low income countries.
- 94.** The agricultural production systems of the region are much less input intensive than those of the OECD countries, and therefore it is reasonable to affirm that their GHG emissions are substantially lower. However, it should be noted that all such estimates are based on theoretical models' that have not been empirically validated. The methodology approved in 1996 by the UN Intergovernmental Panel on Climate Change was modified in 2006 because during such decade nobody was able to prove that theoretical estimates were consistent with the reality. In addition, is it not clear that the new methodology will provide appropriate estimates on real GHG emissions.

32 UNEP (2010). "Assessing the Environmental Impacts of Consumption and Production". A Report of the Working Group on the Environmental Impacts of Products and Materials to the International Panel for Sustainable Resource Management. Authors: Hertwich E, van der Voet E, Suh S, Tukker A, Huijbregts M, Kazmierczyk P, Lenzen M, McNeely J, Moriguchi Y.

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In the new world food situation, Argentina, Brazil, Paraguay and Uruguay have a major role to play. In our view, the world needs to address and take appropriate actions with respect to a number of issues that affect production and trade. The main issues are:

Strengthening world research and development aimed at increasing productivity and at achieving a more efficient and sustainable use of natural resources

95. Most specialized agencies and international organizations highlight that world food security and natural agricultural resources sustainability rely very much on productivity increases and on a more efficient and sustainable use of available natural resources. Therefore investment in R&D and innovation play a key role to achieve both purposes at the global level, as well as to continue improving the region's growing contributions to the global food supply and demand balance, as has been the case during the last two decades.
96. However, as was highlighted in Chapter II section 1, during the 1980s and the 1990s, agricultural issues did not receive a high priority in national public policies and in the agenda of the development community. One of the consequences has been that in most countries, public investment intensity in agriculture R&D has declined¹. Although the CGIAR centers maintained and very recently increased their funding, it was insufficient to offset the decrease in the rest of the system. The weakness of public research had a serious impact, not only on productivity growth rates but also on R&D

1 This has been the case for most industrialized and the developing countries. Some significant exceptions were Brazil and China.

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in public goods, such as a better knowledge of natural resources and its potential use, the improvement and promotion of resource conservation practices, the efficient use of scarce natural resources, management technologies required to improve productivity², etc. Most of R&D until very recently has focused on productivity increases. However the new challenge is more complex because research should reconcile both objectives: productivity / sustainability. In addition R&D should include other purposes, such as crops more resilient to climate change. Finding all these solutions will need a lot of public and private research.

- 97.** In developed countries, private sector investment in agriculture research and development helped increase productivity associated with the use of some inputs, such as improved seeds, agrochemicals and machinery, in the case of technologies whose costs could be paid to the private sector through intellectual property rights regulations (IPR) involving the cases in which the size of the market was large enough to encourage private investment³.
- 98.** However, this has not been the case for most developing countries in Africa, Latin America and Asia, in which private sector investment has been very limited. Technology developments therefore played an important role only in some innovations and for some developing countries which were able to adapt the innovations to local conditions. In this respect, worth highlighting is Brazil's strategic decision to create EMBRAPA, which helped substantially to develop innovations for tropical areas that were not prioritized by R&D conducted in most developed countries. The dramatic increase in soybean, corn and beef productivity and production in the Cerrado and other tropical areas of Brazil is an interesting example of the importance of that kind of development, aimed at improving productivity and at achieving a more efficient use of natural resources in many developing countries.

2 They are particularly important in beef production.

3 It should be noted that private R&D concentrated on corn, soybean and wheat, while many other productions did not receive much attention (i.e. tropical productions, other cereals and oilseeds, pastures).

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- 99.** In addition, regulations not based on scientific evidence in many relevant markets of Europe, Asia and Africa, limited the use⁴ and /or increased the cost of some new technologies⁵, such as the GMOs. They reduced investment in R&D in such technologies and are delaying their commercial production. This has resulted in a reduction of the potential impacts of such developments on increased productivity, on a more efficient use of scarce resources, and on a lesser use of herbicides and other pesticides through resistant and tolerant seeds.
- 100.** Factors described in sections 93 to 96 resulted in lower productivity growth rates for major agricultural commodities projected for future decades, and have already had negative impacts on the environment (greater use of fuel, herbicides and insecticides; deterioration of groundwater) and on human health in some developing countries⁶. It should be noted that less productivity results in a higher requirement of land and other resources to comply with demand growth.
- 101.** The challenge for the coming decades is to produce more food using natural resources more efficiently and sustainably. For such purpose, public and private investment in agricultural R&D should be increased, to scale up technical solutions, particularly those that foster a more efficient and effective use of land, energy and water. Smart site-specific agro-ecological management approaches that increase productivity, preserve

4 It is interesting to note that the European Commission has stated that: "The main conclusion to be drawn from the efforts of more than 130 research projects, covering a period of more than 25 years of research and involving more than 500 independent research groups, is that biotechnology, and in particular GMOs, are not per se more risky than e.g. conventional plant breeding technologies." Genetically Modified Foods: Scientific Perspective and Controversies Adrian Dubock, In "Safety of Genetically Engineered Foods: Approaches to Assessing Unintended Health Effects". Committee on Identifying and Assessing Unintended Effects of Genetically Engineered Foods on Human Health. National Academy of Sciences.

5 Associated with biosecurity requirements and/or delaying their availability in the market.

6 For intensive crops like cotton and rice, resistance to insects provided by improved seeds reduces the manual application of chemicals in countries like India and China (which often result in human health problems).

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natural resources, and are tailored to specific human and environmental conditions should be developed and promoted. Such approaches include many innovations that are public goods, such as: i) integrated soil fertility management (applying both organic and inorganic fertilizers to the soil while practicing reduced tillage and increasing the reuse of crop residues); iii) increased fertilizer use efficiency through precision agriculture; iii) improved and more efficient irrigation systems. Therefore, the role of public national and international organizations' investment in agricultural R&D should receive a high priority to secure medium and long term global food security and natural resources sustainability.

- 102.** Taking into account the strategic role of South America for medium and long term food security and trade, the international organizations R&D agenda should pay more attention to the region's specific needs, particularly those related to public goods knowledge. It should be noted that, because the Southern Cone countries are better off than other developing regions, the development community (NGOs and international financial and technical organizations) has reduced the priority given to the development of agriculture in the region. However, the performance of ABPU agriculture and its sustainable use of natural resources is very important for the rest of the world, both in regards to food security providing net exports and to the environment, producing global environmental goods (such as oxygen and biodiversity) and lower GHG per GDP and per person.
- 103.** The attention and priorities given by the CGIAR and a number of other international organizations to world food security issues, have largely focused in increasing production and productivity in poor smallholder farm units in developing countries. While this is certainly urgently needed, the activities of these organizations, including R&D, should also be extended to cover the needs of medium and larger scale farm production systems, such as for example ABPU countries, which can make a significant contribution to a more food secure and sustainable world.
- 104.** Another strategic challenge is the environment to promote private sector

investment in agriculture R&D. IPR regulations and enforcement, and sound economic policies are key elements to promote a higher participation of the private sector. Most countries of the region have already shown good progress on IPR regulations and on sound economic policies; however, this is not the case of Argentina, where both issues need to be improved⁷.

- 105.** The possibility of reaching a plurilateral or a multilateral agreement on biosafety regulations should be explored, aimed at reducing the excessive costs and the delays in the availability in the market of innovations associated with different national regulations. The current situation not only increases the cost of innovations, but also discriminates in favor of multinational firms against small and medium sized local firms and from other developing countries, which have financial limitations in affording the high costs required for the approval of new biotechnology developments in the main markets.

Technical assistance to developing countries, including North-South and South-South cooperation

- 106.** Most of total world investment in agriculture R&D is concentrated in industrialized countries, which also exhibit the highest R&D investment intensity indexes when compared with the respective gross value of agriculture production. For such reason North-South technical cooperation continues to be a major challenge for improving global food security as well as achieving a better management of natural resources. This is important for all developing countries, including the ABPU countries.
- 107.** A deeper assessment of the best ways to promote and conduct such cooperation should receive more attention⁸, both at the private and the

7 Currently, the Ministry of Agriculture has prepared a proposal to amend existing legislation which has received support from the industry; however it is still a project to be submitted to Congress.

8 It should be revisited the linear top-down model of knowledge and innovation diffusion from research to farmers through extension.

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public level. Some NGOs have been playing an interesting role in North-South cooperation, particularly in the case of Africa. However, it seems that there is an important potential for intensifying and making more efficient such cooperation with all developing countries.

- 108.** Highlighted in Chapter II is the fact that food security and the hunger situations particularly affect many countries of Africa and other developing countries of Asia and the Middle East. Considering that most of such countries have a large rural population, fostering their agricultural production could be strategic not only for food security but also for development purposes. Productivity of major commodities in such countries is very low when compared with developed countries as well as with ABPU countries. In addition, the lack of improved technologies aimed at producing food sustainably is deteriorating their natural resources.
- 109.** It is proposed that ABPU countries assist other regions to increase production through South-South technical cooperation in connection with innovations in the organization and management of agricultural production, zero till agriculture, commercial practices, and other production technologies.
- 110.** The countries of the region already have some interesting experience on knowledge transfer outside the Americas, and also within LAC countries. Worth mentioning among them are the sharing of innovative technologies, organizational production and commercial structures:
- Brazil started an agricultural revolution thirty years ago that turned the area of the Cerrado (a low production region) into one of the world's largest food reserves. Innovations in beef production, with improved pastures and livestock management technologies, and in crop production, with improved seeds, fertilizers, no-till practices, and soybean-corn double cropping made it possible to dramatically increase beef and crop production at the same time. Because Brazil has much in common with Africa (similarities in climate, soils, culture), this revolution can be transferred to Africa. EMBRAPA (the public research agency) is

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sharing this knowledge with some African countries through the Africa-Brazil Agricultural Innovation Marketplace. The initiative supports the creation of partnerships between African and Brazilian organizations.

- Argentina also has a number of innovative technical practices to share, especially in no-till agriculture, and the adoption of GMO seeds which make it possible to reduce the use of herbicides and pesticides, and to improve the use of water in rain-fed crops. Firms in Argentina have also been pioneers in organizational innovations and commercial structures that help cope with underdeveloped financial markets and increase business efficiency, such as “planting pools” and other innovative organizational networks that develop extensive upstream and downstream linkages. These developments have already been transferred to some LAC and African countries, but in limited cases.
- Uruguay has implemented important innovations in animal tracking systems. It is the first country to have achieved 100 percent cattle traceability. Its experience has already been shared internationally with South Korea and Bolivia.

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Box 1. EMBRAPA in International Technical Cooperation

EMBRAPA in International Technical Cooperation

Nowadays, the main institution responsible for technical cooperation and transfer of agricultural technology from Brazil to other countries is the Brazilian Agricultural Research Corporation (Embrapa), which is linked to the Ministry of Agriculture, Livestock and Food Supply (MAPA). This institution created the National Agricultural Research System (NARS) in Brazil, seeks to gather all scientific knowledge of different states and subjects. This system is supplied with projects developed in cooperation with other research institutions, public institutions, universities, private companies and foundations.

Embrapa has a strong presence in the international transfer of technology, and currently has 78 bilateral agreements with 56 countries and 89

institutions, mainly involving technology transfer and research in partnership.

The institution has 75 technical cooperation projects developed in 31 countries, of which 13 are in Africa. To allow the development of research with international partnerships, the institution created the so-called Laboratories Abroad (Labex's) in which leading technology research is conducted. These laboratories are located in China, South Korea, Europe (France and the United Kingdom), and the United States. The institution also has technology transfer projects in developing countries in Africa (Senegal, Mozambique, Ghana and Mali) and America (Ecuador, Colombia, Venezuela and Panama).

Source: Markestrat, based on Ministry of Agriculture, Livestock and Food Supply (MAPA) reports.

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Box 2. International Cooperation Brazil and Mozambique

International Cooperation of Brazil and Mozambique

Among Brazilian initiatives for technology transfer, the country has a very good relationship with Mozambique, which is the country with the highest number of cooperative activities. Brazil is currently working on the Project to Support Development and Strengthen the Agricultural Research Sector of the Republic of Mozambique, with a set of actions geared towards the operational and institutional establishment of the Institute of Agricultural Research of Mozambique (IIAM).

The main front of the work for Brazilian agricultural technical cooperation is the **Embrapa-ABC Mozambique** program, a partnership between the Brazilian Cooperation Agency (ABC) and Embrapa. The Embrapa-program seeks to strengthen the agricultural, agrarian and nutrition sectors in Mozambique, adapting Brazilian technologies to the specific conditions of the country, developing the Institute of Agricultural Research of Mozambique and empowering its staff. The program consists of three major projects covering the main agricultural areas:

- (i) **Platform** - Technical Cooperation Project for Support to Agricultural Innovation Platform in Mozambique, which aims to strengthen the system of the Institute of Agricultural Research of Mozambique, promoting the planning, coordination, control and evaluation of research actions and the dissemination of agricultural technology. This project is a trilateral cooperation between Brazil, the USA and Mozambique;
- (ii) **ProSavana** - Research Capacity Enhancement Project and Technology Transfer for the Development of Agriculture in the Nacala Corridor in Mozambique. This project will support 400,000 small and medium-sized farmers and indirectly 3.6 million producers, thereby helping Mozambique to reach its potential for food production. The project seeks to increase agricultural production through increased research capacity, and rural extension and investments in warehouses, energy and transportation. This project is a triangular cooperation between Brazil, Japan and Mozambique;
- (iii) **ProAlimento** - Project to Provide Technical Support to Nutrition and Food Security programs in Mozambique. The project aims to strengthen the production of vegetables for consumption in natural and processed form, by producers of family farming, seeking to increase and diversify vegetable production through the implementation of new technologies, promoting greater food supply and enriching the diet of families.

Source: Markestrat, based on Ministry of Agriculture, Livestock and Food Supply (MAPA) reports.

Increasing investment in infrastructure and innovation along the value chain to reduce post-harvest losses and waste

- 111.** The world is producing much more food than what is actually consumed. Post-harvest losses and waste represent a high share of primary production, resulting in a much higher demand on natural resources than what is strictly needed. Therefore, reducing such losses and waste should receive a high priority.
- 112.** In developing countries post harvest losses are very serious, particularly in those facing major food security problems. The lack and the poor quality of infrastructure along the value chain, including storage capacity, transportation systems and other logistics, are responsible for most of such losses; lack of knowledge of post-harvest management plays also an important role, and therefore technical support for improving education is also very important.
- 113.** A better knowledge of post harvest losses in each stage of the value chain and the best practical ways of reducing them, particularly in countries of Africa and in other developing countries, could contribute to implement solutions to such serious situation. The case of the “silo-bags” used to store grain, developed during the last two decades in Argentina, is an interesting illustration of a practical and low capital cost innovation to replace conventional storage facilities⁹.
- 114.** Such kind of innovations along the value chain have not received a high priority in the agriculture research system, mainly for two reasons: i) in industrialized countries, where most of the investment in agriculture R&D is made, the lack of “on-farm” and regional infrastructure capital goods is not a major problem and access to financing is relatively simple and cheap; ii) in most developing countries and in the international research centers, post-harvest R&D all along the value chain is very limited. Therefore there is an urgent need to increase R&D with such an approach.

⁹ In Argentina around 30% of total current storage capacity corresponds to plastic silo-bags, which are very cheap. They help reduce losses and allow a better management and commercial sale of the grain.

- 115.** A significant reduction in post-harvest losses could be achieved with more investment in infrastructure. International cooperation and financial organizations and NGOs can play a significant role in most developing countries. It is important to highlight that during the 1990s, many international financial organizations decided to discontinue the long term financing of agriculture infrastructure in developing countries, which was not replaced by other sources, resulting in insufficient investment (and consequently, more losses). Currently, some developing countries, particularly in Africa, are receiving this kind of support. Two comments on this issue are worth making: i) the amounts being invested in Africa are much less than needed; ii) many other developing countries which also have insufficient infrastructure, including Argentina, Brazil, Paraguay and Uruguay, are not receiving such international support, as already mentioned with respect to other issues in previous sections, and this also impacts on a less efficient use of natural resources and on global food security (also in the case of net exporting countries).
- 116.** A similar challenge of better knowledge and management relates to waste. In these cases, the major challenges appear in industrialized countries. In many cases, consumer preferences lead to excessive losses and waste. Many regulations contribute to such a situation, and should be revisited with this new natural resources approach.

Institutional building and strengthening of existing organizations in developing countries

- 117.** Most developing countries produce substantially less food than their potential as a result of institutional limitations. Such limitations result in insufficient development of human skills and social capital, poor performance of the trading system and markets along the value chain, lack of access to modern inputs and technologies, and a weak legal and regulatory framework. All of them limit investment, development, the adoption of innovations, and production growth.

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- 118.** Food production has moved to very complex and sophisticated production and distribution systems within the production units, but especially in relation with their horizontal and vertical links along the value chains. Productivity, sustainability, quality controls, logistics, auditing and certifications, risk management and mitigation, networking and many other challenges require the development of human capital and institutions.
- 119.** Food security and the sustainability of natural resources in developing countries rely not only on natural resources endowment but also on developed private and public institutions. For such reason, institutional building and the strengthening of existing organizations in developing countries –particularly in Africa and other regions facing significant problems of hunger and food security– should be a high priority for international cooperation. The countries of the region have some interesting experiences, such as the development of value chain organizations and other initiatives to link private sector and public R&D, and could also contribute to such proposal.

Box 3. Brazilian food safety programs

Brazilian food safety programs

Concern regarding food safety has been increasing worldwide, thus affecting industries, producers, distributors, and the entire production chain. Considering this scenario, Brazil has chain traceability and animal and plant health programs. A major supply chain program in the country nowadays is Sisbov (Cattle and Buffalo Supply Chain Traceability Service). This service, created by the Ministry of Agriculture, records and controls the entire meat chain production process through the identification and control of the herd, as well as the tracking of the production process from the perspective of rural properties. It is a service that is well-structured and voluntary. However, there are no incentives for producers to join the

program, due to the fact that the industry does not provide them appropriately. In Brazil there is also the Federal Inspection Service (SIF) which identifies the origin of fresh packed products or animal by-products.

Another initiative regarding Brazilian food safety is the animal and plant health program. Both animal and plant health are under the Agriculture Defense Department (SDA), which is under the responsibility of the Ministry of Agriculture, Livestock and Food Supply (MAPA), and is responsible for preventing, controlling and eradicating diseases and pests of animals and plants, ensuring sanitation and conformity of animal and plant products, agricultural inputs and

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(continuación)

livestock. SDA operates throughout the supply chain, ensuring and protecting the sanitary and phytosanitary heritage of national agriculture. Animal Health reports to the Department of Animal Health (DAS), which acts in the coordination of the programs, ensuring Brazilian animal health. The most important programs and their respective acronyms in Portuguese are: the National Program for Herbivore Rabies Control and Other Encephalopathies, the National Beekeeping Health Program (PNSAp), the National Avian Health Program (PNSA), the National Caprine and Ovine Health Program (PNSCO), the National Swine Health Program (PNSS), the National Program for the Control and Eradication of Brucellosis and Tuberculosis (PNCEBT), the National Equine Health Program (PNSE) and the National Program for the

Prevention and Eradication of FMD (PNEFA). Regarding Plant Health, there is the Department of Plant Health (DSV) that operates in the following areas: Phytosanitary Certifications, Traffic Control of Vegetables, Quarantine, Pest Risk Analysis and Prevention, Surveillance and Pest Control. In this department, each of its operational areas has its own coordination, which conducts several plant health programs, seeking to achieve protection and food safety in accordance with the principles established by international phytosanitary organizations, such as the International Convention for the Protection of Vegetables (IPPC), WTO, FAO and Mercosur. Brazil has numerous sanitation programs, both for animals and for plants, seeking the highest possible safety in food production.

Source: Markestrat, based on Ministry of Agriculture, Livestock and Food Supply (MAPA) reports.

Rational expansion of new agricultural areas

120. As has been highlighted in Chapter II, South America is one of the regions where there is still good quality land available to be devoted to agricultural production. Most of such land is located in Brazil; however Argentina and Paraguay also have a high potential to increase land devoted to agriculture, replacing natural and cultivated pastures. There are millions hectares that are poorly used today. In Brazil, several studies by recognized institutions confirm the existence of nearly 80 million hectares (Table 18) that can be utilized for food and biofuel production, without affecting fragile systems, and mostly growing over degraded pastures. In Argentina, the additional cultivated land could be around 30 million hectares, as described in Chapter III. This production and land expansion, if encouraged with sustainable contracts, will bring inclusion in farming, new entrepreneurs, job creation, better distribution of income and economic development, and will even have a positive impact on democracy.

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- 121.** Unlike what happens in many industrialized countries and in some developing countries, where agriculture is very intensive in capital and in input use, production systems in Argentina, Brazil, Paraguay and Uruguay are less intensive and more environmentally friendly. While in other regions the challenge is how to reduce the excessive use of inputs damaging the soils, groundwater and the environment, the production systems developed in the four countries during the last two decades have shown that there are alternatives to continue to boost productivity while improving soil conditions (the “no-till” integrated strategy already described in Chapter III)¹⁰. In addition, the plentiful availability of renewable water resources in the region could make it possible to increase productivity with irrigation; some areas in the tropics can produce three crops per year.
- 122.** The integrated sustainable production strategy implemented in ABPU countries has already had a very significant impact on production and sustainability. In many of the most productive areas of the region (i.e. the Argentine Pampas, the Southern States and some new production areas of Brazil, the Western crop areas of Uruguay), which several decades ago required the implementation of rotations involving crops and pastures to maintain a sustainable production system (grassland farming), productivity is currently being increased through the expansion of land devoted to crop rotations (soybean-cereals), and a more intensive use of land for livestock production through improved pastures and management, as well as supplementation with several feedstocks (vertical expansion)¹¹.
- 123.** Taking into account the importance of this issue, we include the summary

10 The extremely intensive production system prevailing in many European countries contributed to the emergence of some approaches that sought to move to other extreme options (such as organic agriculture and “green agriculture”), which seem to be unrealistic to meet current and future food demand.

11 In Argentina, in previous decades, small farmers were not using grassland farming because permanent agriculture was more profitable in the short term, and soil conditions were deteriorating until the implementation of the no-till and other associated technologies during the last two decades. In Brazil, the new technologies for livestock production and the no-till strategy for crop rotation in the Cerrado have had an impressive impact on both types of production.

of a recent study conducted in Argentina by Viglizzo, E. et al.¹² ...“Agriculture expanded during the last 50 years from the Pampas to NW Argentina at the expense of natural forests and rangelands. In parallel, productivity was boosted through the increasing application of external inputs, modern technology and management practices. This study evaluated the impact of agricultural expansion between 1960 and 2005 by assessing the implications of land use, technology and management changes on (i) carbon (C), nitrogen (N) and phosphorous (P) stocks in soil and biomass, (ii) energy, C, N, P and water fluxes and (iii) water pollution, soil erosion, habitat intervention and greenhouse gas (GHG) emissions (impacts). Based on different data sources, these issues were assessed over 1.5 million km² (63% of Argentina), involving 399 political districts during three representative periods: 1956–1960, 1986–1990 and 2001–2005. The ecological and environmental performance of 1,197 types of farming system was evaluated through the AgroEcolIndex model, which quantified the stocks, fluxes and impacts mentioned above. Cultivation of natural ecosystems and farming intensification caused a noticeable increase in productivity, a strengthening of energy flux, an opening of matter cycles (C, N, P) and a negative impact on habitats and GHGs emission. However, due to the improved tillage practices and the application of less aggressive pesticides, erosion and pollution risk are lower today than in the mid-20th century. The consistency of some assumptions and results was checked through uncertainty analysis. Comparing our results with international figures, some impacts (e.g. soil erosion, nutrient balance, energy use) were less significant than those recorded in intensive-farming countries like China, Japan, New Zealand, the US or those of Western Europe, showing that farmers in Argentina developed the capacity to produce under relatively low-input/low-impact schemes during the last decades”...

- 124.** The Brazilian Cerrado region covers about 200 million hectares, and is the second largest biome in the country, second only to the Amazon biome. By

12 “Ecological and environmental footprint of 50 years of agricultural expansion in Argentina” Viglizzo, E. et al. published in *Global Change Biology* (2011) 17, 959–973, doi: 10.1111/j.1365-2486.2010.02293.x. 2010 Blackwell Publishing Ltd.

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the late 1960s, the area was considered unsuitable for agriculture, mainly because of the characteristics of the soil. However, since the 1970s, as a result of the development of scientific research, mainly in EMBRAPA, the Cerrado soils became suitable for grain production through management techniques. They are deep soils with little slope and good water drainage. In addition to soil improvement, decisive factors were the development of plant varieties adapted to the climate of the region, no-till planting and crop rotation. In about 40 years the region has changed its reputation from “unsuitable production area” to a region with the highest crop yields in the country, thus making it a great example of agricultural revolution and sustainable development. Currently, according to EMBRAPA, 98.5 million hectares are cultivated in the Cerrado, of which 50 million hectares are planted pastures, 30 million are native pastures, 15 million hectares are cultivated with annual crops, and 3.5 million hectares are perennial crops and forests. The Cerrado now accounts for 76% of national cotton production, 55% of soybean production, 31% of corn production, 22% of bean production and 18% of rice production; it also has 42% of the national herd and contributes with 55% of Brazilian beef production.

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Box 4. Land issues: productivity growth and land expansion

Land issues: productivity growth and land expansion

Given that approximately 450 million ha is savannah and woodlands suited to crop production in Latin America and the sub-Saharan Africa, the combined response to technology and governance is particularly relevant for future land-use strategies.

Ernesto Viglizzo has pointed out that beyond the well-proved impact of high-yielding technology, the recent experience with better governance and monitoring of the Brazilian Amazon and the Argentine Chaco has shown a remarkable drop in rates of deforestation, even as commodity prices have risen sharply in recent times.

The evidence suggests that the individual response of the four countries of the region during the last decade has been to increase the production of food mainly from already cultivated land following a way of less pressure on the environment and natural resources. There are well-proved policies to reduce deforestation in Argentina, Brazil and Paraguay, and policies of forest plantation in Uruguay.

These ideas are clearly aligned with the novel concept of Sustainable Intensification (SI) that aims at: (i) increasing food production while preserving the resilience of the production system through technology incorporation (e.g., no-tillage, precision agriculture); (ii) replacing land by high yielding schemes; (iii) selecting only suitable land for food production avoiding the use of lands that would impose unacceptable environmental cost to society; (iv) assessing production systems under a biophysical and social context (Garnett et al, 2013).

Reference:

Garnett T, Appleby MC, Balmford A et al. (2013). Sustainable intensification in agriculture: Premises and policies. *Science* 341: 33-34.

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Box 5. Sustainable Development Programs for Agriculture in Brazil

Sustainable Development Programs for Agriculture in Brazil

Besides the case of the Brazilian Cerrado revolution, Brazil currently has other programs to develop sustainable agriculture. The Ministry of Agriculture, Livestock and Food Supply fosters and develops agricultural practices aimed at favoring economic, social, cultural, environmental and biotic factors.

The Ministry also designs and implements projects and programs to support producers targeted for technical assistance, financing and regulation of rural sustainable practices. Some of the above-mentioned projects include:

Plano ABC: The Sectorial Plan for Mitigation and Adaptation to Climate Change for the consolidation of a Low Carbon Emission economy in Agriculture (Plano ABC) is the leading program on the subject in Brazil, which will be force from 2010 to 2020, providing 197 billion reales financed through credit lines or budget sources. The goal of the plan is to organize and plan actions to be undertaken geared towards the adoption of sustainable production technologies that will be selected in the search for commitments to reduce GHG emissions in the agricultural sector. According to MAPA, the plan is composed of seven different programs, six of which relate to mitigation technologies and one to actions to adapt to climate change:

- Program 1: Rehabilitation of Degraded Pastures;
- Program 2: Crop-Livestock-Forest Integration (iLPF) and Agroforestry Systems (AFS);
- Program 3: Direct Planting System (DPS);
- Program 4: Biological Nitrogen Fixation (BNF);
- Program 5: Planted Forests;
- Program 6: Treatment of Animal Waste;
- Program 7: Adaptation to Climate Change.

Agro-energy: Brazil has a Department of Sugarcane and Agro-energy, which is linked to the Secretariat of Production and Agro-energy within the Ministry of Agriculture. This Department is responsible for planning and promoting actions to mobilize the state and society with a view to reducing the consumption of fossil fuels and increasing the production and consumption of biofuels, protecting the environment, greater participation in the international market and contributing to social inclusion. The country also has a National Agro-Energy plan, which aims to ensure the competitiveness and sustainability of bioenergy production chains, and to systematize strategies and actions regarding research and development on the subject.

Integrated Production: the program is a voluntary certification process, in which interested producers follow a specific set of technical standards that are audited on farms by federal organizations. Aimed at ensuring sustainability and to allow for traceability of production, Agriculture Integrated Production (PI

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(continuación)

Brazil) focuses on the adequacy of production systems for the generation of high quality and security products, by regulating mechanisms to replace polluting inputs and applying natural resources.

Organic: In organic production, the use of substances that endanger human health and the environment (soluble synthetic fertilizers, GMOs, pesticides) is not allowed. Practices should include responsible use of soil, air, water and other natural resources, and respecting social and cultural patterns. The goal of organic production, both animal and vegetable, is to promote quality of life while protecting the environment. In Brazil, the sector responsible for actions to develop organic agriculture is the Coordination of Agro-ecology (Coagre) that is part of the Secretariat of Agricultural Development and Cooperatives (SDC) within the Ministry of Agriculture. The functions of the Coordination of Agro-ecology are the encouragement, promotion and development of standards and the implementation of control mechanisms. There is a stamp in the country that certifies organic production, which is the Sisorg seal, obtained through an Auditing Certification or by a Participatory Guarantee System.

Soil and water conservation: In Brazil, official programs that contribute to erosion control, restoration of riparian forests and protection of hillsides and springs act as an inductor and catalyst for the practical use of natural resources, assisting in setting guidelines, objectives and goals, which are driven by the Coordination for Sustainable Management of Productive Systems (CMSO) within the Secretariat of Agricultural Development and Cooperatives (SDC). The main program is the National Watersheds and Soil Conservation in Agriculture Program, developed by the Ministry of Agriculture in partnership with EMBRAPA, agricultural research institutions, municipal governments, non-governmental organizations (NGOs) and technical assistance and rural extension. The program has 17 priority actions aimed at promoting development in an integrated and sustainable manner.

Organic vegetable extraction: It is the one in which the product is extracted or collected in native or modified ecosystems, where the maintenance of the ecosystem does not depend on systematic use of external inputs. These activities are regulated by the Ministry of Agriculture and the Ministry of Environment, which set technical standards for obtaining certification of organic products originating from sustainable harvesting.

Agricultural technology: the Ministry of Agriculture, Livestock and Food Supply of Brazil promotes actions aimed at disseminating and facilitating the adoption of technology in the field. The use of advanced technologies leads to sustainable development. In the country, the entity responsible for coordination of technological innovation is the Coordination of Monitoring and Agricultural Technology Promotion (CAPTA). It works on five main pillars: (i) precision agriculture, (ii) agricultural biotechnology, (iii) innovation and intellectual property, (iv) genetic resources and (v) transfer of agricultural technology.

Source: Markestrat, based on Ministry of Agriculture, Livestock and Food Supply (MAPA) reports.

Removal of trade barriers. The danger of new non-tariff barriers, such as environmental, labor and other private standards

- 125.** A smooth and efficient trading system is strategic for global food security. Food security and sustainable production of natural resources could be improved substantially based on supply growth in regions and countries which have high potential to produce in a sustainable manner without subsidies and other trade distortions. This is the case of Argentina, Brazil, Paraguay and Uruguay; and for such reason, the four countries strongly believe in a production and innovation-driven solution to the above-mentioned challenges, rather than in supply and trade limiting approaches.
- 126.** Many challenges to food security are associated with subsidies and other trade barriers implemented by industrialized countries and also by some developing countries. In previous decades, most of these barriers were import regulations and other agriculture support policies which limited production and trade from many developing countries, and had negative impacts on their economic and social development. Despite the fact that some trade barriers have been reduced as a result of the Uruguay Round negotiations, import tariffs on many agricultural products continue to be extremely high. Our countries are seriously concerned about the lack of progress of the DOHA Round negotiations and believe in the urgent need to find solutions within the framework of the WTO.
- 127.** In recent years the situation has worsened, because new private and public import and export barriers have emerged. Considering that trade is an important tool to deal with global food imbalances and to promote a better use of natural resources, we believe that both kinds of barrier do not contribute to the global food security solution; in addition, such barriers increase price volatility.
- 128.** On the import side, we find that new non-tariff barriers such as environmental, labor and other private standards are creating additional production and trading costs, which impact on current high food prices. In addition, they

are limiting production and trade growth that could help improve the global food security outlook. They also create market uncertainties, and often increase the volatility of international prices. Environmental trade barriers that have been recently imposed are based on theoretical models' estimates on GHG emissions that have not been empirically validated, particularly in the case of the production systems of the region. Therefore such trade barriers are not based on scientific evidence.

- 129.** On the export side, in recent years some countries have implemented export barriers, such as bans and quotas, aimed at limiting the impact of world price peaks on their domestic markets. We believe that such measures do not contribute to the global food security solution and also increase the volatility of international prices.
- 130.** Removal of both kinds of trade barriers should receive a high priority in international trade negotiations within the WTO. It should also be part of the international agenda of other forums, such as the G20. Reaching an international agreement on the elimination of all trade import and export barriers could be an important tool to improve the global food security situation and the sustainability of natural resources.
- 131.** It should be noted that some of the new trade barriers are private standards which are currently not subject to international trade negotiations. For such reason, there is an additional challenge: to find alternatives to discuss private standards involving all interested parties from the supply and the demand side.

Improving pricing mechanisms in spot and futures markets

- 132.** In many developing countries, the poor performance of domestic spot markets is a serious limitation for local food production development and regional food security. In such countries, domestic prices show extremely high seasonal variations and sub-regional prices differ substantially from

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the quotations at the ports and at the main consumption centers. The lack of good information systems and the lack of investment in infrastructure (transport, storage and other logistics) are important barriers to improving pricing mechanisms. For exporting countries in which regional prices are substantially lower than export prices, such poor market performance limits incentives to increase local production in areas located far from the ports and from the main cities, particularly in the case of grains with low prices per unit. For importing countries, such limitations result in excessively high prices paid by consumers in areas far from the ports.

133. In addition, in many developing countries¹³ –including some South American countries– the absence of forward and futures markets creates uncertainties which have very negative impacts on both producers and consumers’ incomes, particularly when world food prices on international reference futures markets show high volatility, as is the case when the supply-demand situation is tight. Therefore, at the same time that we look for a good performance of leading countries’ futures markets (used as benchmark prices¹⁴), which have been recently evaluated by the respective countries’ regulatory agencies, it should be noted that it is in the interest of developing countries to promote and strengthen local forward and futures markets. Improved information systems and developed markets will also contribute to reduce transaction costs along the value chains in developing countries.

134. International technical and financial assistance to improve information systems, to promote futures and forward market development and to increase investment in infrastructure should receive a high priority in most developing countries, including the South American countries.

13 It should be noted that in other developing countries facing more hunger and food security problems, as is the case in many African countries, the situation is still more critical.

14 We find that the above-mentioned futures markets, characterized by the high liquidity provided by all their participants (including the transparent speculators operating in the market), contribute positively to providing market signals.

Investment in the development of a new generation of fertilizers

- 135.** Fertilizers are among the most important and expensive inputs for agriculture. In circumstances in which yields must be improved, their importance is even greater. It is an important challenge to produce fertilizers from alternative sources, such as plants that can better absorb the energy of the sun, recycling of by-products and other renewable sources of fertilizers aimed at mitigating the risks and reducing the costs of fossil fertilizers in the future.
- 136.** Such challenge highlights the importance of additional R&D aimed at the development of new fertilizers, as well as on the strengthening of the new holistic approach included in the “no-till production strategy” based on biosystems¹⁵ described in Chapter III.4.

Biofuel production in the region

- 137.** The growing interest in biofuel production in most leading countries during the last decade has also been taken into consideration by the governments of the region, which have implemented several policies in recent years to promote the production and use of biofuels. Biofuel production has aroused growing interest in Argentina, Brazil and Paraguay in connection with economic, energy supply and environment driving forces. There are several factors supporting the increase of biofuel production and consumption in the region:
- Projected regional production growth rates of sugar, coarse grains and soybean are much higher than regional and global food demand growth rates. The high potential growth of the cultivated area and the productivity of the main crops will allow the region to substantially increase food exports, while also increasing biofuel production.

¹⁵ Which also reduce the need of chemical fertilizers.

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- The social and economic contributions that such additional production could make to regional development and job creation, including energy supplies (biofuels and biogas), and beef/dairy production in areas in which such production is currently insufficient to supply local demand¹⁶;
- The development of new alternative energy markets, making it possible to diversify the demand and risks associated with excessive concentration on agricultural production and exports by the countries of the region;
- The excessive dependence on imported fossil fuels, and the opportunity to diversify the energy supply matrix through local biofuel production (import substitution);
- The positive impact on the environment associated with the substitution of fossil fuels with the biofuels produced in the region, based on low input production systems (substantially different from those implemented in the European Union and the US).

The reasons mentioned above and the growing importance of biofuel production for the countries' trade balances, resulted in the projected increases of mandated biofuel blends for the next decade.

138. As described in Chapter III, in the case of Argentina, Brazil and Paraguay, total projected increases in soybean and in coarse grain supply during the next decade will make it possible to provide increasing availability of soybean and coarse grains for use as feed-food to be consumed in the region and to be exported to rest of the world as grains, by-products, meats and dairy products, and enough feedstocks for the growing needs of biofuel production. In the case of Brazil, where the main biofuel is sugar cane ethanol, the scenario is very favorable: increases in sugar cane supply during the next decade will make it possible to provide enough cane to meet the growing needs of domestic biofuel consumption, while increasing the

¹⁶ Regional income growth, job creation and energy supply are key components for poverty reduction and food security in less developed rural areas of the region, which have abundant natural resources.

availability of sugar for consumption in the domestic market and for export to the rest of the world. Most of the additional ABPU commodity production included in the forecasts for the next decade included in Chapter III (sugar, sugar cane ethanol, soybean meal, soybean oil, coarse grain and its processed food products -meats and dairy products-) will be destined for export markets.

- 139.** For the reasons mentioned above (regional economic development, trade balance, market diversification, positive impact on the environment in the case of sugar and extensive grain production, high potential growth of food production and exports in addition to biofuel production and exports), in our opinion, the region's biofuel production should not be analyzed on terms similar to the cases of Europe and the US.
- 140.** A further assessment of the better sources of biofuels would show that the example of Brazilian ethanol production based on sugar cane is a very interesting alternative. It has been produced for more than 35 years, using only 1% of the country's arable land and supplying 52% of fuel transport consumption, with very little impact on food production. The growth of food production and biofuels in the State of Sao Paulo (the major area in which sugar cane is produced) during the last 10 years shows that it is possible to combine and increase both types of production. In addition, the energy balance of sugar cane ethanol is 4.5 times better than that of ethanol produced from sugar beet or wheat, and almost seven times better than ethanol produced from corn in the Northern Hemisphere. Most of the countries of the region can dramatically expand sugar cane production that could be used for the production of bioethanol and other byproducts.
- 141.** The region has also a large potential of bioenergy production based on second-generation biofuels and biogas. R&D in the region and in other developed countries should receive a high priority, which could result in a better use of waste, forest byproducts and other alternative sources available in the region.

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V. The Global Perspective: Addressing the International Agenda on Food Security and Agricultural Natural Resources

- 142.** During the last 15 years, the world has witnessed unusual economic growth and the emergence of an expanding middle class in many parts of the developing world. One major consequence of the global increase in purchasing power is the growth in the demand for food and other agricultural products, including bio-fuels and other non-food uses of agricultural products.
- 143.** These demand increases have made evident a growing economic scarcity of natural resources including energy, minerals and agricultural natural resources (including arable land, water and forests), and have brought back the specter of resource scarcity and food insecurity. Furthermore, the fundamental conditions that have led to the current situation are most likely to continue in place for the next decade or two.
- 144.** Fears of resource scarcity are not new, but recent food price surges have brought back the discussion about the world's capacity to feed itself with new intensity and urgency. The Malthusian trap image is back at the forefront. These images and the pressing political problems that have emerged, such as food insecurity and related political unrest in some countries, have resulted in a number of initiatives and proposals that attempt to address the urgent need for more and better global governance mechanisms that could promote global food security, while preserving resources for future generations through their environmentally responsible and sustainable use.
- 145.** These initiatives have been described and analyzed in a series of studies and statements concerning the issues emerging from an increasing demand for food and for renewable fuels and the finite availability of natural resources such as land, water and fossil energy. The main issue under discussion is the need for alternative options to improve the world governance of food

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production and distribution and the sustainable use of natural resources. This analysis needs to take into consideration the political economy issues involved, and the interests and political behaviors that different stakeholders and governments may have in the international arena. Consequently, the issues of food security and access to agricultural natural resources have emerged as an important item on the international agenda.

- 146.** It is important to note, and it is one of the main arguments presented in this document, that the collective production capacity of the four countries (Argentina, Brazil, Paraguay and Uruguay) is an important part of any possible global solution. At present, they are the largest net food exporting region of the world and, as shown in Chapter II, they have a large potential to increase their food production, based on their endowment of land, water, forests, biodiversity and other natural resources, and the social capital represented by well-developed organizational and managerial skills. For these reasons, their views on the existing initiatives on the international agenda should be given serious consideration. These views are presented in the following paragraphs.
- 147.** The discussion that follows focuses on initiatives that entail the creation of formal or informal structures and/or processes by which countries and/or other stakeholders agree to participate in the discussion and development of agreements on common actions to address perceived common needs. Eight main areas of analysis and proposals are presented.

Food Security

- 148.** The international agenda has incorporated food security as a major concern. It was recognized as such in the World Food Summit in 1996 and again in 2009, and has been included in the United Nations Millennium Development Goals as Goal Number 1. More recently, in the Rio plus 20 Conference, participating countries recognized Food Security as a human right. This recognition and the global commitment that emerged in the

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Conference, suggest the need for concerted global action to eradicate hunger and malnutrition.

- 149.** Two main governance mechanisms have been created in recent years:
- a)** The Committee on Food Security (CFS) that functions under the FAO administrative umbrella. Its members are FAO member governments and other interested stakeholders, who are represented under established mechanisms. It has different layers of internal governance procedures. The CFS is technically supported by the High Level Panel of Experts (HLPE), which has the responsibility of analyzing food security issues and proposing common actions.
 - b)** The High Level Task Force (HLTF) that, under the leadership of the UN Secretary General and the vice-chairmanship of the Director General of FAO, serves as a coordination mechanism for 22 UN organizations. The HLTF recognizes CFS resolutions as governmental policy guidelines and attempts to coordinate a common response to global problems, by the UN system.
- 150.** These two formalized mechanisms provide a basis for the development of coordinated actions at the global level and represent an important opportunity. However, it is suggested that, in order to attain its potential the CFS needs to fully involve high-level decision making officials in charge of food security issues from the respective countries; governance requires decision making and unless those who attend the CFS have this authority nothing will happen. Private sector participation should be promoted, and the number and importance of participating NGOs should be revisited.
- 151.** In addition, in recent years the nutrition component has gained special attention. One expression of this increased attention is the Scaling Up Nutrition (SUN) movement. Created under the aegis of the UN Secretary General, it is a concerted effort of the UN system; and a number of countries that have made a commitment to work jointly for the elimination of

malnutrition, especially in expecting mothers and children less than two years of age. The magnitude of the effort provides SUN with some elements of a global governance mechanism.

High volatility of food prices

152. The recent increased and very high price volatility of major food commodities has created great concern, and a number of proposals have either emerged from the G20 deliberations, or have been proposed by international organizations such as IFPRI, or the HLPE that works within the Committee on Food Security. Three of them are especially significant:

i. AMIS, which is an information system on food production, stocks, commercial policies and food security conditions and has proved to be an important creation. Countries have made the commitment to report regularly on these issues. Compliance is still a major issue to be resolved (more commitment needed). The correct functioning of AMIS is in the best interest of all concerned and the GPS initiative supports its development.

ii. Enhanced Regulation of Commodity Futures Markets. Individual countries where future markets operate have taken some additional regulatory measures. Collective action at the global level seems to be unfeasible.

iii. International reserves initiatives. Creation of stocks with the specific objective of regulating international price volatility has been promoted in many occasions. Generally speaking, there is agreement that they are expensive to maintain and have not been an effective solution to resolve global price volatility and food security. Previous international agreements on physical food stocks have failed. It is also difficult to find a practical and feasible solution based on virtual stocks held by exporting countries. It seems that existing options on food stocks (physical or

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virtual) should be restricted to national stocks and, in some cases, to small regional stocks to face emergencies, especially for situations where poor physical infrastructure in roads and ports make the rapid distribution of food difficult, when there are climatic or other types of emergencies. Regional stocks of this type have been proposed by FAO in the PREPARE scheme. The financing of such national and regional stocks could be part of the international strategy to reduce hunger and improve short term food security events in low income countries.

The creation of small regional stocks to support rapid response actions when food shortages appear and threaten the food security of poor social sectors is particularly relevant to ABPU countries. These are major food exporters and may be called to make contributions in case of emergencies. In addition, there is a standing offer from the Government of China to contribute funds to such an initiative. The governments of the region have not taken an official position on this matter and need to do so.

- 153.** Chatham House has proposed that biofuels producers buy options from the biofuels industry in order to release them when food shortages appear. It seems that this proposal puts all the responsibility for regulating food price volatility on the shoulders of countries that are biofuels producers, and does not specify who would bear the financial burden. In addition, it does not seem to be a very effective way of dealing with the issue of food price volatility.

Formation of a specialized forum on agricultural natural resources

- 154.** The growing economic scarcity of natural resources and the potential difficulties for meeting world food demand at reasonable prices have created new concerns related to the need to establish mechanisms to promote an efficient use of such resources and an equitable distribution and access to agricultural food production. A proposal for a new global governance

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mechanism has been advanced by a Chatham House report¹. The main idea has been to create a new association of the worlds' principal resource-producing and consuming countries, where governments and stakeholders could address and agree on proposals leading to an efficient and sustainable use of natural resources.

- 155.** In our view the creation of such a Forum is unnecessary. We believe that the efficient and sustainable use of natural resources is very much a sovereign decision of the countries that have them. In addition, other forums such as the G20 and the CFS already exist and have the capacity to delve into these issues.
- 156.** The CFS has been identified as the highest political forum to deal with world food security issues. It should coordinate all existing world food security initiatives and provide leadership towards a more food secure world. It has already advanced in a number of issues related to food security and the management of natural resources. The Voluntary Guidelines for Land Tenure are an example that could be expanded to other relevant aspects of its overall mandate. In addition, it is our view that the CFS should prepare an annual report on the 'State of the World's Agricultural Resources', and should launch an international resources data bank to standardize, in a transparent manner, the collection and sharing of data on resource endowments, stocks, production and trade figures, with a view to increasing the ability of governments, civil society and local communities to monitor the use of natural resource at the global and local level.
- 157.** On the other hand, it is our view that the countries that have large endowments of agricultural natural resources should develop, individually and collectively, sound policies in regards to their efficient and sustainable use. In this way they would, in their self interest, take care of an important natural and economic asset. But, in addition, they would contribute and respond to their collective responsibility in relation to the global community.

1 "Resources Futures". Bernice Lee, Felix Preston, Jaakko Kooroshy, Rob Bailey and Glada Lahn. A Chatham House Report. December 2012.

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In considering the need for a stronger collective action for the efficient and sustainable use of agricultural natural resources, the countries of the region make a commitment to work within the GPS initiative to promote their views and needs in the international arena. These actions could be a first step in the construction of a wider coalition.

Foreign investment in agricultural land and agricultural production

158. The growing economic scarcity of agricultural natural resources and their unequal distribution around the world has created economic and political conditions leading to rapidly increasing investment by individuals, private corporations and, in certain cases, governments in agricultural land, in most cases associated with production projects. Governments that have been active in this area are those that have limited access to agricultural natural resources in their own countries and are at present, and more so in the future, important net food importers. As shown in Chapter III, investment in land by governments from outside the region has not been a significant activity in the four countries. However, there is considerable evidence (Deninger et al., World Bank, 2011²) that in other regions -mainly in Africa- there are investments in land associated with large agricultural production projects where the benefits for the recipient countries and the local communities have not been evident. These situations suggest that there is the danger of a potential problem emerging, and that there is a need for a mechanism that will allow for some degree of transparency and global governance in connection with foreign land acquisition projects.

159. A first step has been taken with the Voluntary Guidelines for Land Tenure approved at the 38th Special Session of the Committee on Food Security in May 2012. A mechanism to oversee compliance with these guidelines in land acquisitions by foreigners is necessary, and could be negotiated as a second step within the CFS.

2 Deninger K. and D. Byerlee (2011). Rising Global interest in farmland: Can it yield sustainable and equitable benefits?, Washington DC. The World Bank.

***Innovation and international technology transfer
to less developed countries***

160. Innovation is the main instrument to increase agricultural production within the limits of sustainable production principles. Agricultural research has been mainly a public good developed by public sector organizations, both at the national level and by the CGIAR and other international organizations at the global level. However, in the last couple of decades, the global innovation system has changed, and a large proportion of innovations is being developed by the private sector and sold in the market. Consequently, the international transfer and utilization of available technology in the developing world is determined, to a large extent, by the actions of the private sector, whose innovations are promoted and protected by intellectual property rights legislation. The collection of royalties limits access to innovations by poor farmers in less developed countries, where no institutional and technological basis exists for appropriate protection of intellectual property rights. The pressing need for a global increase in food production calls for a collective action that may accelerate the access to and the use of technology in the less developed countries that have a significant endowment of natural resources. One possibility is the creation of an International Forum organized jointly by FAO, the CGIAR, WTO and WIPO, where governments and the private sector could evaluate, negotiate and agree on mechanisms to obtain a more complete and effective use of innovation opportunities in less developed countries. Most of the decisions that affect these processes have been taken, up to now, by private firms from importing countries with little participation and/or consultation with the supply side.

Private Standards

161. Standards for food and agriculture are governed at the international level by the Codex Alimentarius, which is administered by FAO. In recent years, trading companies and retail supermarkets have started to apply specific quality

and/or safety requirements that have not been negotiated by governments within the context of the multilateral or bilateral trade agreements. These private standards represent a new challenge for exporting countries and have become new non-tariff barriers to trade. Unilateral decisions that have been taken in recent years are limiting trade and increasing food costs without generally accepted scientific support, discriminating against exporting developing countries. This issue needs to be considered at the multilateral level, and should be incorporated as a special subject in the WTO. Despite the fact that we believe that solutions should be negotiated within the WTO, since such negotiations are stalled, we welcome the recent creation of the United Nations Forum on Sustainability Standards involving the participation of public, private and civil society organizations, aimed at promoting dialogue among the different players. The region should actively participate in such initiative.

Elimination of perverse subsidies

162. Subsidies to agricultural production and exports are pervasive in the world. Furthermore, after some years of clear improvement, the present international financial and economic crisis has brought back a recurrent use of these economic policies. Some of these subsidies not only distort prices and markets, but have a perverse environmental impact by promoting excessive use of natural resources and inputs. In the long run, these subsidies will have a negative effect on the productivity of agriculture and its sustainability. Several organizations, including FAO, UNEP, WTO and UNDP, have addressed this issue, and more recently, the G20 has expressed concern and proposed some actions. We support the creation of a multilateral action plan that could be promoted by the G20, in consultation with the multilateral international organizations that deal with the subject. The action plan should set forth clear recommendations in respect of possible actions and should include specific proposals to support poorer states in reforming their resource pricing, as well as promote effective channels and fora to share experiences and technical expertise.

Biofuel production and consumption

- 163.** The use of biofuels has expanded rapidly in the world, and Argentina and Brazil are major producers and exporters. Furthermore, the four countries could substantially expand production and are making investments to do so. In the present situation of energy prices biofuels production is competitive in the countries of the region and does not need production subsidies. For these reasons, the countries of the region consider the production of biofuels as a legitimate economic activity that can have a favorable impact on rural development and employment in ABPU, but keeping in mind the importance and urgency of achieving global food security and its future developments. The position of the four countries is that biofuel production and trade should be governed by the same international rules and agreements as other agriculture-related goods.
- 164.** However, biofuel production has developed within a special legal and economic framework mainly determined by three interrelated elements: i) the demand for biofuels is largely determined by the legal frameworks applied by a number of countries that regulate their mandatory use in prescribed percentages. These regulations are mainly determined by environmental and fossil fuel import substitution concerns that are outside the food markets. This has led to proposals to limit these requirements in order to decrease the mandatory use of biofuels; ii) special subsidies have been applied to promote its production and export, distorting the markets in favor of biofuel production. On the other hand, a number of restrictive measures have been implemented by producing and importing countries, which introduce additional distortions and impact the level of trade; iii) a growing recognition of the interrelation of biofuel markets and food price volatility has created concerns that may lead to regulatory frameworks like the one proposed by Chatham House (see paragraph 153 in this chapter).
- 165.** In connection with these regulatory proposals we do recognize that: a) the growing importance of biofuel production and its close association and interrelation with food markets and prices makes it necessary to closely

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monitor the market performance thereof; b) clear global agreements need to be established with respect to statutory frameworks that regulate their mandatory use in regular fuels; c) limitations on production and export subsidies need to be established. However, it would seem that no special global governance mechanism is necessary and that existing institutions should assume responsibility for implementing these three points.

Annex

Sao Paulo Workshop Agenda

Global Food Security and Agricultural Natural Resources Role and Views of Argentina, Brazil, Paraguay and Uruguay

WORKSHOP - São Paulo, July 18th and y 19th, 2013

July 18th

20.00: Reception – dinner (Baby Beef Rubaiyat Avenida Brigadeiro Faria Lima, 2.954 Pinheiros – São Paulo)

July 19th

AGENDA

09.45 hs: Reception of delegates – FIESP, AVENIDA PAULISTA 1313 - 15th Floor “SALA EJECUTIVA”

10.00 hs: First Meeting

Welcome Address: Joao de Almeida Sampaio Filho, President of the Superior Council of Agribusiness of Sao Paolo's Federation of Industries (FIESP)

Roberto Rodrigues, Coordinator of FGVAgro

Project Presentation and Objectives: Horacio Sánchez Caballero

10.45 hs: Second Meeting

Presentation of Paper: Marcelo Regúnaga

Discussion. Coordinator: Roberto Rodrigues (Brazil)

12.00 hs: Lunch

Annex

14.00 hs: Third Meeting

Discussion of Chapter III – The International Role of Argentina, Brazil, Paraguay and Uruguay.

Presentation: Marcelo Regúnaga

Comments by: Achim Zickler – (Senior Research Advisor, Center for Development Research (ZEF), University of Bonn, Germany)

Discussion: Coordinator: Roberto Rodrigues (Brazil)

14.45 hs: Fourth Meeting

Discussion of Chapter IV – Argentina, Brazil, Paraguay and Uruguay. View and perspectives: Key Issues for the International Agenda.

Presentation: Marcelo Regúnaga

Comments by: Michel Petit (Chairman Scientific Council FARM Foundation (France))

** Mr. Petit unable to assist, Mr. Bailey kindly agreed to do the comments.*

Discussion: Coordinator, Gerardo Berton (Paraguay)

15.30 hs: Fifth Meeting

Discussion of Chapter V – The Global Perspective: Addressing the International Agenda on Food Security and on Agricultural Natural Resources
Presentation: Martín Piñeiro

Comments by: Máximo Torero (Director Markets, Trade and Institutions Division IFPRI)

Discussion: Coordinator, Carlos Pérez del Castillo (Uruguay)

16.15 hs: Sixth Meeting

Conclusions and proposals

16.35 hs: Closing of Workshop

Benedito Ferreira (Chief Director of Agribusiness division - FIESP)

Francisco Matturro (Vice President - ABAG)

Horacio Sánchez Caballero (Project Coordinator - CARI)

