

Report No. 12123-PA

Paraguay Agricultural Sector Review

August 2, 1995

Country Department I
Natural Resources, Environment and Rural Poverty Division
Latin America and the Caribbean Regional Office



WEIGHTS AND MEASURES

The metric system has been used throughout the report.

ABBREVIATIONS AND ACRONYMS

ARP	Rural Association (<i>Asociación Rural del Paraguay</i>)
BCP	Central Bank (<i>Banco Central del Paraguay</i>)
BNF	National Development Bank (<i>Banco Nacional de Fomento</i>)
CAH	Smallholder Credit Agency (<i>Crédito Agrícola de Habilitación</i>)
CDR	Rural Development Council (<i>Consejo de Desarrollo Rural</i>)
CGIAR	Consultative Group on International Agricultural Research
DEA	Agricultural Extension Directorate (<i>Dirección de Extensión Agraria</i>)
DGC	General Directorate of Cooperatives (<i>Dirección General de Cooperativismo</i>)
DIA	Agricultural Research Directorate (<i>Dirección de Investigación Agrícola</i>)
EU	European Union
FG	Livestock Fund (<i>Fondo Ganadero</i>)
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
GIS	Geographic Information System
IBR	Rural Welfare Institute (<i>Instituto de Bienestar Rural</i>)
IFAD	International Fund for Agricultural Development
IICA	Inter-American Institute for Cooperation in Agriculture
INDI	The Paraguayan Institute for Indigenous People (<i>Instituto Paraguayo del Indígena</i>)
LURP	Land Use Rationalization Project
MAG	Ministry of Agriculture (<i>Ministerio de Agricultura y Ganadería</i>)
MERCOSUR	Southern Cone Common Market (<i>Mercado Común del Cono Sur</i>)
MOPC	Ministry of Public Works and Communications (<i>Ministerio de Obras Públicas y Comunicaciones</i>)
MSPBS	Ministry of Health (<i>Ministerio de Salud Pública y Bienestar Social</i>)
NAFTA	North American Free Trade Agreement
NGO	Non-Governmental Organization
PHRD	Policy and Human Resources Development Fund (of Japanese Government)
SENASA	National Environmental Sanitation Service (<i>Servicio Nacional de Saneamiento Ambiental</i>)
STP	Technical Planning Secretariat (<i>Secretaría Técnica de Planificación</i>)

PARAGUAY
AGRICULTURAL SECTOR REVIEW

Table of Contents

	Page
EXECUTIVE SUMMARY AND POLICY MATRIX	i
I. INTRODUCTION	1
II. EVOLUTION OF THE POLICY ENVIRONMENT	3
A. Macroeconomic Policy	3
B. Policy towards the Agricultural Sector	4
III. SECTORAL STRUCTURE AND CONSTRAINTS	7
A. The Agricultural Resource Base	7
B. Land Use and Tenure	8
C. Agricultural Systems	11
D. Agro-Industry and Infrastructure	12
E. Agricultural Finance and Credit	13
F. Marketing and Trade	15
G. Agricultural Research and Extension	17
H. Institutions in the Sector	18
IV. AGRARIAN ISSUES	21
A. Environment and Natural Resources	21
B. Land Distribution and Titling	23
C. Rural Poverty and Living Conditions	24
D. Rural Women	27
E. Indigenous People	27
V. THE POTENTIAL FOR SECTORAL DEVELOPMENT	29
A. Introduction	29
B. Market Opportunities	29
C. Productive Resources	33
VI. STRATEGIC OPTIONS AND POLICY	39
A. Introduction: The Long-Term View	39
B. The Objectives of Agricultural Development	40
C. The Proposed Strategy	41
D. External Assistance	44
APPENDIX A	46
APPENDIX B	54

PREFACE

This Report is based principally on the findings of a Bank mission which visited Paraguay in November/December 1992. The mission comprised Messrs/Mmes. Steven Oliver, Guzmán García-Rivero, Steven Schonberger, and Philip Hazelton (of the Bank), and Anna Roumani, Anne del Castillo, Isabel Valencia, John Young, Jonathan Lynch, Jonathan Renshaw and John Strasma (consultants to the Bank). The mission was supported by additional material and background papers contributed by Messrs. Robert Kirmse, Alain Tobelem (of the Bank), and Roberto Ronchietto, Alfonso Graña, Alvaro Soler, Diego Payssé, Carlos Peralta, Reuben Ausher and Eduardo Zaffaroni (consultants to the Bank). A considerable amount of this work was carried out under two Japan PHRD grants, executed by the Bank in close cooperation with the Ministry of Agriculture and forming an integral part of the preparation and implementation of two new lending operations.

The principal findings of the Report were discussed with the Planning Directorate (previously the Gabinete Técnico) of the Ministry of Agriculture during 1993, and an unofficial translation of the Green Cover Report was submitted to the Government in early 1994. It is the Government's intention that the Grey Cover Report should receive as wide a dissemination as possible, and that its conclusions and recommendations should be discussed in an open forum at the same time as the soils mapping and agro-ecological zoning work carried out under the first PHRD grant.

PARAGUAY

AGRICULTURAL SECTOR REVIEW

EXECUTIVE SUMMARY AND POLICY RECOMMENDATIONS

1. This Agricultural Sector Review has four main objectives and is designed to assist the Government of Paraguay to plan and to adopt a new strategy for agricultural development, aimed at achieving a harmonious balance between the maintenance and protection of natural resources and an expansion in sustainable agricultural production. These objectives are:

- (a) to bring up-to-date the Bank's knowledge of the agricultural sector of Paraguay;
- (b) to analyze the opportunities for and constraints to its further development;
- (c) to propose the outline of an appropriate strategy and the accompanying body of policy measures to guide development towards agreed objectives; and
- (d) to define the role of external assistance in the implementation of the strategy, and to map out a program of Bank assistance.

2. Detailed description and analysis of the agricultural sector is provided in the Annexes to the Review which are contained in a separate Technical Volume. This Report does not attempt to summarize the material contained in the Annexes; rather, it describes key features and issues, in order to provide support for the proposals of strategy and policy for the future development of agriculture and the resolution of agrarian and rural problems.

3. The agricultural sector is of fundamental importance to the economy of Paraguay and its future growth. It produces more than one-quarter of GDP, employs almost half the work force, and generates 90% of registered exports. More than half of industry's value-added comes from agro-industry and almost half of Paraguay's population lives in the rural areas. The future well-being of the agricultural sector is crucial to the development of the economy as a whole and to the welfare of a major part of the population. Paraguay faces a significant number of agrarian issues and is rapidly reaching a turning-point in agricultural development as the agricultural frontier is neared.

4. The central thesis of this Review is that the resource endowment and the availability of markets are sufficient to allow the agricultural sector to continue to grow and to catalyze the growth of the economy as a whole. The nature of

agricultural development, however, must undergo a radical transformation from the strategies adopted in the past. A fundamental structural change is required, from the present implicit policy of continuous expansion of the agricultural frontier to a strategy of intensification of resource use via the development and adoption of sustainable agricultural production systems. If the overall challenge is accepted, a coherent and balanced strategy is adopted, and the policies necessary to implement it are put in place, most of the sector's problems can be successfully overcome.

5. The role which the agricultural sector has played in the past, simultaneously absorbing a growing population while providing domestic food requirements and most of export earnings, must continue but against a backdrop of changing circumstances, particularly related to pressure on natural resources. The Government should take a long-term view and address the structural issues affecting the agricultural sector and its development. Intensification of land use, significant increases in production, diversification, development of sustainable production systems and maintenance of the resource base are perfectly compatible objectives; however, their achievement requires a strong public sector role in key areas of support to the private sector. The long-term agricultural strategy should: (a) make the allocation of resources, including land, as flexible as possible; (b) encourage those forms and sizes of landholding which maximize output; and (c) integrate agricultural production and agro-industry, to maximize value-added within the framework of Paraguay's comparative advantage in international trade.

6. The agricultural sector has experienced a high rate of growth almost continuously throughout the past 30 years, but the development strategy employed to achieve this growth has created a number of serious problems. The rate of growth achieved in the past cannot be sustained in the future by a continuation of the same strategy because the physical incorporation of new land into agriculture has almost reached its limits. The growth and development already achieved cannot be maintained because of the lack of protection being given to the resource base. The development achieved to date has been unbalanced between sub-sectors, narrow in terms of the key importance of a few products (particularly in exports), and inequitable in terms of the skewed distribution of assets and of the benefits of development.

7. The overall objective of agricultural development in Paraguay should be to maximize the contribution of the sector to the development of the economy as a whole and to achieve a significant increase in rural well-being. The objectives which will contribute to this are the following:

- (a) to increase output and exports, and to diversify production;
- (b) to adopt sustainable production systems;
- (c) to promote the efficient use of land and other factors of production;

- (d) to maintain the productive resource base, and to conserve natural resources including part of the remaining natural forest; and
- (e) to improve the productive and income-generating capacity of the rural population, including indigenous people, and to reduce the incidence of rural poverty.

8. The strategy proposed and supported by the recommendations of this Review is aimed at: (a) the consolidation of the sectoral development achieved to date; (b) the maintenance of the productive base of the sector; and (c) an increase in gross sector output, in the productivity of all factors of production, and in rural well-being.

9. The policy recommendations which follow from this analysis are grouped into three major areas: (a) sectoral growth; (b) the environment and sustainability; and (c) the alleviation of rural poverty.

The continued growth of sectoral output requires the Government to pursue policies at both the macro-economic and the sectoral levels that enhance the sector's ability: (a) to exploit market opportunities, particularly exports, and (b) to intensify and to diversify production in the face of limits on the expansion of the productive area.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• The outward-looking and expansionary strategy for agriculture requires a supportive macro-economic framework. The macro-economic reforms achieved since February 1989 have significantly improved producer incentives in the sector, but may be threatened if unemployment or inflation become major political issues.• The absence of long-term savings in the domestic financial system limits lending maturities in private sector lending to agriculture. This is an important impediment to the provision of those investments necessary to improve productivity and to diversify into sustainable production systems.	<ul style="list-style-type: none">• The unified exchange rate should be maintained, and pressures should be resisted to return to the multiple exchange rate system. Exchange rate intervention should be limited to buffering short-term fluctuations resulting from external shocks.• Financial sector reform should be continued, to remove the remaining distortions in financial intermediation and to mobilize rural savings.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• In the past, the financial sector has suffered serious distortions as a result of targeting and subsidization of credit to the agricultural sector. This was reduced in 1989-1991, but worsened in 1992.	<ul style="list-style-type: none">• The Government should avoid giving incentives (via targeting and subsidies) through the credit system, particularly to medium and large-scale farmers. In the case of small farmers with poor or non-existent access to the formal banking system, any credit interventions should be narrowly targeted, designed to operate transparently, and consistent with broader financial sector reform initiatives.
<ul style="list-style-type: none">• Paraguay's low level of taxation (as a proportion of GDP) is the counterpart of a less than optimal supply of public goods, including infrastructure and services for agriculture and rural areas. The public sector is inefficient and, in the case of agriculture, unfocused on the major issues.	<ul style="list-style-type: none">• Public sector expenditure should be increased in agriculture and the rural areas, to enable the Government to play a key role in sectoral development. Taxation should be increased to fund these expenditures, but must be accompanied by institutional reform to ensure that additional resources are used efficiently. The fiscal reform should be strongly supported. The <u>Impuesto a la Renta</u> should be applied to the whole agricultural sector, and should evolve as rapidly as possible from the "presumed" basis to an actual income basis wherever possible. The <u>Impuesto Inmobiliario Rural</u> should reflect market prices for land and should have progressive rates; it should incorporate the information to be compiled in the Geographic Information System (GIS) under the Land Use Rationalization Project, in order to define land values based on intrinsic productive capability. These changes would explicitly encourage the more efficient use of land.
<ul style="list-style-type: none">• The Government's long-term strategy towards the agricultural sector has not been made explicit. The resulting lack of a coherent set of policy measures creates uncertainty in the sector and limits government's ability to support growth.	<ul style="list-style-type: none">• The government should define and issue its long-term strategy and supporting policies as soon as possible.

Issue

Recommendation

- The process of agricultural policy formulation is poorly defined and appears in many cases to be ad hoc. This is a major constraint to sectoral development in the face of the necessary shift towards intensification and diversification. The analysis and coordination of agricultural policies in the context of MERCOSUR is also seriously affected.
- There are few interventions in trade or in price formation; the few import prohibitions which do exist tend to distort production decisions and provide consumers with lower quality products, and they are unenforceable in practice when price differentials become significant.
- The role of the public sector is ill-defined, and complementarity between the public and private sector is not exploited.
- The existing institutional structure is inadequate for the implementation of the new strategy.
- Government is highly concentrated in Asunción and its effective representation in the rural areas is extremely limited.
- The capability for policy formulation and analysis in MAG should be strengthened by hiring additional qualified staff, training of existing staff, and the establishment of cooperative agreements with universities and the private sector.
- The generally open trade regime should be further improved by the abolition of the remaining import restrictions and reference prices in agriculture, as well as the export and quasi-export taxes on the major export commodities.
- The role of the public sector should be clearly defined. Formulation of policy and design and implementation of government programs should include the participation of producer groups, agricultural processors and exporters.
- On the basis of the redefinition of the public sector's role, MAG and other public sector institutions should be restructured, staffed and funded accordingly.
- The responsibilities of Departmental and Municipal authorities and the appropriate means to fund them should be defined clearly and early to allow appropriate institutional strengthening to be carried out prior to devolution of authority. Decentralization, as expressed in the Constitution of 1992, should not be allowed to create inefficient bureaucracies at the Departmental level.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• The civil service is highly politicized and suffers from poor pay and career prospects, resulting in low productivity.• Government assistance to the agricultural sector through credit, research and extension, and restrictions on imports have encouraged the sector's focus on a narrow range of products. This has increased the sector's exposure to fluctuations in international prices and its vulnerability to major crop pests, and has resulted in the adoption of production systems which rapidly mine the production potential of the soil. It has also created a highly concentrated marketing system.	<ul style="list-style-type: none">• Institutional reform should include well-defined career streams and professional development opportunities. The reform should cover the whole of the public sector; piece-meal interventions should be restricted, and where they are felt to be necessary they should represent interim solutions.• Government programs of assistance to the sector should provide producers with a range of production options based on agro-ecological potential, market opportunities, availability of inputs and capacity of farmers. Credit should be delinked from specific crops. A market information system should be developed to improve access to marketing activities by cooperatives and other new entrants.

Agricultural development based on extensive and extractive land use is inefficient and unsustainable, and it is destructive of natural resources and important eco-systems. A coherent and long-term strategy must be adopted, based on intensification and sustainability of land use.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• The unplanned and uncontrolled incorporation of land into agricultural production in the Eastern Region has encouraged excessive and inefficient deforestation. In many areas, land has been deforested without regard for the quality of the soils or for the topography. MAG has limited resources to enforce even the existing (inadequate) controls on land use. The existing legal framework (i.e., the Ley Agraria) has certain deleterious effects on resource use.	<ul style="list-style-type: none">• On the basis of the work being done under the Land Use Rationalization Project (LURP) to form the first levels of information of the GIS and to analyze the policy and legal frameworks affecting land use, the Government should implement a policy of agro-ecological zoning, including where necessary changes in legal provisions. This should emphasize incentives and minimize the need for the enforcement of command and control regulations.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• Land distribution by government fiat has resulted in production systems based largely on the size, rather than the productive potential, of the holding. Inefficient and often destructive land use has increased the need to bring new, and increasingly marginal, lands into production.	<ul style="list-style-type: none">• Application of the <u>Impuesto a la Renta</u> and the <u>Impuesto Inmobiliario Rural</u> should reflect the productive capacity of land, to encourage the better utilization of land through subdivision or consolidation into units which permit the realization of the land's productive potential.
<ul style="list-style-type: none">• Erosion and degradation of soils is a major problem on many farms. There is a wholly inadequate application of existing and available technology to the maintenance of soils and their fertility.	<ul style="list-style-type: none">• Land titling should be improved to increase incentives for good land stewardship. Technical packages incorporating soil conservation practices should be developed, in conjunction with the definition and implementation of agro-ecological zoning, for transfer to farmers.
<ul style="list-style-type: none">• Research and extension facilities and personnel are ill-suited to the immediate challenge of moving agricultural production onto a more ecologically-sustainable basis.	<ul style="list-style-type: none">• The Government's research and extension bodies (DIA and DEA in MAG) should strengthen their links with the CGIAR system, IICA and other multilateral research fora, in order to benefit from international experience. The focus should be on staff development and on technology adaptation and transfer appropriate to the absorptive capacity of the sector.
<ul style="list-style-type: none">• Deforestation has been accompanied by an inadequate definition of protected areas and of the requirements for their support and maintenance.	<ul style="list-style-type: none">• The policy of agro-ecological zoning should include the definition of those areas of remaining forest and other eco-systems which should be protected. An aggressive program should be followed to obtain international support for the acquisition of land in reserves, and Government should explicitly recognize its obligation to design and implement fiscal and institutional measures to maintain the reserved areas. Similar consideration should be given to the Chaco which, though less threatened, contains many fragile eco-systems.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• There are no large continuous blocks of land titled to indigenous communities in Eastern Paraguay, and the forest resources utilized by the indigenous communities are rapidly dwindling.	<ul style="list-style-type: none">• The design of protected area management plans should consider the participation of indigenous communities. Specific rights could be given to indigenous people within larger conservation areas, and they could be encouraged to take an active role in park management.

The alleviation of rural poverty, though closely associated with access to land, requires greater production support, improved access to social services and basic infrastructure, and particular attention to the needs of rural women and indigenous people.

<u>Issue</u>	<u>Recommendation</u>
<ul style="list-style-type: none">• The extent and nature of rural poverty in Paraguay is poorly understood. This limits the ability of the Government to design and target programs of assistance to the rural poor.• Landlessness and the occupation of sub-economic holdings are growing problems in Paraguay, despite four decades of Government-sponsored, large-scale land settlement. The Government's ability to meet the rural poor's demand for land is limited by the exhaustion of state-owned lands, its reluctance to expropriate large holdings, and the rising price of land.• More than 60% of farmers with holdings of less than 5 ha do not have formal title to their land; this limits their access to credit and reduces the incentives for the maintenance of the productive potential of their land.	<ul style="list-style-type: none">• The Government should carry out an extensive survey of rural households in conjunction with the Agricultural Census to determine levels and sources of income, access to social services, and living conditions.• The Government should explore options for assisting landless and near-landless poor to obtain land through greater reliance on the land market. Emphasis should be placed on reducing transaction costs (e.g., in titling) and on the provision of basic social services and production assistance. The size of holdings should be flexible to reflect differences in land quality and the capacity of the farmer. Progressive taxation of land should be an integral feature of the tax code.• The Rural Welfare Institute (IBR) should focus on the accelerated titling of existing holdings. The titling process should be simplified and decentralized, as has been achieved on a pilot basis in the Department of San Pedro, in order to lower the cost to landholders.

Issue

- Low public sector expenditures on essential social and physical infrastructure (education, health, water and sanitation, roads) in rural areas seriously affects the well-being of the rural population and reduces its developmental potential. The marked difference in the quality of government services between rural and urban areas adds to the pressures driving rural-urban migration.
- The multi-faceted role of women in rural families is often poorly understood or ignored in programs of assistance to the rural poor. Education is a key element in the ability of women to increase their contribution to farm productivity, reduce the size of families, and improve family diet and overall health.
- Problems of access to land, lack of title and poor social services are particularly acute for indigenous communities. The staff and financial resources of the principal institution concerned (the Paraguayan Institute for Indigenous People - INDI) are inadequate for its responsibilities. NGO assistance is inconsistent and uneven in its coverage.

Recommendation

- Greater priority should be given to the provision of services in rural areas. Incentives should be strengthened to improve the quality of health and education personnel working in rural areas. As decentralization occurs, Departmental and Municipal authorities should be given increasing responsibilities and support for the provision of infrastructure and services.
- Programs targeted to women should combine production and family welfare components. The progress made in increasing the education level of girls should be expanded.
- INDI should be strengthened, and should work in cooperation with other government agencies and ministries to improve the provision of social services to indigenous communities on a more consistent basis throughout Paraguay. The role of NGOs should be clarified, and should be closely coordinated through INDI.

PARAGUAY

AGRICULTURAL SECTOR REVIEW

I. INTRODUCTION

1.1 The agricultural sector in Paraguay has played a fundamental role in economic development, and both the resource endowment and the availability of markets are sufficient to allow the sector to continue to grow and to catalyze the economy as a whole. In 1992, the agricultural sector (broadly defined to include crops, livestock and forestry) generated 27% of Gross Domestic Product (GDP) and employed almost half of the total work-force. Industry, by comparison, produced 16% of GDP and, to emphasize the importance of agriculture, the contribution of agro-industry to total industrial value-added is over 50%. The agricultural sector provides 90% of registered exports; the crops sub-sector alone provides over 80%, almost all of which comes from cotton and soybeans and their processed products. This marked dependency on two crops is a relatively recent phenomenon, dating from the mid-1970s.

1.2 The development models emphasizing industrialization and urbanization which characterized most Latin American countries in the post-1945 period were not adopted in Paraguay, which today has the lowest levels of urbanization in the region. The 1992 Census indicates that almost 50% of the population of 4.1 million lives in the rural areas. Instead of a tendency to marked rural-urban migration, with the resultant increase in the number of marginalized poor experienced by so many countries, Paraguay has achieved a deconcentration of its population via the settlement of previously-undeveloped parts of the country. The social and economic development strategy pursued by Paraguay during the past four decades has led to an increase in the importance of the agricultural sector, but the benefits of agricultural development have not been shared in a balanced manner by the rural population. Increasing contradictions have occurred in the structure of land-holding and the welfare of a growing mass of peasants, and rural poverty is a serious and apparently worsening problem.

1.3 Since the colonial period, the development of the agricultural sector of Paraguay has been based fundamentally on the extraction of natural wealth. Over the long term, the natural forest has been exploited for its valuable timber and via other extensive, and basically sustainable, activities - for example the production of yerba mate. The gradual extension of the agricultural frontier has been driven partly by the need to absorb a growing population but also by commercial interests emulating the large-scale farming of neighboring Brazil, particularly the State of Paraná. The former was adopted as the basis of the Government's agricultural and rural development strategy in the 1950s, and resulted in a large-scale and quasi-subsistence form of population settlement over large areas of the Eastern Region. The Government's major road-building programs quickly put huge areas within economic access. Large tracts of state-owned land (the *tierras fiscales*) were distributed to both

large and small farmers. Large-scale internal migration was coupled with the arrival of many farmers from Brazil seeking land as the agricultural land resources of Paraná and Mato Grosso were exhausted. In recent decades, the advent of large-scale commercial agriculture has accelerated the rate of deforestation and has brought most of the best soils into production.

1.4 Over the course of the last four decades, a national agrarian economy has been created and the different phases of evolution of the sector have left their mark on the structures of land holding and production. Indigenous hunter-gatherers, extensive cattle ranchers and subsistence farmers (often on sub-economic holdings) are all present, in addition to numerous forms of production based on commercial farming. This heterogeneity gives rise to a complex set of challenges in the formulation of development strategy and policy. The administration that took office in 1989 stated that a differentiated set of policy instruments must be provided, with the state focusing its scarce resources on the small farmers. The new administration has not yet enunciated its policy; the resurgent demands of small farmers and the landless are ensuring that attention is focused on their concerns. While these demands are of obvious importance, it is important to bear in mind that there are a number of issues which encompass the whole spectrum of producers and which demand the attention of the Government.

1.5 There is no long-term plan or ultimate objective defined by the government concerning land use. Policy makers have implicitly assumed in the past that unused forested land is sufficient in size to allow the postponement of difficult decisions for a matter of decades. This approach has influenced both strategy and policy, and has helped to form the institutions, the administrative and legal structures, and patterns of public and private expenditure. Little has been put back into agriculture, and only scant attention has been paid to such issues as the sustainability of production or the environmental consequences of extensive development. A resource-based approach to agricultural development has also diverted attention from the need to increase productivity to remain internationally-competitive in the key export crops.

1.6 Paraguay is rapidly approaching a crucial juncture in the development of its agricultural sector. All of the stages of agricultural development through which Paraguay has passed have been extractive and exploitive of natural resources. With land as an abundant factor, the natural renewal of fertility and the low intensity of land use allowed this to operate in the past as a "sustainable" form of production. However, the acceleration of development over the past twenty years has meant that the frontier of agricultural development, based on the extension of the productive land area, will soon be reached. In addition, there is a serious problem of increasing degradation and erosion of soils in the areas already taken into production. Therefore, a radical change in the strategic approach to the development of the sector must be adopted, which should emphasize efforts to increase output and productivity in tandem with a heightened concern for the environment and the preservation of natural resources.

II. EVOLUTION OF THE POLICY ENVIRONMENT

A. Macroeconomic Policy

2.1 The economic history of the past two decades is one of strong growth (1970-1981), followed by periods of stagnation (1982-1986) and slow recovery (1987-1993). Between 1970-1981, GDP grew at an annual rate of 8.1% in real terms, equal to 4.7% per capita. The main driving forces of economic growth were a major and sustained increase in agricultural production and exports, and the construction of joint-venture hydroelectric projects with neighboring countries, at Itaipú and Yacyretá on the Paraná river. Investment increased from 15% of GDP in 1970 to 29% in 1981, excluding Itaipú.

2.2 After 1981, the economy suffered a severe recession caused by a combination of external and domestic factors, and GDP declined for two successive years. When growth resumed in 1985, it was at a much reduced rate and less than the growth rate in the population. The recession was aggravated by poor macroeconomic policy which attempted to ameliorate the effects of the recession through a program of public investment and spending. The result was to compound the recession with financial disequilibrium which created far-reaching and long-lasting distortions.

2.3 Upon assuming office in February 1989, the government faced fundamental macro-economic difficulties including: (a) economic stagnation, caused by a multiple exchange rate system and distortions in relative prices due to price controls and import prohibitions; (b) financial disequilibrium, caused by a large public sector deficit and by interest rate ceilings; and (c) balance of payments and external debt problems, reflecting economic stagnation, the build-up of external arrears, and negative long-term capital inflows.

2.4 The policy response included: (a) the unification of the exchange rate and the institution of a managed float system; (b) the elimination of most price controls; (c) the introduction of comprehensive fiscal reform and a reduction in public expenditure; (d) the liberalization of interest rates; and (e) the initiation of negotiations with external creditors. These policies helped to reduce inflation, which declined from 38% in 1990 to an estimated 15% in 1992. Since 1991 there has been marked slippage in adherence to these reforms, especially with respect to exchange rate and fiscal policies. Of particular concern was the increase, between 1990-1992, of public salary costs, from around 5.6% to 8.3% of GDP.

2.5 Financial sector reforms were introduced, including the removal of interest rate ceilings and the modification of reserve requirements among the different types of financial institutions. After an initial jump, interest rates on lending operations by the commercial banks to agriculture have tended to stabilize. An important deficiency of the financial market is the virtual absence of long-term financial instruments, in part a legacy of former interest rate regulations but also reflecting uncertainties related to economic and political stability.

2.6 The level of taxation in Paraguay is low, between 8-10% of GDP, and is among the lowest in the Latin America region. Evidence suggests that the tax burden on the agricultural sector is no higher, and probably in practice lower, than on other sectors of the economy. The fiscal reforms introduced in Decree 125/91 are intended to simplify the national tax code and to make the system more responsive to economic growth.

2.7 Public expenditure on the agricultural sector amounted to only 2.3% of the Central Government budget in 1990. Half the intended allocations of the 1993 agricultural public budget (which includes all institutions involved in the sector) was destined to finance the agricultural credit programs of the National Development Bank (Banco Nacional de Fomento - BNF), the Smallholder Credit Agency (Crédito Agrícola de Habilitación - CAH) and the Livestock Fund (Fondo Ganadero - FG). Nearly 30% of the agricultural budget is debt servicing. The remaining 20% is allocated to research, training, marketing and the agrarian reform programs.

B. Policy towards the Agricultural Sector

2.8 With one major exception, there has been little government intervention in the production aspects of the agricultural sector. This has been due as much to the loose enforcement and ease of by-pass of regulations as to any consistent application of free market principles. The major departure was the intervention introduced in the early 1980s via multiple (under-valued) exchange rates and the policy of *aforos* (administratively-determined export prices used to determine the surrender of foreign exchange by exporters). By imposing significant levels of *de facto* export taxation, both of these measures severely distorted both input:output price relationships within agriculture and agricultural prices relative to the rest of the economy.

2.9 There are very few interventions remaining in agricultural markets and, of those, even fewer are sufficiently enforced to affect the market. After 1989, most direct price intervention was eliminated. The official reference price mechanism was maintained to provide "indicative" market prices but without any attempt at effective control. These were abandoned for wheat and soybeans after 1990, but remain for cotton. The only other official actions are for the Government to participate as a "mediator" between producers and agro-industries such as in cotton and oilseeds. There are no state marketing intervention boards.

2.10 In cotton production, apart from credit through the BNF and the public seed improvement program, there is normally little Government involvement. Because of the large number of people involved in cotton production and the fact that they are all small farmers, government intervention on an *ad hoc* basis is frequently demanded and achieved. In recent years, climate, pest and disease problems have reduced yields, and low world prices have reduced incomes; in response, the government has from time to time instituted short-lived support measures. In early 1992, for example, a Fondo de Apoyo al Productor de Algodón was established, which set a minimum price for cotton delivered to the gin and instituted a government subsidy. It is difficult to know what actual impact this had on producer prices.

Soybean processors lobbied intensively in late 1992 to persuade the Government to reinstate an export tax on soybeans to reduce their cost of raw materials, but the Government refused to deviate from its recent free trade course. Wheat production, however, is protected through a program of special credit lines and strict import controls through permits and quotas. Paraguayan producers are thus able to command a price higher than the international price from the local industry, which must buy all of local production despite the inferior quality of the product.

2.11 Estimates of nominal and effective protection coefficients for Paraguay for the period 1984-1988 indicate that the over-valuation of the currency was the most important determinant of producer incentives, often reversing the effects of government's direct price policies, which generally provided some protection to producers of both exportable and importable commodities. After government moved to a unified market exchange rate in 1989, farm-gate prices increased but lagged behind international prices for two years, whereas input prices increased immediately to international levels. By 1991, farm-gate prices were generally at least as high as their border price equivalents.

2.12 There are only three taxes which directly affect the agricultural sector. The rural real estate tax (*Impuesto Inmobiliario Rural*) is based on a fiscal value of parcels defined by the *Servicio Nacional de Catastro* (SNC) in the Ministerio de Hacienda and collected according to a cadastre maintained by the SNC. The unrealistically low fiscal valuations and the incomplete cadastre make the actual collections of this tax a very small part of the potential. The tax rate is only 1% of the fiscal value of land, reduced to 0.5% for holdings of 5 ha or less, and IBR colonists are exempted from its payment for five years. The revenue-raising capacity of this tax will increase greatly as the new cadastre is compiled, which is the main objective of the Land Use Rationalization Project (LURP) supported by the Bank. The *Impuesto Adicional a las Grandes Extensiones y Latifundios* is only a token gesture, in practice, at making the real estate tax progressive. Under the provisions of the 1992 Constitution, both of these taxes will be administered and collected by the Municipal authorities; they will need considerable technical assistance and a proper working arrangement with the Ministry of Finance (as responsible for the cadastre) if this is to succeed.

2.13 The sector is also subject to a Livestock Sales Tax (*Impuesto a la Comercialización Interna de Ganado Vacuno - ICIGV*) and to value-added tax (IVA). The income tax (*Impuesto a la Renta*) introduced with the fiscal reform will be applied to the agricultural sector based on a presumed level of farm income calculated as a function of the zonal fiscal valuation of land. Holdings of less than 20 ha will be exempted. With the introduction of this tax, originally scheduled for January 1994, but postponed until July 1994, the ICIGV is to be abolished. Given a progressive rate schedule, this could prove useful in encouraging more productive use of land and in the break-up of large holdings, especially of unutilized or under-utilized land. Its effectiveness, however, will depend on the establishment of property values which reflect the market value and productive potential of the land.

2.14 Since 1989, there has been little direct intervention for the main export crops of cotton and soybeans, other than minor export taxes and stamp duties on export documents which cost the exporter up to 15% of the FOB value. A notable exception was the producer price subsidy provided for cotton in 1992 to lessen the combined impact on small farmers of low world prices and low yields resulting from poor weather conditions. A credit subsidy pursued at the same time attempted to provide a transfer to small farmers to cover loan arrears rather than as a production incentive.

2.15 Government intervention has generally been focused on importable crops. The main instruments utilized are quantitative restrictions on imports, official procurement prices generally set below equivalent border prices, and commodity-specific subsidized credit. The rediscounts are the main instruments, especially in cotton, soybeans, wheat and sugar cane. The Banco Central del Paraguay (Central Bank - BCP) makes loans to the private commercial banks (at preferential interest rates) which are used for specific crops and activities; they are essentially seasonal and short-term, and are concentrated in the harvesting and marketing of cotton and soybeans.

2.16 While these policies have provided some protection to producers from foreign competition, liberalization of the exchange rate has significantly reduced the government's ability to control imports. Thus, the main effect of government policy has been to ensure higher consumer prices for the "protected" commodities. The small contribution of these crops to Paraguay's agricultural output, the readily available supply from its export-oriented neighbors, and the decreasing effectiveness of protection suggest that existing policies to promote domestic production are both impractical and undesirable.

III. SECTORAL STRUCTURE AND CONSTRAINTS

3.1 Agricultural production, processing and marketing in Paraguay are essentially private sector undertakings which operate in a market economy with little Government interference. Important Government interventions in the past, however, have left their marks on the structure and functioning of the sector and on the environment. The most important intervention was the strategy of opening up new land for settlement. On the positive side, large areas have been brought into productive use and are the source of most foreign exchange earnings from registered exports. On the negative side, this was not achieved efficiently and there are increasingly serious environmental consequences. There are several constraints to the further development of the sector, not all of which can be resolved by direct governmental intervention.

A. The Agricultural Resource Base

3.2 Paraguay has a total area of 406,752 km² of which only 2.3% is made up of bodies of water. Although there are no major physiographic contrasts, its relatively complex geomorphology combined with wide variations in climate (particularly rainfall) and natural drainage result in distinct agro-ecological zones. In the period 1980-1990, the cultivated area of Paraguay increased by about 1.0 million ha and the area under planted and natural pasture increased by 5.4 million ha. More than one-third of the forest area remaining in 1980 was deforested during this period and converted to crop and livestock use.

3.3 Paraguay is divided physically, climatically and administratively into two distinct regions: the Eastern Region and the Chaco. The Eastern Region accounts for only 39% of the national territory but has 98% of the country's population and 98% of its farms. The Chaco accounts for 61% of the national territory, but its relatively harsh climate and isolation have limited agricultural activity, though the region does contain a wide variety of agro-ecological zones; in some areas, soils are moderately fertile and, depending on rainfall, drainage and management, have some agricultural potential. The lack of fresh water supplies, either in surface flows or aquifers, is the main factor limiting agricultural development in the Chaco.

3.4 Before 1992, no overall soil survey had ever been undertaken for the Eastern Region, let alone for the whole country, even at a reconnaissance level. In order to provide the basic data for the implementation of new strategy in agriculture, the Land Use Rationalization Project (LURP) is being implemented, financed in part by a Bank loan and a Japanese PHRD grant. The project includes the development of a Geographic Information System (GIS), the basic levels of information for which will be completed by March, 1994. This includes, for the Eastern Region, a reconnaissance-level soil study at a scale of 1:100,000 and accompanying maps of (a) soils and geomorphology; (b) satellite imagery interpretation of actual land use; and (c) natural vegetation cover. Derived from soils maps and from the climatic and

topographic overlays, agro-ecological zoning is being carried out to define appropriate land use and supporting policies.

B. Land Use and Tenure

3.5 Data from the 1991 Agricultural Census indicate that 299,259 farms occupy an area of 23.8 million ha, or reported to be about 58 percent of the total land area of Paraguay. Land use on these farms is reported to be as follows:

Table 3.1 Land Use: Census Data
('000 ha)

Region	Annual Crops	Permanent Crops	Improved Pasture	Permanent Natural Pasture	Plantations, Planted Forest and Natural Scrubland	Fallow and Degraded Land	Other	Total
Eastern	1,534.1	82.1	1,472.2	4,794.1	2,312.4	494.3	739.5	11,428.7
Chaco	42.8	3.0	843.5	5,462.0	5,506.0	79.0	452.6	12,389.0
TOTAL	1,576.8	85.2	2,315.7	10,256.1	7,818.4	573.3	1,192.1	23,817.7

This aggregative approach leads to a considerable under-estimate in terms of total land use. The total area of the Eastern Region, for example, is 15.98 million ha, and almost all of the land is in private ownership. The conclusion is that there is serious under-reporting and/or that significant areas of land are not recognized as being held in farms or productive units.

3.6 The analysis of land use from satellite imagery interpretation associated with the reconnaissance soil survey has given the following preliminary results for the Eastern Region:

Table 3.2 Land Use: Image Interpretation
('000 ha)

	Forest		Crop Production		Pasture		Other	Total
	Continuous and Residual	Scrub	Mechanized	Non-mechanized	High	Flooded/Floodable		
	3,321.8	361.6	3,171.9	2,139.5	1,974.7	3,983.1	1,030.2	15,982.8
Forest	3,683.4							
Cropland			5,311.4					
Pasture					5,957.8			
Other							1,030.2	

A comparison of these data indicates that the area under crops as measured from satellite imagery is considerably greater than that calculated from census returns. The area remaining under forest appears similarly to be under-estimated by the census analysis of land use.

3.7 Land holding in Paraguay reflects the historical use of land distribution by the Government as an instrument of social policy. From the beginning of the twentieth century, population growth and subdivision of family land amongst heirs began to reduce the size of holdings below subsistence level in the areas of traditional settlement around Asunción and in the center of the Eastern Region. By the 1940s, the Government had turned to its one relatively abundant resource - land - as a means of addressing the needs of peasants, and in the 1950s initiated a program of road construction to facilitate colonization of areas in the north and east of the Eastern Region. In 1963, the Rural Welfare Institute (IBR) was created specifically to facilitate the colonization and titling of government lands (the *tierras fiscales*) and large estates expropriated for the purpose. IBR was also used as an instrument of political patronage under the former regime which distributed large tracts of land to reward political supporters and placate potential rivals. Much of this land was subsequently subdivided and sold to foreign farmers, primarily from Brazil, or held in extensively-exploited *latifundias*.

3.8 The legacy of these policies is a highly skewed pattern of land distribution. There are important reasons why large landholdings should exist in certain parts of the country. Much of the Chaco is suitable only for very extensive cattle production, and the extremely poor infrastructure and communications dictate that holdings must be very large to achieve the required economies of scale and self-sufficiency in operation. Consideration of land distribution data on a national basis, therefore, tends to be heavily influenced by the extreme conditions obtaining in the Chaco and its large size. Thus, taking Paraguay as a whole, 82% of farms have less than 20 ha and occupy only 6% of the land in agriculture.

3.9 However, in the Eastern Region alone, which has most of the cultivable soils, 84% of farms have less than 20 ha and occupy only 12.8% of the land in agriculture. Almost half of these farmers have less than 5 ha and farm only 2% of the land. A comparison of 1981 and 1991 Census data indicates that the number of farmers with less than 5 ha increased by 40% over the period. There are considerable areas in the Eastern Region where the natural conditions also dictate extensive use of land and, therefore, a large unit size of farms. However, as Table 3.3 indicates, there are only 10,400 farmers with between 50-200 ha which is where the economies of scale in mechanized crop production are to be found, and these farmers have only 8% of the land in agriculture.

Table 3.3 Land Distribution: Eastern Region

Farm Size	Number of Farms	% of Total	Cumulative % of Total	Area (ha)	% of Total	Cumulative % of Total
Landless	7,610	2.53	2.53	-	-	-
Less than 1 ha	21,872	7.28	9.81	8,461	0.07	0.07
1 to < 5 ha	92,392	30.74	40.55	221,814	1.94	2.01
5 to < 10 ha	66,364	22.08	62.63	429,115	3.75	5.76
10 to < 20 ha	65,932	21.94	84.57	803,183	7.03	12.79
20 to < 50 ha	31,095	10.35	94.92	845,103	7.39	20.18
50 to < 100 ha	7,007	2.33	97.25	464,073	4.06	24.24
100 to < 200 ha	3,383	1.13	98.38	449,376	3.93	28.17
200 to < 500 ha	2,227	0.74	99.12	663,455	5.81	33.98
500 to < 1,000	927	0.31	99.43	614,599	5.38	39.36
1,000 to < 5000	1,360	0.45	99.88	2,838,461	24.84	64.20
5,000 to < 10,000	240	0.08	99.96	1,657,600	14.50	78.70
10,000 +	114	0.04	100	2,433,510	21.30	100.00
TOTAL	300,523	100	-	11,428,750	100	-

Source: Agricultural Census, 1991

3.10 The highly-skewed distribution of land has serious implications, including potential social tensions and low agricultural efficiency and productivity. Farmland size distribution and concentration have been reinforced and perpetuated by present policies and regulations regarding domestic investment, fiscal incentives, and land reform. An ineffective fiscal policy provides no disincentive to holding large tracts of unproductive land, and the land reform program has been rendered ineffective primarily because of the absence of strong political will to support the relatively modest objectives of the program.

3.11 The consequences for the natural resource base of the current farm land tenure structure are unfortunately already manifest throughout Paraguay. Destruction of natural resources is caused by small and large farmers alike. The small farmers lack the resources, in terms of training, time and capital, to practice adequate soil management techniques. Larger farmers continue to clear large tracts of land in order to maintain their claims on the land. Larger farmers are, in fact, encouraged to cut down the remaining forests by the Agrarian Law itself, which states that land under forest is unproductive and hence vulnerable to expropriation. In addition to this indiscriminate expansion of the cultivated area, production methods themselves are not oriented towards soil conservation.

C. Agricultural Systems

3.12 Paraguay's history of land distribution has resulted in agricultural systems based primarily on the size of land holdings and to a lesser extent on land capability and farmers' access to inputs. While few of the farms of less than 200 ha can be classified as being based on purely livestock or crop operations, this distinction provides a useful basis for describing the main agricultural systems in Paraguay.

3.13 **Crop production** is largely confined to the Eastern Region, with the notable exception of the Mennonite colonies in the central Chaco. The crops sub-sector can be divided into two categories of operations, small-holders and commercial farms, which are distinguished by farm size, output mix and use of inputs. Small-holder farms account for over 80% of all farms and vary from the *minifundias* located near urban centers to family farms in the areas of new colonization in the eastern and northern parts of the country. *Minifundias* are generally less than 5 ha in size and are frequently owned by part-time farmers.

3.14 Where location and transport infrastructure permit, *minifundias* produce higher-value horticultural crops, dairy and other perishable products for urban markets. The typical small-holder in the resettlement colonies has 20 ha or less in mixed use, including fragments of forest used for fuelwood or charcoal production, pasture, 2 to 3 ha in mixed plantings of subsistence crops, and 2 to 3 ha in cash crop monoculture. The principal cash crop on these farms is cotton, which in aggregate exceeds the value of sugar cane, yerba mate and other cash crops combined. Paraguayan cotton has an international reputation for high quality, in large part the result of the reliance on manual harvesting. The major subsistence crops include cassava, maize, beans and peanuts.

3.15 Technology employed on small-holder farms is quite rudimentary. There is only limited use of agricultural chemicals (e.g., insecticides on cotton), fertilizers and improved seeds, and the use of draft animals and family labor are the norm. Women provide a significant proportion of the labor on small-holder farms and are responsible for most of the subsistence crop production; however, labor demands for cash crops and off-farm income earning activities are forcing farm women to sacrifice food crop production for income. Small-holders are generally poorly educated (functional illiteracy is estimated in the rural areas to be over 80%), isolated from public services, poorly informed and poorly organized. Formal extension and credit services reach very few small farmers. Local middlemen (*acopiadores*) provide 71% of loans and 88% of marketing services, usually on terms unfavorable to the small-holder. The principal issue in the small-holder sector, and indeed in the entire crop sector in Paraguay, is the need for greater profitability and agro-ecological sustainability in production systems, which is inextricably linked to the fate of cotton as the predominant small-holder cash crop.

3.16 Commercial farms vary in size from 20 ha to several thousand ha, but are typically over 100 ha. The principal commercial crop is soybeans, sometimes rotated with wheat as the winter crop. Some rice is grown in areas unsuitable to the

soybeans/wheat rotation, and alternative winter crops, such as canola, are being experimented with. In the immigrant colonies, Mennonite, German, Japanese and Italian farmers grow wine grapes, fruit and nut trees, and plant pasture and fodder crops for intensive dairy production.

3.17 Commercial crop production is dynamic and employs relatively modern technology, much of which is transferred from Brazil. Cooperatives are the central organizing point for access to inputs, marketing and in some cases research and extension. Despite their dynamism, the commercial farms, like the small-holders, are suffering the consequences of a narrowly-focused production system. Continued soybeans or soybeans/wheat production with mechanized cultivation is causing serious soil erosion and degradation, and only a small proportion of farmers are beginning to implement soil conservation techniques. Farming systems research is currently in progress to identify the constraints which impede the up-take of conservation measures.

3.18 **Livestock production** is undertaken throughout Paraguay. Livestock systems vary according to type of livestock and intensity of production. Artisanal production occurs in the Eastern Region on small and medium farms up to 200 ha devoted primarily to crop production. Artisanal livestock production is an important component of the small farmer's strategy to diversify and reduce risk. Women are responsible for a large proportion of animal care on small farms. While larger units, particularly those engaged in dairy production, utilize improved and planted pasture and commercial feeds, most artisanal livestock production is based on free forage and grazing on fallow or uncleared land.

3.19 Modern livestock operations are most prevalent in the Eastern Region, though several examples, most notably on the Mennonite Colonies, exist in the Chaco. Typical operations of this type contain 500 to 4,000 head of cattle on 500 to 2,000 ha of land. They are distinguished by the relatively intensive use of capital and technology focused on breeding and fattening utilizing improved pasture, silage and commercial feeds. Productivity varies from 40 kg of live-weight gain per ha per year up to 150-200 kg per ha per year in the Mennonite colonies in the Chaco.

3.20 Extensive cattle operations are the archetypical production units in the Chaco, but are also found in the Eastern Region where timber extraction is often combined with livestock production. These *latifundias* are low input, low management systems, with between 500 and 10,000 head of cattle free grazing on 2,000 to 50,000 ha of land. Productivity is typically 20 to 25 kg of live-weight gain per ha per year.

D. Agro-Industry and Infrastructure

3.21 Two distinct categories of agro-industrial enterprises coexist in Paraguay. A large number of small- and medium-sized firms, often family-owned, are characterized by low levels of technology and management inputs. The few larger firms employ modern technology, relatively complex management structures and hold

the largest share of production. Value added by agro-industrial enterprises is low, but in the case of cotton gins and sugar cane processors, provides an important source of seasonal off-farm labor in rural areas.

3.22 Paraguay's small internal market requires that any significant agro-industrial growth should be export-oriented. In addition to a stable macroeconomic environment, government can assist export-oriented industries by simplifying investment and export procedures, providing market information, and setting and enforcing international quality standards. From time to time, Government considers proposals to impose export taxes on cotton fibre and unprocessed soybeans in order to lower the price of these inputs to domestic processors. This strategy, if adopted, would add to the downward pressure on producer prices and, in practice, would be only partially applied given the porosity of Paraguay's international borders. More importantly, export taxes would not address the structural deficiencies in the commodity systems which impede Paraguay's international competitiveness.

3.23 Given the low level of value-added involved and limited market opportunities open to Paraguayan agro-industries, competition is based on access to credit. Most agro-industrial plants operate with slack capacity, primarily because they lack enough operating capital to stock raw materials. Firms with access to financing effectively control input markets and are able to pass inefficiencies and risk premiums down the marketing system to farmers in the form of low prices for raw materials. Producer cooperatives have provided some bargaining power and have forced middlemen and processors to share some of these costs, but the narrow commodity basis of most commercial agricultural production undermines the bargaining power of farmers.

3.24 Overall responsibility for trunk and rural roads rests with the Ministry of Public Works and Communications (MOPC), though MAG constructs rural roads which it then passes to MOPC for maintenance. The construction of roads has been an important stimulus to colonization and intensification of agricultural activity, but public expenditure on transport infrastructure has not been sufficient to support current use, declining from 1.3% of GDP in the early 1980s to 0.4% at the end of the decade, and comparing unfavorably with Chile (1.5% of GDP) and Uruguay (1.8% of GDP). Road maintenance is a major problem, with only 29% of the trunk road system considered to be in good condition.

E. Agricultural Finance and Credit

3.25 The Central Bank (BCP) extends credit to the agricultural sector through the use of rediscounts. The rediscounts were originally more an instrument of monetary policy than a support mechanism to agriculture, but in recent years have become selective credit tools. Until 1989, interest rates on the credit in this system were heavily subsidized, which artificially increased demand. Rates have since increased and are positive, approaching market rates. This credit is channelled through both the public financial institutions — the BNF, the CAH and the FG — and private banks.

3.26 Although more than half of the public budget for agriculture is for agricultural credit, the government does not have an agricultural credit policy. Credit is extended almost exclusively for cotton, soybeans, wheat, sugarcane and livestock. The levels of credit extended in a particular year to a particular crop are determined by prevailing national and sector economic conditions.

3.27 According to the 1991 Agricultural Census, only 33% of farmers receive credit of any kind. Less than one-third of that credit was channelled through the public intermediaries and most of it was received by larger farmers. Over 80% of bank lending in the sector is to crop production and less than 20% to livestock. Forestry credit has never exceeded 0.4% of total sectoral lending. The share of output supported by lending from government and private banks to the sector grew from 13.5% of sectoral GDP in 1982 to 31.5% in 1991.

3.28 Approximately 70% of small farmers with less than 20 ha do not receive any credit. Of those that do, 16% receive credit from public sources and 8% from cooperatives. High transaction costs and a perception of higher risk discourage financial institutions from lending to small farmers. Semi-formal lenders (*acopiadores* and intermediaries) account for some 70% of credit extended to small farmers. The public banks finance small growers indirectly, by lending to the intermediary who on-lends to farmers. Such informal credit is frequently two to three times more costly than credit available from formal channels and works against capital formation by small farmers.

3.29 The cost of extending loans to small farmers can be reduced by lending through groups or cooperatives. By assuming responsibility for the administration, supervision and collection of the loan, the cooperatives reduce costs to the credit institution. However, current lending practices in Paraguay, especially those of the CAH, discriminate against this kind of lending; this causes cooperative loans to be expensive, which encourages the more prosperous members to seek loans outside the cooperative, thereby weakening its structure.

3.30 Crop selection is largely determined by availability of credit. Small farmers plant cotton or soybeans on some of their land, even if they do not get good yields, largely because these are the two crops for which they can get credit. Public and private banks lend for them, while the *acopiadores* only offer credit to growers who will have cotton or soybeans to be marketed by them. This limits the ability of farmers to diversify production beyond the traditional export crops.

3.31 A significant share of the land in medium-sized farms is not tilled in any given year. Recent research suggests that imperfections in rural credit markets may account for much of the idle land. In other words, imperfect markets for credit, labor and other inputs, as well as for land, impede increased production and the alleviation of poverty.

3.32 There is virtually no credit available in Paraguay for small farmers or landless persons seeking to buy a small parcel to farm, who are likely to find

themselves in a vicious circle: no access to credit for lack of land with title, and for lack of credit an inability either to develop and capitalize or to buy land with registered title. In the absence of such credit, innovative approaches should be identified and explored; for example, a group contractual arrangement, like that used in the Dominican Republic, in which group members pledge land-use rights should be attractive to official lenders, intermediaries, and even commercial banks. An innovative lender might even propose it, with an incentive such as a rebate on interest charges for all borrowers in such solidarity groups if they have no defaults for three consecutive years.

3.33 There is a need to decentralize the Registries in which land mortgages and chattel liens on vehicles and equipment are recorded, in order to reduce transaction costs, fees and delays. Anecdotal evidence suggests that the fees and costs to record and lift liens are, for small borrowers, as high as, or higher than, the interest costs on formal loans. The semi-formal lenders, such as the intermediaries, are not significantly more expensive than bank lenders, once this is taken into account. Further study could determine whether other changes in laws, regulations and institutions would make it simpler and lower cost for lenders to deal with borrowers and vice versa.

3.34 It is important to recognize that there is some capacity for mobilizing savings in the rural sector. If the Banco Central implements and enforces legal reserves and spot inspections of financial intermediaries, as do many other countries, irregularities would be less likely to occur and the competition between banks and the informal lenders would be more healthy. In turn, some type of deposit insurance for intermediaries meeting reasonable standards could help to draw more savings and thereby help generate loanable funds in the countryside itself.

F. Marketing and Trade

3.35 **Marketing.** Current systems of marketing in Paraguay function poorly. In order to adjust to the MERCOSUR transition, and to meet quality and cost requirements for various markets, processors and exporters must provide the means for growers to meet high quality and yield standards. The elevated cost of the Paraguayan marketing system results from its low structural level and consequent high risk.

3.36 Analysis of Paraguayan commodity systems reveals that the principles of universality, transparency and reciprocity frequently do not apply to the relationships between processors, intermediaries and growers. Only those organizations with access to credit to finance growers are able to participate in trade. Exporters and processors have access to market and price information far superior to that of other participants in the chain. Finally, the relationships within the chain are both asymmetrical and adversarial, with the recipients of credit bound to redeem their obligation by supplying product at the market price on the day of delivery, while growers seek to evade repayment of financing agents by selling their product at the

best price from any buyer. Under such circumstances, quality is difficult to achieve, if it is even raised as an issue.

3.37 All of the system costs, including high throughput, processing and financing costs, high rejection rates of sub-standard product, and high costs of transportation, are discounted from the international price, producing a low farmgate value. Paraguayan commodity systems are therefore characterized by excessive trading margins, low contractual loyalty and degradation of product quality.

3.38 **Trade.** The implications of MERCOSUR for the four participant countries vary considerably according to the proportion of each country's existing trade with its future partners. Though a relatively small participant in the MERCOSUR economy, Paraguay conducts the highest proportion of its trade within the sub-region; 35% of its exports and 27% of its imports in 1991. By contrast, Brazil sends only 4.5% of its exports to and receives only 9.6% of its imports from MERCOSUR countries.

3.39 The requirements for tariff reductions, harmonization of macroeconomic and sectoral policies, and opportunities for technological cooperation present major challenges to Paraguay. It has already made important progress towards the elimination of intra-regional tariffs through the reform of its tariff structure in 1992, but several import and export bans exist which, under the terms of the Treaty, would need to be eliminated by the end of 1995.

3.40 A more difficult challenge is that of macroeconomic coordination. The small size of Paraguay relative to its two large MERCOSUR neighbors makes it a "policy-taker" as well as price-taker. Its recent record in macroeconomic management is the best in the sub-region, but the stability of the economy is constantly challenged by the divergent policies of Brazil and Argentina. In sectoral policy, Paraguay has greater scope to influence the harmonization process. The low level of intervention in the agricultural sector provides incentive for Paraguay to identify and focus attention on interventionist policies in the rest of the bloc, especially non-tariff protection of their domestic producers. This will require greater capacity for policy analysis than currently exists within MAG.

3.41 Technological cooperation is one of the most important opportunities which could emerge from MERCOSUR. Paraguay's research and extension lags far behind those in Brazil and Argentina; in the case of Brazil, there are strong agro-ecological similarities which imply that technology transfer would require little adaptation to local conditions. Paraguay's yields of major crops lag behind those of its neighbors, implying that real gains in productivity could result from such a transfer.

3.42 The Government needs to create a more positive foreign investment climate, including:

- (a) demonstrating continued political and macroeconomic stability;
- (b) establishing an open foreign investment regime, eliminating impediments such as a complicated investment code and immigration requirements, and establishing bilateral tax agreements with capital exporting countries;
- (c) increasing investment in social and physical infrastructure to levels consistent with its neighbors and allowing increases in official wage levels to result only from productivity improvements; and
- (d) improving market information for local growers and processors, especially the establishment and enforcement of quality standards consistent with MERCOSUR and world markets.

G. Agricultural Research and Extension

3.43 The Agricultural Research Directorate (DIA) of MAG is the main agricultural research institution. Some research activities are carried out by schools of agriculture and veterinary sciences and by non-governmental organizations (NGOs). University involvement in agricultural research is weak and budgets are small or non-existent. Nevertheless, they do have the human resources to contribute significantly to agricultural research, under better conditions.

3.44 The most important constraints on agricultural research are:

- (a) the lack of management and a long-term planning strategy in the DIA;
- (b) inadequate physical facilities to cover the wide range of agro-ecological conditions, and centralized planning of research experiments;
- (c) human resource deficiencies: only 12% of the total DIA staff hold M.S. degrees, 20% have basic degrees and there are no Ph.D.s; salaries are low, causing researchers to leave the institution;
- (d) while research funding was increased by 35% in 1991, the budget remains insufficient; in 1992, only 2.4% of the total budget of MAG was used in agricultural research and, of this, 61% was expended on human resources;
- (e) most research is directed at the two main export crops, soybeans and cotton, and at wheat and maize: given the importance of diversification, research on new products, based on sound market analysis, should be encouraged;
- (f) research methodology needs improvement from topic selection to design, analysis and the diffusion of results; and

- (g) research is commodity-oriented: there is little interaction or teamwork among disciplines, or emphasis of farming systems.

3.45 DIA's executive level is aware of the need to strengthen research activities, to broaden the product base in support of diversification, and to improve the research structure. MAG's policy is to focus research on the needs of peasant agriculture and its potential linkages to commercial agriculture, while continuing to assist more modern farmers.

3.46 Technology transfer is carried out mainly by the Agricultural Extension Directorate (DEA) of MAG. Some extension activity is undertaken by NGOs, agricultural chemical and seed companies, banks and other private companies. The DEA provides assistance to rural families, concentrating mainly on medium and small farmers. Out of 307,000 farms in the whole of Paraguay, only 41,000 (13%) receive technical assistance. Almost half of the assisted farmers (48%) are attended the DEA, which suffers from a lack of staff and facilities, and inadequate operating expenses and salaries. As in agricultural research, at the central level there is a lack of long-term planning. The DEA is aware, at the executive level, of the importance of extension. However, available technology is inadequate to improve agricultural productivity and satisfy current demand. The DEA now has several regional offices and is attempting to decentralize. Its focus is shifting from the individual to the group, using limited resources more efficiently and improving small farmers' marketing arrangements.

3.47 The relationship between research and extension is weak, mainly in terms of the required feed-back from extensionists to researchers. Even though some efforts are currently in progress to improve this relationship, both activities need to increase linkages in an organized manner. In addition, there is only weak cooperation with neighboring countries (despite the positive cooperation with international organizations) and there is little farmer participation in the establishment of extension and research priorities.

H. Institutions in the Sector

3.48 The MAG adopted a new Carta Orgánica in late 1992, which provided for a simplified and streamlined structure to improve the formulation and implementation of government policy in the sector. The implementation of the new structure, however, is being delayed by internal resistance to change. Overall policy formulation is now centralized in the Minister's Cabinet while policy formulation and implementation at the sub-sectoral level, including research and extension programs, are divided functionally amongst the three Sub-Secretariats of Agriculture, Livestock and Natural Resources and the Environment. Other agencies which are responsible for donor-financed project coordination, internal audits, and other administrative functions which cut across sub-sectors, report directly to the Minister.

3.49 Several government-financed agencies are outside the formal structure of MAG but coordinate with it and take their policy direction from it. The most

prominent of these are the three credit agencies (the BNF, the CAH and the FG) and the agencies responsible for implementation of the land reform program (the IBR and Rural Development Council - CDR). MAG also works closely with the Technical Planning Secretariat (STP) in the President's Office in the preparation of studies of sectoral issues and formulation of sectoral policies.

3.50 Farmer groups are playing an increasingly important role in the development of the agricultural sector. The best known group is the Rural Association of Paraguay (ARP) which represents livestock producers. ARP was founded in 1940 and presently has over 2,800 members. Other farmer groups are oriented towards the needs of small farmers, with many having been formed with the encouragement of the Catholic Church during the 1970s and 1980s to attend to the social and economic needs of the peasantry - particularly access to land, credit, technical assistance, education, water supply and sanitation, and rural roads. These groups, now mostly autonomous of the church, are coordinated by associations at the national, regional and district level, and provide input supply and produce marketing services in addition to their advocacy activities.

3.51 Producer groups have also been formed with the encouragement of government agencies to participate in the land reform programs of IBR, the credit programs of CAH and the extension programs of DEA. Formal cooperatives are regulated by the General Directorate of Cooperatives in MAG, and receive technical assistance as well as exemption from export taxes on their products and import taxes on production inputs. Of the approximately 160 officially-registered producer cooperatives, more than half have less than 100 members.

3.52 Institutional weakness is recognized as being a significant limitation to the ability of the Government to provide public goods and to make the necessary interventions in support of private sector activity. In the specific case of MAG, a recent Institutional Capacity Analysis, undertaken in the preparation of the Natural Resources Management Project, has identified several general institutional weaknesses which impede its ability to carry out its mandate. The planning process is not an integrated one; it follows *ad hoc* and erratic processes, a pervasive capacity gap that is found even within specific Sub-Secretariats. Functions tend to be duplicated because there are no conscious uniform processes for planning, budgeting, accounting, internal control, or personnel management.

3.53 MAG agencies lack competent professionals and other levels of staff. This is particularly true for planning, budgeting and for mid-level management functions. Research and extension also lack a minimum level of competent staff, and related entities do not have the flexibility to staff themselves adequately. The solution to such issues is not facilitated by the lack of civil service systems or careers, or by the existence of systems which are different in almost all entities involved.

3.54 Personnel policies do not generally provide positive performance incentives. The level of salaries in the public sector, and compensation packages in general, do not allow for retaining competent professionals. As a result, staff turn

over is high and those remaining in the implementing entities lack motivation to activate their skills at the optimum level. Furthermore, as they are forced to have second and, occasionally, even third jobs in order to survive, they do not have the time to concentrate on their tasks and ensure the required performance. Finally, there is no training plan offered to civil servants, no personnel evaluation mechanisms, or hope for objective promotion.

3.55 The politicization of the Government's administrative apparatus (i.e., the Civil Service) present serious constraints to improvements in public sector management, which includes institutions which serve the agricultural sector and agricultural projects themselves. The powerful influences extend to the rural areas through the operation of the local *seccionales*. This form of political involvement has a direct and negative impact on public sector performance. Public employment is widely regarded as a form of income supplementation, and public sector salaries are considerably below the legal minimum wage. Paraguay's political process constrains the ability of outside agencies such as the Bank to provide assistance in addressing organizational or institutional issues.

IV. AGRARIAN ISSUES

4.1 There are several key issues which go beyond the purely technical aspects of agriculture, and which must be analyzed and included in the development of strategy and policy prescription for the rural areas.

A. Environment and Natural Resources

4.2 The major growth experienced by the agricultural sector in the past three decades has been achieved at the expense of the natural forest as new land has been taken into production. The removal of forest where the underlying soils are capable of sustained agricultural production represents a rational choice in land use. However, to a great extent deforestation has been indiscriminate and uncontrolled, with the result that: (a) land unsuitable for permanent agricultural use has been cleared for short-term benefits; and (b) methods of land clearance and the agricultural practices adopted on the areas of good soils have caused a severe and worsening problem of soil degradation. The *laissez-faire* approach to the use of agricultural natural resources is based on a totally inadequate application of existing knowledge and technology in soils management, and the complete absence of any strategy or long-term vision. The Bank's role could be crucial in preventing complete deforestation; in this respect, it is important that the debate should be carried out on the basis of the detailed technical knowledge referred to earlier, in para. 3.4.

4.3 The high rates of indiscriminate deforestation have left *lacunae* of original forest which, regardless of their intrinsic potential agricultural capacity, should be submitted to scrutiny from the point of view of creating representative conservation areas to maintain biodiversity. These areas are mainly in private ownership, and early and determined action by the Government, supported by the relevant NGOs, is required if anything of practical value is to be achieved.

4.4 The situation of indigenous people in Paraguay remains precarious, and the expansion of the agricultural frontier at the expense of the natural forest has pushed those communities in the Eastern Region into ever-smaller areas which are often inadequate for their subsistence requirements. The available options are rapidly diminishing, and devising a role for the indigenous people in the management of the protected areas may soon be the only course available to policy makers.

4.5 The extractive use of the resource base has caused rapid deforestation in the Eastern Region, followed in many areas by degradation and erosion of soils on the cleared land, and serious damage to Paraguay's rich biodiversity. The institutions which have responsibility for rural environmental issues are under-funded and under-staffed; existing legislation limits the authority of Government to control environmental degradation and generalized institutional weakness also inhibits application of those laws. Deforestation is encouraged by the faulty land tenure laws and agricultural credit system in Paraguay. There is a need to increase the area of

land set aside for conservation, and action is being taken to ensure protection of the areas of highest priority. Many of these "protected areas", however, exist largely only on paper. A Protected Area Masterplan is under preparation, which will identify priority conservation areas in Paraguay and propose management plans.

4.6 Soil degradation is the principal threat to the sustainability of commercial farm systems. Soybean cultivation has already been responsible for significant amounts of soil degradation and erosion in Eastern Paraguay. There have been no public sector incentives for soil conservation; in practice, the colonization and land distribution programs have been a disincentive to soil conservation by maintaining available to farmers a frontier of accessible undegraded land, and the colonization itself has been carried out with little regard for topography in the layout of lots and roads. Although local demonstration of the utility of soil conservation practices and economic pressures from declining soil fertility may go some way to convince soybean farmers to adopt soil conservation practices, public sector incentives are also needed.

4.7 Greater profitability and agro-ecological sustainability in small-holder production systems is the most important issue in the crops sub-sector. In the medium term, soil degradation poses a threat to the sustainability of small-holder production. Use of phosphatic fertilizers, control of soil erosion, use of fallows and green manures, greater attention to minor elements, and other components of soil conservation need to become fully integrated with small-holder production. The public sector has made virtually no effort in this area.

4.8 In order to maintain and improve land productivity while conserving the productive capacity of the natural resource base, small-holders will have to deploy new technologies that require greater access to information, capital, and markets. It is unlikely that they can make this change while the present system of cotton production remains the cash crop enterprise on the majority of small farms. A rational production system for small-holders would be profitable, equitable, agriculturally sustainable, ecologically benign, appropriate to present technological capabilities, and conducive to local and national development through links with agro-industry and exports. Paraguayan small-holders have several attractive options that meet these criteria, involving agro-forestry systems integrating subsistence crops, sustained use of native forest species, pasture, and high value perennial crops or annual/perennial intercrops. Elements of this system are already in place and the need for crop diversification is acknowledged in government policies.

4.9 Sparse human settlement in the Chaco has limited deforestation, though range-land degradation and salinization of cultivated lands in the Mennonite colonies of the central Chaco are potentially serious environmental problems. The fragility of the eco-systems and the extensive biodiversity in the Chaco require particularly careful study to avoid inadvertent environmental destruction.

4.10 An important issue in protected area management is the participation of indigenous communities. There are no large, continuous blocks of land titled to the

Indian communities and the forest resources utilized by the Indians are rapidly dwindling. One solution that would ensure the access of indigenous people to the forest would be to give them specific rights within larger conservation areas and to encourage them to take an active role in the management of these areas.

4.11 Many aspects of the legal framework as it affects natural resources management are in need of review, and the Parliament is inundated with new bills. The Constitution adopted in June 1992 contains explicit references to environmental issues. One of the key issues that impedes the development of adequate environmental legislation is the highly-charged notion that private property is inviolable. Both real and perceived threats to this principle have traditionally attracted a harsh response.

B. Land Distribution and Titling

4.12 The skewed distribution and concentration of farm land pose serious questions regarding efficiency and loss of production in the agricultural sector. In Paraguay, as has been suggested in numerous studies for other developing countries, there appears to be a significant negative size-productivity relationship. Many factors contribute to the size distribution and concentration of land. These include the uncertain economic environment, and the consequent lack of long-term investment instruments, which encourages investors to buy land. In addition, an ineffective fiscal policy provides no disincentive to holding large tracts of unproductive or under-utilized land. Finally, the agrarian reform program has been rendered ineffective primarily because of the absence of strong political will to support the relatively-limited objectives of the program.

4.13 The new Constitution affirms agrarian reform as a fundamental requirement for rural development, and calls for the adoption of equitable land ownership, distribution and titling systems. The means available to the State to promote agrarian reform include expropriation of land, resettlement programs and fiscal measures which encourage productive land use. While the Constitution recognizes the authority of the State to expropriate lands from unproductive *latifundios* (defined as more than 10,000 ha in the Eastern Region and 20,000 ha in the Chaco), in practice rights to private property are strongly defended. Conditions placed upon the expropriation process are so onerous that it has been abandoned by IBR for all practical purposes as a means of land reform.

4.14 Most of the settlement activity undertaken by the IBR occupied state-owned land; there are no precise estimates available, but these *tierras fiscales* are now so limited as to be no longer important for future settlement programs. The shortage of fiscal lands and growing pressure on land in the Eastern Region means that IBR must acquire land through purchase, placing severe pressure on its finances and reducing the area of individual settlement lots, from 20 ha between 1973-1984 to 10 ha between 1984-1989. Since 1990, the IBR has virtually discontinued its new colonization program in order to respond to the rash of "spontaneous colonizations" which have resulted from the wave of land invasions and occupations which followed

the change in government in early 1989. The IBR is responsible for negotiating with the former owners, defining land claims and attempting to provide adequate infrastructure to these settlements. The demand for land is difficult to measure. The IBR generally considers that those without land or with less than 5 ha are in need of additional land (it may be that these families are, in fact, in need of supplemental or alternative non-agricultural employment). The IBR 1992 official estimate of those in need of land is 150,000, while the 1991 Agricultural Census shows 7,962 farm families without land and 114,788 with 5 ha or less. An estimated 40,000 farm families are classified by MAG as being landless.

4.15 Most small farmers never receive definite title to their land. Tenure is recognized on a *de facto* basis and, generally, small-holder occupancy rights have been defended by the State. The proportion of small farmers (those with 5 ha or less) without definite title to their land exceeds 60%. IBR is solely responsible for clarifying the title status of its beneficiaries and currently has a backlog of pending requests totalling 120,000. The titling system is complicated, making it very difficult for the small farmer to legitimize his claim. The absence of definite, clear titles has important implications with respect to access to credit, the viability of a modern land market and the effectiveness of the fiscal reform. The existing system of land tenure cannot provide security because it lacks the means to provide clear and unambiguous identification of holdings (i.e., a complete cadastre) or clear and verifiable ownership (i.e., a complete property register). The multi-purpose cadastre to be developed under the LURP is intended to help resolve this issue.

C. Rural Poverty and Living Conditions

4.16 The issue of rural poverty has been only of peripheral importance in the formulation of agricultural and overall development strategy in Paraguay. Measures specifically designed to alleviate rural poverty and its causes have been at best piecemeal and usually have had a cosmetic and/or political hue. The magnitude of the problem of rural poverty is not well understood, and thus the policies adopted have failed to have significant impact. Aggregate measures of poverty in Paraguay are low by Latin American standards, but the incidence of extreme poverty is much higher in the rural than in the urban areas.

4.17 According to the 1991 agricultural census, an estimated 250,000 farms of less than 20 ha support approximately 1.2 million people. Studies by the International Fund for Agricultural Development (IFAD) indicate that 80% of these units, representing over 1 million people or some 25% of the total population, are at or below the level of critical poverty and suffer from poor nutrition and serious health and education deficiencies.¹ This is the result of a complex interplay of factors. Endogenous factors include the high rate of population growth, the inadequate capacity of their land to generate their basic subsistence requirements and a surplus for investment, the low level of technical knowledge, and their poor ability to

1. Report No. 186 - PG, February 1990. "Report of the Special Programming Mission to Paraguay".

organize to achieve more market power. Exogenous factors include the policies adopted for land distribution, infrastructural support, the limited capability of the State to influence variables affecting the situation, and the limited availability of alternative employment in rural areas.

4.18 Most small farmers try to cover their subsistence needs and cultivate an area of cash crops using mainly family labor. Satisfaction of the basic needs of a family requires 2-3 ha of subsistence crops and 1-2 ha of cash crops. Many farmers who cultivate less than 4-5 ha grow subsistence crops and work off-farm, or may place more emphasis on cash crops and use the income to buy staple foods. The IFAD studies indicate that, on average, small-holder on-farm income was supplemented in 55% of cases by off-farm activities. In the case of families without land or with less than 1 ha, the percentage of income earned off-farm rose to 83% indicating that while farming activities retained some significance as a source of food and occupation, their income significance was low. Wages are highly variable and minimum wage laws are not observed. Outside the peak period of demand for labor in the agricultural cycle, laborers have difficulty finding work. The cotton ginneries and sugar factories are an important source of employment for about six months of the year. Forest extractive industries and ranching also contract workers on a piece work basis. The families of both small-holders and wage laborers often depend on petty commerce, artisanal activities or the sale of services for additional income.

4.19 **Access to Social Services.** Expenditures on social services, at less than 3% of GDP, are low in Paraguay relative to other countries in Latin America. The quality and availability of health and education services are much lower in rural than in urban areas. Although the Government does not have an explicit social strategy, there are some programs and institutions that are strengthening existing social services (health, nutrition, education and housing), with some actions targeted at the poor and with an increasing rural focus. According to a recent Bank poverty assessment on Paraguay (December 1993), the Government is interested in increasing the private sector's role in service delivery through greater community and NGO participation. Despite such measures, however, there is no clearly-defined social policy; programs implemented through established institutional channels face increasingly poor management and service quality which means a higher proportion of the poor are bypassed, especially in rural areas. Public social policy is overly centralized; however, substantial authority is granted under the new Constitution to the municipalities, and a transfer of some social service delivery to these levels is to be expected in the future.

4.20 Public health services tend to be concentrated in the towns and there is little or no coverage in other areas. Two-thirds of all rural health facilities of the Ministry of Health (MSPBS) do not have medical personnel capable of handling an emergency. Most facilities are in the hands of medical auxiliaries, many with limited training. Inferior access to health care services in rural areas is reflected in: (a) higher rates of infant mortality (38.2 per thousand children under one year of age, compared to 33.5 per thousand overall); (b) higher levels of malnutrition (22% of children under 5 in rural areas show evidence of chronic under-nourishment,

compared to 10% in urban areas); and (c) the high level of maternal mortality (well over 350 women per 100,000 live births in the 1980s), the second highest rate in Latin America. The Government has enunciated an official national health policy; the emphasis is now on primary health and preventive care, community participation, targeted services and institutional improvements. The policy emphasizes the indigenous, areas of recent rural colonization, women and children, and other vulnerable groups. Implementation is hampered by a seriously deficient information system which adversely affects targeting and realistic budgeting.

4.21 A number of positive educational developments have occurred in recent years in Paraguay including the expansion of primary schooling in rural areas, decreased rates of illiteracy, improved technical education including agricultural and livestock, and growing participation of women in the education process. Nonetheless, educational availability and achievement remains much lower in rural areas compared to urban centers, characterized by high rates of drop-out and repetition, high numbers of primary schools with incomplete grade levels, poorly-trained teachers, and low levels of secondary school availability and graduation.

4.22 Living conditions are poorer in rural than in urban areas. Access to safe drinking water is low by regional standards, and there is a striking contrast between urban and rural Paraguay. Government's programs, using local water-user groups (*juntas*), have been almost wholly inadequate for the need. Only 3% of the rural population have access to safe water, compared to 63% of the urban population, and 50% of rural populations in the region as a whole. This problem is a major challenge for the Government.

4.23 In contrast with drinking water availability, sanitation facilities in rural Paraguay compare favorably with the rest of Latin America. Around 92% of all rural households have a simple, rustic, pit latrine generally located at some distance from the house and well. Extensive latrine programs executed in recent years by the National Environmental Sanitation Service (SENASA), the Peace Corps, NGOs and other groups have built on a grass roots commitment to better sanitation.

4.24 Only 17% of rural households have access to electricity, as opposed to almost 93% of urban households. Lack of electricity limits the use of consumer durables such as televisions and refrigerators which are common in urban households, and constrains rural families' ability to use most on-farm processing equipment even if they could afford its acquisition.

4.25 Housing varies greatly in size and quality, from the precarious dwellings of *minifundistas*, landless laborers and many indigenous people to the larger, more substantial houses of established small farmers. Rates of overcrowding in sleeping quarters are high in rural areas, with 30% of houses having an average of six persons per room.

D. Rural Women

4.26 Rural women in Paraguay have a central role in agricultural production and off-farm income generation in addition to their responsibilities for family and community welfare. The comprehensiveness of this role is not reflected in their access to productive inputs (extension and credit) or their participation in rural organizations. Effective rural development strategies must increase women's formal participation in the rural and national economy, and must simultaneously address pressing issues of fertility, health and education, in order to increase the overall productivity of the sector and improve rural living standards. Female heads of household, frequently surviving under precarious conditions and in extreme poverty, merit special focus in public programs. Many female heads of household live close to small towns and would benefit from efforts to develop rural industry, services and commerce.

E. Indigenous People

4.27 The indigenous people of Paraguay maintain a separate identity from the rest of the population, even though most Paraguayans are of mixed blood and speak Guaraní. The best available estimates place the total indigenous population at a little over 60,000. The indigenous population appears to be increasing. However, information from the 1981 census suggests that fertility rates and infant mortality rates are much higher than the averages for the rural areas. The latter should have decreased now that most communities are covered by vaccination programs. However, health care remains a critical deficiency in indigenous communities.

4.28 In the last two decades, the expansion of the agricultural frontier in Eastern Paraguay has forced many indigenous communities to seek refuge in reserves which are often too small even for small-holder agriculture. Some communities no longer have access to areas of forest, and this can only be assured by giving them rights within protected areas. The Chaco has not suffered the same degree of environmental degradation, and while land remains an issue, particularly in the Lower Chaco where many indigenous people live on ranches, an estimated 20,000 now have access to land in 41 settlements covering 422,000 ha.

4.29 The priority requirements for the indigenous population are: (a) access to sufficient land and natural resources to allow them to live in accordance with their cultural values and aspirations; (b) the provision of legal and institutional support to ensure that their land and other rights are respected; (c) provision of basic services, principally primary health care and education; and (d) the opportunity to improve their economic situation, reduce their dependence on wage labor and develop alternative economic activities. The rights of the indigenous population are explicitly recognized in the Constitution of June 1992. The significance of this remains to be tested.

4.30 This report accords with the recent Bank poverty assessment which proposes a coherent poverty-alleviation strategy, including priorities and goals for the short-

to medium-term and well-integrated social programs associated with that strategy. Greater coordination is needed between agencies engaged in social programs, including an expanded role for NGOs, and managerial capabilities need improvement including integrating the planning and budgeting processes. The impact of public resources and efforts in poverty alleviation would be enhanced if public agencies had more and better information. This could be attained through actions including: (a) poverty mapping, down to the municipal and local levels; (b) strengthening the Directorate of Census and Statistics, and widening the scope of important surveys (e.g., the annual household survey) to include rural areas; and (c) developing proper education, health and nutrition indicators.

V. THE POTENTIAL FOR SECTORAL DEVELOPMENT

A. Introduction

5.1 Paraguay has the natural resources and the population to become a significant producer and exporter of a wide range of products, including rice, oilseeds, citrus, timber, livestock products, and fruit and vegetables. The appropriate role for the Government should be to provide the environment within which the private sector can respond to market signals and to perform those services in which the public sector has a strong advantage. This requires a combination of direct interventions (e.g., the provision of public goods - rural infrastructure, research) and indirect interventions (e.g., improvements in the functioning of the financial sector).

5.2 The potential for sectoral development is considered in terms of market prospects - the demand side - and available resources - the supply side. As a country basically self-sufficient in food and raw material supply as well as being a significant exporter of two basic commodities, cotton and soybeans, a continued market orientation of the agricultural sector is synonymous with exports and diversification.

5.3 It is not the task of an Agricultural Sector Review to attempt to "pick winners" in terms of those products and commodities that are expected to prosper in the long term, with a view to providing recommendations as to what Paraguay should produce and therefore what the Government should support. Paraguay has a range of (largely benevolent) agro-climatic conditions and a range of landholding and production systems which can be exploited for their varying contributions to a diversified "portfolio" of activities. The role of the Government should therefore be to provide the basic framework within which economic agents — farmers, their organizations, cooperatives, and marketing entities — can make their decisions.

B. Market Opportunities

5.4 The key groups of Paraguay's current and potential products have been analyzed to define the constraints and opportunities presented by the market. In a world market mostly defined by access or subsidy, commodities whose costs of production in Paraguay are internationally competitive (e.g., sugar and beef) are largely ruled out or are severely limited in their potential because world trade is administered through bilateral agreements or trading bloc rules that discriminate against them. For other commodities, such as cotton, key producers either subsidize their exports (the USA) or sell at aggressive discounts to earn foreign exchange (China and Uzbekistan); the net result is a lowering of international prices to Paraguay's detriment. Paraguay, of course, also protects key commodity systems on an *ad hoc* basis including wheat, feed grains, sugar, poultry and beef.

5.5 In terms of regional and local markets, frustration with the growth of preferential trading blocs - in particular the European Union (EU) and the North American Free Trade Agreement (NAFTA) - has brought Brazil and Argentina to the

negotiation of their own common market (MERCOSUR) in which Paraguay and Uruguay are included. One of the attractions for Paraguay in such a trading bloc would be the opportunity to find markets in Brazil or Argentina for commodities whose world demand is restricted or undermined by subsidy.

5.6 In a market extending from the Amazon to Patagonia, Paraguayan products would have to compete on equal terms (including common external tariffs on inputs, common policies on agricultural extension, investment credits for processing plants and zero tariffs between MERCOSUR members) with Argentina, Brazil and Uruguay. These trading partners produce similar products; Argentina is a low-cost exporter of temperate commodities, while Brazil is a low-cost exporter of tropical commodities. Within the context of MERCOSUR, the most attractive strategy for Paraguay appears to be the formation of strategic alliances between Paraguayan growers, first handlers, processors and/or food merchandisers, on the one hand, and participants in the Argentine and Brazilian parts of different commodity systems, on the other.

5.7 While Paraguayan-owned businesses do not seem well-positioned to compete directly as exporters in such a market, there are signs that individual exporters are finding success in frontier areas, in the form of local area groupings across borders, where competitiveness depends more on local freight advantages and on qualities such as freshness, timeliness of delivery and the identity of the supplier. The possibility of Paraguayan firms and cooperatives succeeding would be enhanced by strategic cross-border alliances with medium-sized or small counterparts in Argentina or Brazil.

5.8 The current pattern of Paraguayan companies vying with each other to export to world markets, and diverting products opportunistically to Brazil or Argentina, has had only moderate success in the global context and been a failure in regional terms. The "strategy" is largely ill-suited to MERCOSUR. Even if a superior portfolio of agribusiness commodities could be envisaged for Paraguay, the actors capable of changing and willing to change must be identified. Paraguay's prospects in cotton, meat and livestock products, oilseeds and feedgrains, foodgrains, sugar and forest products are summarized below.

5.9 **Cotton.** The emerging long-term trend is for traditional suppliers of cotton fiber to transform it into yarn and fabric in an attempt to acquire competitive advantage. As a percentage of world production, the trade in cotton fiber has declined. The implications for Paraguay depend crucially on Brazil's trajectory in the cotton/textile system. If Brazil, globally or domestically, is able to conserve its processing components in the face of competition from Asia, then Paraguay is ideally placed to supply it with differentiated (long) cotton fiber to complement its own domestic supplies. If not, Paraguay would be a supplier of above-average fiber or yarn to the world market. In the medium-term, Paraguay needs to define its cotton strategy to take advantage of projected higher market growth (3% per year) to the year 2000. If this cannot be done by 1995, the opportunity will probably have passed. In the short-term, as a country whose growers receive a price based on the

world price for cotton, Paraguay must base its strategy on low cotton prices until the market improves around the end of the 1990s. For the present, given the deep slump in the Brazilian textile industry, Brazil is likely to import from Paraguay only such differentiated fiber as is strictly necessary to meet fabric quality and make up any shortfall in domestic production.

5.10 Meat and Livestock Products. World trade in meat is dominated by bilateral arrangements which limit the flow of product. The share of the total market enjoyed by the most important meats - pork, beef and poultry - will depend upon their redesign to meet consumer expectations with regard to healthfulness. The implication for Paraguay is that the cost of meeting consumer standards for beef will rise over time, and that the country needs first to eradicate foot and mouth disease if it to become a serious player in world markets. In the medium-term, also, there seems little doubt that production and consumption of poultry will continue to grow at a faster rate than pork and beef. Given the ties between income and meat consumption, current market prospects in a recession are bleak, and made more so by the restructuring of Eastern Europe and the former USSR, traditionally consumers of meat in quantity. The South American market is based upon a variety of governmental interventions and is unstable. Paraguay's costs of transporting meat internationally are high relative to the product's value, while exporters sell through import agents that establish no lasting market presence for Paraguayan product. Paraguay's current beef export markets are fragile and its options limited. All of the above suggests Paraguay should concentrate on local, cross-border area markets.

5.11 Oilseeds. The Southern Cone is a major exporter of soybeans and products which have a higher content of protein and oil than soybeans from the USA; the resulting price premium offsets slightly the logistical disadvantage in relation to the major European and Mediterranean markets. Successful Southern Cone exporters, through market intelligence and positioning, are able to take advantage of arbitrage opportunities resulting from the constant movement of soy complex prices in relation to one another. Paraguay's exporters are divided between shippers of soybeans and shippers of soybean products. Despite the vagaries of the international spreads between Europe and Southern Cone origin ports, Paraguayan exporters still have to design procurement programs, typically finessing the spread volatility by bidding on the basis of the Chicago Board of Trade quotation for soybeans minus a lump-sum discount intended to cover all costs between Chicago and the Paraguayan elevator. As a general rule, Paraguayan farmers receive a price for their soybeans which is US\$50-60 per ton less than their Illinois counterparts.

5.12 Food and Feedgrains. The staple energy food for human consumption in Paraguay is cassava, while maize is a minor alternative. Cassava could be used in quantity for poultry and hog feed if it could be transformed into chips or similar, before incorporation into a feed ration; this requires additional investment in the feed plant or elsewhere. Further, it is grown mostly for subsistence with small surpluses reaching urban markets. Its cost increases dramatically when it is handled often, transported any distance, or has to be collected from remote locations. Its price,

given current market conditions, might permit the competitive production of compound feeds.

5.13 Several varieties of maize are grown, including feed maize which is stored for consumption by poultry producers and others. Expansion of the area sown to maize is constrained by the lack of a viable market and the potential competition from neighboring Southern Cone countries. Once the Paraguayan market is satisfied, the only alternative is the world market. Under MERCOSUR, Brazil will probably eventually import a substantial part of its feedgrain requirements from Argentina; Paraguay may find itself in a similar situation. Paraguay might have the cheapest soybean meal in the region, but Argentina has the cheapest feedgrains. The catalyst for competitive poultry production in Paraguay is probably an international marketer, with an existing Brazilian operation, seeking alternative sources of product.

5.14 **Sugar.** World trade in sugar is extensively managed; few countries are willing to sacrifice expensive domestic production for cheap imports. Paraguay has access to the protected US market through a (minimum) quota, renewed annually, and has no other export markets. It is anticipated that a new sugar regime will be renegotiated under MERCOSUR. Opportunities may arise to supply the local, cross-border Argentine states of Formosa and Chaco, and the importance of local markets as opposed to the larger, regional one may make Paraguay's sugar industry continue to be viable. The efficiency of a large sugar facility in Paraguay is little better than a small one due to the de-coupling of the ownership of cane land and sugar factory and the fragmentation of cane holdings. New investment in a modern operation is unlikely unless MERCOSUR, or the GATT, were to provide access to a market in which a Paraguayan operation could be competitive. The long-term forecast for sugar is quite bullish on volume, price and market size, modified by risks associated with the sugar trade. However, the overall implication for Paraguay, as part of MERCOSUR, is that as far as the sugar sub-sector is concerned, it cannot define its policy in isolation.

5.15 **Forest Products.** Paraguay's principal hardwoods are used for furniture, veneers, flooring and construction. Such products are manufactured from logs in the industrialized countries and, on a small scale, in Paraguay. The former have a competitive advantage in design and economies of scale, and can enjoy the protection of import tariffs. Paraguay has a potential advantage where a premium is placed on artisanal work or where low labor cost is a factor. With increased scarcity of natural, tropical hardwoods due to rapid depletion, the price of hardwood logs and sawnwood is projected to continue to increase above the historical trend through 2005. There will be an increased temptation to over-exploit Paraguay's remaining hardwood resources; even with legal limitations on cutting for export, illegal extraction and export will make control difficult and expensive.

5.16 Observing the plantation of eucalyptus in all their Southern Cone neighbors, Paraguayans are also examining this option; some plantings have occurred, for production of industrial fuel, domestic firewood and charcoal, with the future prospect of export commodities such as logs, chips or pulp.

5.17 **Spices and Herbs.** Paraguayan *petit-grain* oil used in the perfume trade has quadrupled in price over the last five years, due mainly to a deficient essential oils marketing system in Paraguay; perfume manufacturers responded by substituting a synthetic product. Viewed from the perspective of the manufacturers, dependence upon a single source for a product whose price can rise in this manner is too risky. For the Paraguayan system to reduce this risk, a cohesive approach to international marketing is required, perhaps similar to the New Zealand Kiwi Marketing Board. Efforts so far to improve the orderliness of marketing for *petit-grain* oil have not succeeded. Price volatility is also accompanied by product degradation, which has, unfortunately, become the basis of competition between distillers and exporters.

5.18 Paraguay also exports substantial quantities of commint oil and menthol. Brazil is also involved in both. Menthol from Brazil formerly attracted a 100% import duty on entering the USA. Since this duty was revoked, menthol passes from Paraguay to Brazil for refining and subsequent re-export to the world market where its quality is highly-regarded. Commint oil is mostly produced by Brazilian immigrants in Paraguay and the majority of exports are passed, illegally, through Brazilian hands on their way to world markets.

5.19 The implications for Paraguay are that its existing lines are declining (*petit-grain* oil) or associated with suspect uses (menthol) and it has failed to identify other, more attractive spices, herbs and oils. Further, its marketing approach is self-destructive. More sophisticated coordination could make Paraguay competitive for attractive market niches.

C. Productive Resources

5.20 Paraguay is contained in the basin of the Río de la Plata, which includes two watersheds: the Paraguay and the Paraná. Three great rivers and their affluents integrate the river system: the Paraguay, the Paraná and the Pilcomayo. The Chaco falls wholly within the Paraguay watershed, together with about two-thirds of the Eastern region. The remainder of the country is within the Paraná watershed. These two rivers join on the southern limit of the country, where the water flow reaches 15,000 m³/second, of which 12,000 m³/second come from the Paraná. Since the Paraná watershed is only 50% larger in size but five times larger in flow, there are large differences in relative humidity between the two regions.

5.21 The climate is continental sub-tropical, although one-third of the country, the northern Chaco, is in the tropical zone. Rainfall ranges from 400 mm per year in the north-east Chaco to 1800 mm per year in the south-east of the Eastern Region, producing gradients of humidity from semi-arid to humid. The annual average temperature diminishes gradually from north to south. Minimum temperatures can fall below 0°C in all regions of the country. Large inter- and intra-annual shifts in rainfall distribution and temperature produce occasional frosts and periodic droughts and floods, which tend to limit agricultural production under low levels of technology.

5.22 Analysis of climatic conditions and their effects on the growing cycles tied to soil classification and topography determines land suitability for agriculture and the best localization for different crops. Two main groups of parameters constitute the basic elements for this agro-climatic classification: temperature and rainfall, which are combined to estimate potential evapo-transpiration, and land/soil characteristics, which include texture, slope, and mineral formation. Data on all of these parameters in Paraguay are deficient. Only three meteorological stations compile data that allow the estimation of potential evapo-transpiration. Estimates made for a wide range of stations on the basis of available information show similar values for all stations during the rainy summer months, December and January, averaging 164 and 163 mm/month, with values within a 7 mm/month range. The drier winter months, from April to August, showed large differentials between stations, ranging from 111-87 mm/month in May, 73-98 mm/month in June, and 97-122 in July. These observations indicate that irrigation would increase winter production in some areas, provided the crops were suitable for lower temperatures. Supplemental irrigation during the summer months could also be economic in many areas, to compensate for the vagaries in rainfall distribution.

5.23 The incidence of frost is not an important limitation to all agricultural production. The problem is most significant in the south, where the present cropping systems include susceptible crops. Freezing temperatures affect the southern Departments of Ñeembucú, Misiones, Itapúa, Caazapá and the south of Alto Paraná, where the frequency of frost ranges from 1-5 days per year, and limit the growth period of certain crops, particularly cereals (which are sensitive during the grain formation period), above-ground vegetables and fruits. The availability of accurate and timely meteorological information could greatly reduce this limitation for annual crops.

5.24 It is difficult to define distinct physiographic or ecological regional divisions in Paraguay. It is a relatively small area without determining landmarks and with few morphologically distinct areas. The high losses of original vegetation cover and the reduced number of agricultural systems, which are repeated in virtually every area in the Eastern Region, have created a superficial uniformity. A great variety of soil formations have been determined by the geology of ancient depositions from the continental borders. In addition, Paraguay's location in the transitional sub-tropical zone, and the absence of elevations acting as climate barriers, subject it to extreme ranges of temperature and rainfall within relatively small distances.

5.25 Different ecological, morphological, physiographic and other attempts at resource classification have been made in the past. The present efforts of the Land Use Rationalization Project (LURP), and particularly the work carried out under the first PHRD grant, will greatly assist in providing data for better soil and agro-ecological classification. The results of the reconnaissance-level soil survey of the Eastern Region will be supplemented with the analysis of climatic data and satellite-image interpretation, as well as demographic, economic and other social parameters, and compiled to a geo-referenced base map to form a GIS. For the purposes of this Review, the most widely-used classifications have been used to avoid adding to the

array of classifications. The classification presently proposed for the Eastern region by the MAG has been used. For the Chaco, the zones used are as defined by the Chaco Development Commission.

5.26 The Chaco, which includes about 60% of the country's area, is largely flat and sparsely populated; with the exception of a few agricultural settlements, it is mainly used for forest extraction and extensive cattle production. The availability of water and its quality are the major limiting factors to agriculture in the Chaco. The surface waters are limited to the Pilcomayo and Paraguay rivers, and the intermittent flows of other minor rivers. In ancient geological times, numerous currents ran from west to east across the Chaco, leaving waterway sites which are transformed into natural reservoirs during the rainy season. Several main eco-systems can be identified. The Chaco depression is a flat area with abundant water, where the majority of the extensive cattle operations take place. Directly to the west, the High Chaco is a dry plain with less precipitation which has historically been dedicated to the exploitation of *Quebracho* (*Schinopsis balansae*). In this same area are situated some agricultural settlements dedicated to cropping and cattle raising. Throughout the margins of the Pilcomayo are inundated areas, where lack of drainage is presently a serious limitation to agricultural use.

5.27 **The Eastern Region** has the best agricultural soils and contains the great majority of the population and the cultivated lands. The region includes a variety of topographic conditions, supporting the majority of the agricultural production of the country in crops and pasture lands. Cropping is generally conducted on higher and lower slopes, through a system of clearing and burning. The agricultural systems can best be described as extractive, with little erosion control or maintenance of fertility and organic matter content. A general problem of soil degradation due to agricultural practices is pervasive throughout the region.

5.28 The Eastern Region has been subdivided by MAG into seven sub-regions. The criteria used lack accuracy and specificity, and each zone, although denominated "ecological", contains considerably different soils, micro-climates and vegetation types within its boundaries. "Agro-economic" is probably a better designation for these sub-regions; their descriptions are complex and must be refined to be able to target technical support and recommendations to agricultural producers. These sub-regions are described below.

5.29 **The Northern Zone: Departments of Amambay, Concepción and San Pedro.** The climate is humid mesothermic, with some periods of drought during the summer months, and an average annual rainfall of 1,450 mm. The hydrographic network includes the rivers Apa, Aquidabán, Ypané and Aguaray guazú, and numerous smaller tributaries, all of which are tapped for irrigation programs in the area. The Amambay mountain range covers the eastern limit, and westward the topography changes gradually to moderate slopes between 5-12%, and then to slopes of between 3-5%. The sloping terrain combined with the lack of adequate agricultural technology to prevent soil erosion and to increase fertility and organic matter in cropping and grazing operations has determined a situation of degradation

which already limits productivity. Present cropping systems appear to under-exploit the agricultural potential of the zone. Concepción is largely a cattle region, with improved and natural pastures, although there is some cropping of cotton and peanuts. San Pedro, with more diversity, is also mostly a cattle producing region, supporting dairy operations with improved pastures. There are some wheat systems managed by Mennonite farmers, as well as cotton by small farmers. The cropping systems include subsistence corn and cassava producing as is true in all of Paraguay. Amambay is a major coffee (and yerba mate) producing region. There are important remnants of the original forests which continue to be threatened by illegal timber exports.

5.30 The Central Zone: Departments of Cordillera, Central and Paraguari. The topography ranges from steep slopes of over 20% to flood-susceptible flat and sandy lowlands on the borders of the rivers Paraguay, Tebicuary and their tributaries. This sub-region includes the most degraded soils in the country; in these soils of naturally low nutrient content, the pronounced losses of organic matter have become critical because they limit the effectiveness of fertilizers. The sub-region contains 60% of the country's human population, and has a large number of small farms which have the capital city, Asunción, as their main market. The most productive holdings produce a large proportion of the horticultural crops consumed in Asunción, under relatively intensive production systems. The low alluvial soils are considered to have serious limitations for crops and have traditionally been used for cattle grazing. The higher areas, where cropping is limited by high rock content and steep slopes, are adequate for forestry and agro-forestry uses. Although there are numerous fruit tree farms, there is also extensive cattle production and a dairy industry which supplies the Asunción market. In some of the lowland areas, there are large natural coconut associations, and plantations are exploited as silvo-pastoral systems.

5.31 The Central-East Zone: Departments of Caaguazú, Guairá and Caazapá. The majority of the area is moderately sloping with 5-12% slopes. The best agricultural soils are those derived from sandstones and basalt. The climate is sub-humid, with 1,500 mm rainfall annually. During the dry months, July and August, this zone suffers water deficits. The wet lowlands are used mostly for cattle production, which is predominant in the zone, particularly in the Department of Guairá. Some areas of traditional sugar cane remain. Tobacco, grapes, and yerba mate are found on a limited scale, as well as the traditional staples (cassava, corn, beans and peanuts). Some rice is produced in the wetter areas. To the east, in Caaguazú and Caazapá, there are soybean/wheat rotations, some sunflower, and hog farms. Particular to this region is the extraction of citrus essences (mainly petit grain) for export. There continues to be timber extraction in the remnants of forests and the transformation of those lands to agricultural use.

5.32 The Eastern Zone: Departments of Alto Paraná and Canindeyú. This is an important zone of agricultural expansion where a large number of Paraguayan and foreign producers have settled. The area is moderately ridged, with slopes of 5-12%, presenting limitations for cropping on the steeper gradients. The zone has the greatest biodiversity remaining in Paraguay; over 80% of the fauna of

the region is found here. The greatest number and extension of protected areas and reserves is located in this zone. The soils of the zone require careful management. On the eastern border, covering the flooded area of the Itaipú Dam, there is a large area of Oxisols, still holding some forest remnants. These soils are very susceptible to plowing and to liming, which tend to destroy their structure and promote erosion. Under intensive protective management, geared to increasing soil organic matter content and fertility and to preserving structural integrity, Oxisols are able to sustain some types of agriculture. Forestry and agro-forestry systems with permanent ground cover are most appropriate for these areas; the prevalent soybean/wheat rotations, even under "zero-tillage" systems, are inappropriate and will result in soil degradation and erosion. The sub-zone, however, is currently being cropped indiscriminately. Predominant systems are soybean/wheat rotations, with maize and other crops grown in the initial stages of the rotation or on the steeper slopes. In Alto Paraná, there are predominantly soybean/wheat rotations, cotton, citrus, yerba mate and subsistence crops. There were originally in the area large wooded associations with palms of excellent quality for palm heart; however, the destruction of the forests has almost eliminated these. The area has become one of the most intensively cropped in the country, and energy from the nearby hydroelectric plants has allowed the low-cost industrialization of certain agricultural products, such as soybean oil. Deforestation has occurred at an accelerated pace in what were some of the last forest reserves of the country.

5.33 The Central-Southern Zone: Department of Misiones. This is a flat lowland zone, with some rolling areas giving way to depressions which correspond to the effects of periodic floodings of the Paraná river, and consists mostly of pastures, marshes and bogs divided by a slight elevation which separates the alluvial and fluvial plains. At present there are no protected areas in the zone, and the remaining native fauna has taken refuge in the south-west zone, in the Department of Ñeembucú. The area is used predominantly for the grazing of cattle, sheep and horses. Cattle production is based on cow-calf operations, where yearlings and two-year old animals are moved to the north for finishing on improved pastures. Sheep are run together with the cattle or with horses. Some of the better soils are in cotton or soybean/wheat rotations on a small scale. The traditional staples are grown for subsistence.

5.34 The Southern Zone: Department of Itapúa. This region is considered to have the best agricultural soils of the country, although there are extreme variations in topography. The predominant relief consists of high and medium rolling hills, with almost flat areas of alluvial or fluvial deposits. To the north, the range of anthropic intervention goes from intensively-cropped fields in excellent agricultural soils to bog and marsh sites unsuitable for agriculture and mostly exploited as large pastures for cattle. In the west, 40% of the soils are low floodable plains which support most of the rice production in the country. The western part of the zone was originally cleared for cattle production, and some is still evident, although the land is predominantly being used for agriculture. A number of cooperative colonies are situated in the eastern part of the zone, whose members are among the best farmers in the country. Presently, in addition to the basic

soybean/wheat rotation, there are significant areas in sunflower, yerba mate, tung and castor.

5.35 The South-Western Zone: Department of Ñeembucú. This is a truly differentiated area which most nearly constitutes an agro-ecological zone. The soils reflect the periodic influx of materials from the flooding of the Paraná and Paraguay rivers, and are moist or seasonally wet. In the drier areas, to the east, there is extensive cattle production on natural pastures and limited cotton production. The south-west of the zone is unsuited for traditional agriculture, due to the limitations imposed by the wet regime. Most of the area is covered by marshes and bogs, with a few higher hills of eolic origin. The area is the last refuge of an important number of aquatic species. There is a great variety of habitat types, such as "islands", meadows and grasslands, which forms a "transitional" zone with elements of the Chaco, the eastern forests and the Pampas.

VI. STRATEGIC OPTIONS AND POLICY

A. Introduction: The Long-Term View

6.1 The development potential of the agricultural sector in terms of underutilized resources, available technology and markets is sufficient to allow the sector to continue to play, for a long time to come, the important role which it has done during the past 30 years or so of major economic transformation and growth. However, the "easy" phase of Paraguay's agricultural progress is coming to an end, and a new strategy is required to make more productive use of the resources available. A fundamental structural change is required, from the present (implicit) policy of continuous expansion of the agricultural frontier to a strategy of intensification of resource use via sustainable agricultural practices.

6.2 The Government of Paraguay is faced with a clear choice. It can either plan strategically for the long-term development of the agricultural sector and the rural areas and adopt the tactics (i.e., the policies, programs and projects) to achieve these objectives, or it can continue to react to individual problems, such as landlessness or climate-induced shocks to individual crops, on an *ad hoc* basis and with unknown prospects for success. It should be explicitly recognized by the Government and the Bank that the extensive period of Paraguay's agricultural development is drawing to a close and that a new strategy is required, based on the intensification of the use of resources on a sustainable basis. It must be emphasized that this is potentially consistent with an increase in agricultural productivity and output; while Paraguay is reaching the geographical frontier of agriculture, its production frontier is very far away.

6.3 The degrees of freedom available to the Government in defining its objectives, strategy and policies for the future development of the agricultural sector are more limited than might at first be supposed. Two major and opposing forces will cause radical change. This change can be planned for and used to catalyze development, or it can simply be allowed to happen with unforeseen and potentially explosive consequences. On the one hand, unexploited land (i.e., land under natural forest) of agricultural potential is limited in supply and almost all in private hands. On the other, the population is growing at somewhat over 3.0% per year which will double the population within 20-25 years. To exacerbate the problem, the traditional outward migration to Brazil and Argentina is likely to be reduced, perhaps even to turn to a net inflow, following the process of political opening in Paraguay.

6.4 The Government's Development Plan of July 1989 and subsequent pronouncements on policy toward the rural sector have emphasized a policy of "Integrated Agrarian Reform" to resolve the problem of demand for land by the landless and to promote rural development. This policy follows from the declared strategy which places the development of agriculture and export-oriented agro-industry at the heart of economic and social development.

6.5 Landlessness should be considered the "limiting case" of a problem which affects a very large number of people on small and sub-economic holdings. However successful a policy of integrated agrarian reform might ultimately prove, the government cannot by definition resolve indefinitely problems of landlessness or of sub-economic holdings by purchasing and expropriating land and subdividing it for settlement. The long-term agricultural strategy should make the allocation of resources, including land as flexible as possible, to encourage those forms and sizes of landholding which maximize output, and to integrate agricultural production and agro-industry to maximize value-added within the framework of Paraguay's comparative advantage in international trade.

6.6 Agricultural development in Paraguay has been, and remains, very exploitive in terms of natural resources. The expansion of the agricultural frontier via timber extraction and deforestation has been accompanied by an extractive approach to the natural fertility of the soils. The forest cover is not yet gone, but deforestation is accelerating and it is a matter for speculation, if deforestation is left unimpeded, how much longer the remaining forest cover will survive. Much of the deforested area is capable of sustained agricultural production, given the use of appropriate production and soil-conservation technologies. The problems arise from the unplanned and uncontrolled nature of the area expansion, which results in part from the lack of basic information about land use capability and the lack of a functioning regulatory apparatus. The result has been, in many areas, an indiscriminate clearing of land, including areas which are not capable of sustained agricultural production, where soil and fertility resources are literally being mined. The net result will be soil degradation and erosion on a massive scale unless strong measures are adopted to resolve the problems.

6.7 The issue of rural poverty is to a considerable extent the result of a basic failure of Government to provide the necessary support and catalysis to the development of small farmers. Rural poverty *per se* cannot be "attacked" or "solved" directly. The causes of poverty must be identified and efficient solutions proposed. The provision of more land per farmer is a necessary condition for economic improvement only in the smallest land-holding strata, but even there it is not a sufficient condition. The key, therefore, is to provide the necessary conditions for an increase in productivity.

B. The Objectives of Agricultural Development

6.8 The principal objective of agricultural development should be to improve the well-being of the rural population, on a sustainable basis, by increasing the output of all the factors of production. The achievement of this broad objective requires the pursuit of a number of subsidiary objectives:

- (a) the maintenance of a stable macro-economic environment;
- (b) the diversification of production, in order to improve nutrition and to stabilize and broaden export receipts;

- (c) the introduction and generalization of the use of sustainable production systems at the farm level, emphasizing measures to conserve soil and to reduce its degradation, in order to maintain the productive resource base;
- (d) the conservation of part of the remaining forested area and the protection of its biodiversity; and
- (e) an increase in the capacity of the rural poor to meet their needs through access to land, production inputs, and social and physical infrastructure.

C. The Proposed Strategy

6.9 The proposed strategy for agricultural development is one of: (a) **consolidation** of the achievements in agricultural development over the past 30 years; (b) **expansion** of gross sector product; and (c) **maintenance** of the natural resource base. It is based on a long-term perspective, and its outcome depends upon the achievement of significant structural change in the sector. It is axiomatic that the resources necessary to tackle the agrarian issues will not be provided by transfers from other sectors of the economy. Agriculture, agro-industry and related services must, by definition, provide these resources. Unused capacity and the potential for growth (via increased output and productivity) are more than sufficient to allow the agricultural sector to continue to play a key role in the economy and to generate the resources (in terms of fiscal revenue and savings) necessary to finance the investments and incremental operating expenditures to resolve the agrarian issues. This would require up-to-date valuations of land holdings and the effective implementation of the income and real estate taxes in the agricultural sector. It is also assumed that outmoded models of economic development based on the transfer of resources out of agriculture and into the supposedly more "dynamic" sectors of the economy (e.g., industry) will not be resuscitated.

6.10 The macro-economic environment has improved dramatically since implementation of reforms in 1989. However, distortions in credit markets continue to limit the availability of credit, particularly for long-term capital investments. Improved productivity and implementation of more sustainable production systems are dependent on access to long-term credit.

6.11 Sectoral policy is essentially based on market price signals. Tariffs have been reduced in compliance with the terms of MERCOSUR and remaining import and export prohibitions, already unenforceable, are scheduled to be eliminated by the end of 1995. However, even within this limited sphere, Government's capacity to develop and analyze policy in the sector is important, particularly in areas such as environment and research where negative and positive external effects require direct government intervention in the sector and to analyze the effect on the agricultural sector of intersectoral and international shocks.

6.12 The role of Government should evolve to be consistent with this new strategy. Major changes will be required in MAG, whose legal charter should explicitly state that it would be responsible for all agricultural and agrarian policy. The changes required in MAG, which would involve its restructuring, would orient it towards properly fulfilling a number of functions which today exist only on paper and shedding others which more properly fall into the orbit of the private sector. Production, marketing and processing are almost wholly the responsibility of the private sector. However, there is an important and legitimate role for the government in assisting the agricultural development process; this intervention should mainly take the form of agricultural research, extension, quality and phytosanitary control for exports, control of land clearing and soil conservation practices, and other areas where clear market failures exist. Support should be given to the promotion of farmers' organizations, whose degree of development was greatly restricted under the previous government, which are the most cost-efficient means of providing many essential services to the small farmer.

6.13 Institutional strengthening will be required for government to fulfill its new role. Career development and staff training must be central to any restructuring of MAG if one ineffective structure is not simply to be replaced with another. Incentives must be consistent with job descriptions which in turn must be consistent with the policy objectives in the sector.

6.14 The rural areas have been the recipient of significant public investment, and large parts of it (e.g., the road-building program) were and remain a necessary condition for agricultural development. In order to finance the expanded program of investment (both capital and recurrent costs), a major objective of strategy should be to increase significantly the collection of taxes in the agricultural sector. A major effort will be required to create a complete cadastre and land titling system, and install a mechanism to keep it up-to-date once created. In taxation, the first phase should be to ensure that all landowners are liable for and actually pay the *Impuesto Inmobiliario Rural*. The cost of issuing the invoice is small and there are strong arguments for having a minimum taxable land holding of a very small size. Later phases should then aim at increasing the official (fiscal) value of land to its real market level. As a later refinement, a combination of the cadastre plus production economic and soil capability overlays would yield a tax more closely related to the intrinsic productive capability of the soil and would be broadly production-neutral. Such a tax could be made production-positive by including allowance for capital investments made on the land.

6.15 The relative weight of central and regional government should be shifted towards the latter, particularly where agrarian and agricultural issues are concerned, and the central government's activities should be decentralized. The central government should play a key role in the provision of specific services and public goods, in which it has a comparative advantage (e.g., research; some extension; phytosanitary, animal health and quality control) and in ensuring that major inequalities do not arise between different areas of the country. As the Departmental and municipal levels of administration are strengthened, they should assume

increasing responsibilities in natural resource management, maintenance of infrastructure (particularly rural road), and education.

6.16 The Geographic Information System (GIS), which is being developed under the LURP, and which will be closely coordinated with the improved cadastre, is of crucial importance to the implementation of agro-ecological zoning in Paraguay. This will allow the MAG to implement controls on deforestation, and to enforce practices designed to minimize soil degradation and erosion and to protect watersheds. The Eastern Region of Paraguay has seen enormous deforestation due to expansion of the agricultural frontier at the expense of the natural forest cover. Much of the deforested area is capable of sustained agricultural production, given the use of appropriate production and soil-conservation technology. In this sense, deforestation, while not an agreeable thing to see, is not automatically "a bad thing". The problems arise in the unplanned and uncontrolled nature of this development, which is itself in part the result of the lack of basic information about land use capability and the lack of a functioning regulatory apparatus. The result has been, in many areas, an indiscriminate clearing of land (including land not capable of sustained agricultural production) where soil and fertility resources are literally being mined. Definition of protected areas and their management must be improved before the remnants of important tropical forest habitats are completely eliminated. Formation and protection of parks should exploit international financial and technical resources and involve, where appropriate, local indigenous communities.

6.17 Agro-ecological zoning and more rationally sized holdings will not necessarily lead to more productive or sustainable land use unless appropriate technological packages are made available to farmers. A coordinated effort between Government, the private sector, and international research institutions will have to be undertaken which takes into account marketing and labor requirements as well as the suitability of the crop or animal to the soils and climate of an area. Diversification of production systems should be the inevitable result of the increased options in land size and technical assistance, but will be impeded if existing government interventions in input markets, particularly credit, continue to tie provision to those inputs to particular crops and types of livestock. This is clearly evident in the case of wheat where Government-imposed import restrictions and directed credit have impeded the integration of ecologically more beneficial and potentially more lucrative crops into the soybean rotation.

6.18 The development of a land market is an important potential consequence of the improved cadastre to be developed and the properly functioning *Impuesto Inmobiliario Rural*. An efficient land market would allow the subdivision or agglomeration of holdings into units which allow utilization of agro-ecologically and economically appropriate production systems.

6.19 As settlement becomes an increasingly costly and complicated process, Government will have to consider other means of assisting the rural poor. This will require greater knowledge of the extent and nature of rural poverty than currently exists in Paraguay. The Government already has a vehicle for this work in the

agricultural census which attempts to interview every rural household in the country. The ten-year census cycle should be complemented by a more frequent census to determine the levels and sources of income, access to social services and living conditions of the rural poor.

6.20 The *Instituto de Bienestar Rural (IBR)* should be reorganized and strengthened, in order to undertake efficiently its role of land distribution and settlement. Emphasis should be placed on land titling, and cadastral responsibility should be centralized in the *Servicio Nacional de Catastro/Ministerio de Hacienda*. The purchase of large holdings for fractioning, either through legal channels of expropriation or through the market, will remain a key role of IBR. Financing measures should be sought which limit demands on the Government's resources, including bonds amortized via the payments made by those receiving land under the settlement schemes.

6.21 The provision of social and physical infrastructure is an essential component in facilitating agriculture's transition. The expansion of agro-industrial activity and further settlement of agricultural areas should aim to maximize employment opportunities in the rural areas; however, such development cannot be expected to alleviate totally or even for the long-term the pressures which a rapidly growing population will make on the urban sector. Of crucial importance will be the provision of social infrastructure in rural areas, since employment opportunities are a necessary but not sufficient condition to stem rural-urban migration. Education is a necessary condition for effective technology transfer and health is a basic limitation to human productivity. Electricity, roads and other communications infrastructure are essential to support the expansion of agro-industrial activity, particularly new opportunities which may arise within the context of MERCOSUR. Programs targeted at improving services in rural communities must fully integrate women in a manner consistent with their multi-faceted roles in rural communities, and should attempt to provide coverage of equal quality to indigenous people throughout the country.

D. External Assistance

6.22 The issues described and the recommendations made in this Review lend themselves to the formulation of a number of initiatives suitable for external assistance. Since the restoration of democratic government in 1989, Paraguay has experienced a significant increase in the technical assistance available to it on a bilateral and multilateral basis. It is of vital importance that the Government should provide a consistent, central focus to the assistance it receives, to ensure that as far as possible there is no duplication of effort, on the one hand, or lack of attention to a key issue, on the other. The STP and the DGP in MAG should closely coordinate their overview of available technical assistance and project support.

6.23 The projects and programs undertaken by the Government in general and by the MAG in particular should be shaped by the requirements of the new strategy for agricultural and rural development. A significant start has already been

made on this. Much of the technical and financial assistance being received is focused on the challenges faced by the sector. For example, Japanese Government assistance was crucial to the carrying out of the 1991 agricultural census, and is also being provided to forestry and crop production. German Government and University support is making an important contribution in forestry and natural resource management, and in natural resource inventory in the Chaco. British Government support has been provided to strategic planning for the livestock sector.

6.24 Two new operations are receiving Bank support. The Land Use Rationalization Project (Ln. 3445-PA) will generate the multi-purpose cadastre and the Geographic Information System. These represent the essential databases for the implementation of new strategy. The Natural Resources Management project (Ln. 3708-PA) will generate practical experience in catchment area management and intensification of agricultural production in a limited area (Alto Paraná and Itapúa) for later dissemination in the whole Eastern Region. Other initiatives supported by the Inter-American Development Bank include the consolidation of settlement areas in the north of the Eastern Region and (in preparation) a program of support for diversification and intensification of production.

6.25 To complement these, the following initiatives should form a key part of a future project pipeline:

- (a) Institutional reform of MAG and other public sector entities in the agricultural sector;
- (b) Strengthening of basic agricultural services - research, extension, quality control and veterinary and phytosanitary services;
- (c) Rural infrastructure and services - roads, education, health and municipal development; and
- (d) Natural resources management throughout the Eastern Region and the Chaco.

PARAGUAY
AGRICULTURAL SECTOR REVIEW
STATISTICS

PARAGUAY
AGRICULTURAL SECTOR REVIEW

Table 1. Gross Domestic Product by Sector (at market prices, million Guarani, constant 1982 prices)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Agriculture	113,947	114,677	111,418	119,663	126,865	110,880	121,635	143,530	157,610	159,082	152080
Livestock	55,398	56,506	55,489	57,771	59,430	60,619	62,134	63,874	66,643	69,847	74108
Forestry	19,471	18,370	18,039	18,490	18,649	20,837	22,087	23,390	24,349	25,201	26319
Fisheries	1,060	1,092	1,045	1,066	1,098	1,131	1,165	1,200	1,225	1,255	1285
TOTAL AGRICULTURE	189,876	190,645	185,991	196,990	206,042	193,467	207,021	231,994	249,827	255,385	253,792
Mining	3,070	3,142	2,912	2,942	3,073	3,440	3,646	3,920	4,147	4,300	4515
Industry	125,613	120,966	115,861	121,075	127,129	125,345	129,732	137,309	145,410	149,045	150684
Construction	52,707	49,544	46,720	45,604	45,148	45,600	46,512	47,742	48,936	48,486	49940
TOTAL INDUSTRY	181,390	173,652	165,493	169,621	175,350	174,385	179,890	188,971	198,493	201,831	205,139
Electricity	12,623	15,778	15,014	15,344	16,255	18,060	19,505	21,368	22,732	25,960	28686
Water and Sanitation	2,123	2,342	2,765	2,820	2,993	3,158	3,316	3,455	3,583	3,974	4026
Transport & Communication	30,497	31,107	30,742	31,853	33,468	35,142	36,899	39,149	41,028	42,546	44673
TOTAL BASIC SERVICES	45,243	49,227	48,521	50,017	52,716	56,360	59,720	63,972	67,343	72,480	77,385
Trade & Finance	200,570	196,158	190,171	193,634	202,759	209,437	216,767	225,640	236,136	244,732	255425
General Government	31,594	32,858	32,172	32,953	33,941	34,620	35,312	35,850	40,594	41,774	43027
Housing	22,961	22,500	21,448	21,448	21,662	22,096	22,538	22,989	23,541	24,100	24944
Other Services	72,727	72,000	71,133	72,243	73,688	75,858	78,134	80,791	83,566	87,015	90496
TOTAL SERVICES	327,852	323,516	314,924	320,278	332,050	342,011	352,751	365,270	383,837	397,621	413,892
TOTAL GDP	744,361	737,040	714,929	736,906	766,158	766,223	799,382	850,207	899,500	927,317	950,208

Source: Banco Central del Paraguay, National Account

PARAGUAY

AGRICULTURAL SECTOR REVIEW

Table 2. Land Use by Farm size, 1991

	Amount Exploited	Area	Temporary Crops	Cultivated Forrage	Permanent Crops	Fallow	Natural Pasture	Forest Plant	Others
PARAGUAY	299259	23817	1576	2316	85.17	573.33	10256.2	7818.42	1191.88
REGION ORIENTAL	300523	11428.8	1534.1	1472.2	82.1	494.3	4794.1	2312.4	739.5
REGION OCCIDENTAL	6698	12389.0	42.8	843.5	3.0	79.0	5462.0	5506.0	452.6
Size Cultivated									
Less than 1ha.	21977	8.5	3.3	0.2	0.2	0.2	0.3	0.1	4.3
From 1 to 5	92811	222.8	149.9	4.6	5.6	15.1	10.2	4.3	33.2
From 5 to 10	66605	430.7	225.9	19.0	12.3	56.2	35.7	38.9	42.6
From 10 to 20	66223	806.8	318.9	54.6	20.5	113.0	99.2	138.6	62.1
From 20 to 50	31519	857.9	262.8	89.1	18.5	99.0	195.4	140.3	52.8
From 50 to 100	7577	502.6	130.2	70.2	6.7	34.6	163.6	72.9	24.5
From 100 to 200	4279	569.2	119.8	110.0	3.8	24.7	189.6	97.8	23.5
From 200 to 500	3503	1054.0	145.8	240.0	4.1	31.1	374.4	216.0	42.7
From 500 to 1000	1525	1011.0	72.3	211.6	1.8	20.0	423.6	240.5	41.2
From 1000 to 5000	2356	4982.4	78.7	645.7	5.7	71.6	2517.0	1473.0	190.8
From 5000 to 10000	533	3644.9	30.9	406.3	4.0	70.0	1733.3	1185.9	214.4
More than 10000	351	9730.9	38.3	464.5	2.0	38.0	4513.9	4210.3	464.0

Source: MAG, Censo Agropecuario, 1991.

PARAGUAY

AGRICULTURAL SECTOR REVIEW

Table 3. Number and Area of Farms by Department

DEPARTMENT	1981 CENSUS			1991 CENSUS		
	No. of FARMS	SIZE 1/	AVERAGE 2/	No. of FARMS	SIZE	AVERAGE
EASTERN REGION						
ASUNCION	0	0	0	0	0	0
CONCEPCION	12787	1707.7	133.5	15983	1540.7	96.4
SAN PEDRO	25261	1488	58.9	37028	1601.9	43.3
CORDILLERA	19857	303.7	15.3	21828	335.2	15.4
GUAIRA	16218	253.6	15.6	19811	244.6	12.3
CAAGUAZU	35659	731	20.5	43330	1089.2	25.1
CAAZAPA	15426	536.6	34.8	20351	645.2	31.7
ITAPUA	29945	983.2	32.8	40190	1092.9	27.2
MISIONES	8840	725.3	82	9507	830	87.3
PARAGUARI	26445	620.3	23.5	27479	641.6	23.3
ALTO PARANA	13610	642.8	47.2	21037	833.6	39.6
CENTRAL	13314	163	12.2	13350	122.5	9.2
NEEMBUCU	8334	828.9	99.5	8284	693.3	83.7
AMAMBAY	4074	820.9	201.5	3248	1032.8	318
CANINDEYU	7613	523.2	68.7	11668	647.8	55.5
TOTAL EASTERN REGION	237383	10328.2	43.5	293094	11351.3	38.7
CHACO REGION						
PTE. HAYES	1830	6078.3	3321.5	3745	6325.2	1689
ALTO PARAGUAY	264	3385	12822	236	2627.4	11133.1
CHACO	60	527.7	8795	65	234.9	3613.8
NUEVA ASUNCION	7	141.7	20242.9	31	518.1	16712.9
BOQUERON	2141	1479.6	691.1	1994	1945.1	975.5
TOTAL CHACO REGION	4302	11612.3	45872.5	6071	11650.7	34124.3
TOTAL PARAGUAY	241685	21940.5	90.8	299165	23002	76.9

1/ In thousand of hectares

2/ In hectares

Source: MAG, Censo Agropecuario de 1981-1991

PARAGUAY
AGRICULTURAL SECTOR REVIEW

Table 4. Main Crops - Area Cultivated
(Thousand of ha.)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
COTTON	242.8	290	298.4	301.7	400.7	399	296.1	408	441	533	414.7
RICE	24	31.9	34.6	37.2	40	32	41.4	34	33	34	10.7
PEAS	21.7	2.2	2.1	2.2	2.2	2	2.2	2	2	2	2
SWEET POTATOES	108.9	11.5	11.9	12.2	13.1	13	14.2	14	14	13	11
SUGAR CANE	48.1	49.9	51.8	54.6	56	62	65	58	60	49	55.9
ONION	20.7	3.7	4.2	4.7	4.8	5	5.7	4	5	5	5
STRING BEANS	9.5	9	9.7	10.5	11.4	10	12.3	13	13	9	9
MAIZE	262.8	374.6	418.3	447.5	481.5	385	572.2	497	501	519	243.2
CASSAVA	178	183.4	186.6	191.9	202.7	217	223.6	254	40	262	175.6
PEANUTS	34.5	36	38	39.1	39.9	32	40.9	42	262	39	30.8
POTATOES	0	0.9	1	1	1	1	31	0.3	0.4	0.4	0.3
BEANS	44.9	51.6	53	55.1	59.3	43	56	57	53	48	47.1
SOY BEANS	396.9	532.8	649.7	678.9	746.8	718	679.3	779	860	907	552.7
TOBACCO	8.1	9.9	12.2	14.7	16.3	5	9557.2	4	1	3	4.4
WHEAT	49.4	70.4	79.9	125.1	134.4	162	176.3	198	250	237	153.8

Source: MAG

PARAGUAY
AGRICULTURAL SECTOR REVIEW

Table 5. Area, Production and Yield of Key Crops and Department, 1991

DEPARTMENT	A R E A (ha.)				P R O D U C T I O N (TN.)				Y I E L D (kg/ha.)			
	COTTON	SUGAR CANE	SOY	WHEAT	COTTON	SUGAR CANE	SOY	WHEAT	COTTON	SUGAR CANE	SOY	WHEAT
Concepcion	23,740	782	187	119	30,036	25	359	122	1,265	31	1,918	1,033
San Pedro	78,234	2,020	17,367	14,270	124,755	106	26,806	19,779	1,595	53	1,544	1,386
Cordillera	9,268	5,187	12	85	10,795	244	14	108	1,165	47	1,200	1,273
Guaira	16,745	20,149	237	23	23,485	1,152	425	48	1,424	57	1,795	2,065
Caaguazu	80,011	8,344	21,799	6,710	130,249	470	41,893	11,177	1,628	56	1,922	1,666
Caazapa	27,279	1,988	8,931	370	39,495	97	16,355	530	1,448	49	1,831	1,432
Itapu	55,723	943	210,523	63,979	88,366	29	364,113	99,986	1,586	31	1,730	1,563
Misiones	11,441	514	159	614	14,863	16	181	918	1,299	31	1,133	1,494
Paraguari	25,413	6,044	414	413	32,478	261	1,217	623	1,278	43	2,939	1,510
Alto Parana	34,672	795	228,504	53,616	60,203	30	456,299	84,111	1,736	38	1,997	1,569
Central	3,061	5,281	3	4	3,873	253	6	7	1,265	48	1,882	1,564
Neembuco	10,374	221	2	4	11,545	6	3	6	1,113	29	2,000	1,600
Amambay	5,198	795	15,288	7,407	8,957	21	30,441	13,313	1,723	26	1,991	1,797
Canindeya	22,691	1,002	49,030	5,970	39,986	33	94,200	9,415	1,762	33	1,921	1,577
Ptde. Hayes	6,178	1,810	202	254	6,852	75	363	397	1,109	41	1,799	1,563
Alto Paraguay	0	0	0	0	0	0	0	0	0	0	0	0
Chaco	2	1	2	2	3	1	3	3	1,550	52	1,550	1,550
Nueva Asuncion	0	0	0	0	0	0	0	0	0	0	0	0
Boqueron	4,661	3	0	0	5,427	1	0	0	1,164	50	0	0
TOTAL	414,691	55,879	552,659	153,838	631,368	2,818	1,032,677	240,540	24,110	715	29,152	24,642

Source: MAG

PARAGUAY
AGRICULTURAL SECTOR REVIEW

Table 6. Volume of Livestock Production

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
CATTLE	553,855	544,036	557,810	530,817	539,310	576,424	605,676	729,464	956,925	1,049,620	928,763
HORSES 1/	2,419	2,425	2,472	2,550	2880	3,030	2,091	2,143	2,173	2,000	1,975
PIGS 1/	1,560,129	1,638,135	1,677,426	1,727,749	1,779,580	1,788,400	1,797,560	1,824,523	1,902,977		
SHEEP/GOAT 1/	212,977	218,200	76,471	223,139	231,110	232,260	238,279	243,045	247,488	251,200	242,378
HENS (Units)	1,534,640	1,611,300	1,655,343	1,708,314	1,762,980	1,798,240	1,971,153	2,069,710	2,131,801	2,174,437	2,247,899
CHICKENS	2,603,285	2,720,430	2,738,842	2,996,526	3,296,180	5,412,500	5,913,457	6,209,131	6,457,496	6,768,175	6,996,835
OTHER BIRDS	S/D	306,250	290,000	300,000	306,250	312,500	320,000	330,000	340,000	340,000	358,750
MILK 2/	158,903	159,600	163,857	169,807	176,600	181,980	188,347	193,997	199,817	219,001	233,236
EGGS FROM CHICKENS AND OTHER BIRDS 3/	551,094	564,900	581,054	600,266	620,080	638,680	659,756	681,528	704,018	673,600	715,360
WOOL 4/	514	453	605	610	630	640	654	700	710	721	1,058
HONEY 2/	832	800	857	943	1,010	1,030	1,061	1,093	1,107	1,184	1,224
HORSE HAIR 4/	243	230	196	210	220	225	230	235	242	240	256

1/ Unidades faenadas

2/ 1000 Liters

3/ 1000 Units

4/ Tons

Source: GOP, Cuentas Nacionales

PARAGUAY

AGRICULTURAL SECTOR REVIEW

Table 7. Forestry Plantations Cultivated on Farms by Department 1/

		Total No. Farms with Land	Total with Forestry Plantations		Eucalyptus		Pine		Native Species and others	
			No. Farms	Area Cultivated	No. Farms	Area Cultivated	No. Farms	Area Cultivated	No. Farms	Area Cultivated
PARAGUAY	1991	299,259	4,216	15,152	803.00	2,925	1,201	2,934	3,068	9,294
	1981	241,652	2,926	7,074	462	2,022	798.00	1,682	2,073	3,370
Variation	(%)	23.8	44.10	114.20	73.8	44.70	50.50	74.40	48.0	175.80

EASTERN REGION		29,2913	4,196	15,139	799	2,918	1,199	2,934	3,052	9,288
01.	CONCEPCION	15,734	111	241	7	5	3	2.00	114	234
02.	SAN PEDRO	37,011	346	2,870	22	1,283	16	186	336	1,401
03.	CORDILLERA	21,725	390	1,010	67	114	33	50	382	846
04.	GUAIRA	19,766	93	476	26	219	30	33	67	224
05.	CAAGUAZU	43,475	287	1,156	28	121	38	47	275	988
06.	CAAZAPA	20,331	91	174	29	49	15	24	77	101
07.	ITAPUA	40,376	1,184	3,457	156	296	639	1,240	618	1,921
08.	MISIONES	9,361	198	587	57	174	25	36	167	377
09.	PARAGUARI	27,464	310	666	59	180	30	105	273	381
10.	ALTO PARANA	21,427	806	3,168	237	163	320	1,115	407	1,890
11.	CENTRAL	12,905	194	401	59	62	26	17	176	323
12.	NEEMBUCU	8,285	107	363	20	21	4	2	110	339
13.	AMAMBAY	3,244	23	288	17	215	6	5	8	68
14.	CANINDEYU	11,809	56	283	15	15	14	72	42	196

WESTERN REGION		6,346	20	13	4	7	2	0	16	6
14.	PTE. HAYES	4,004	7	8	4	7	2	0	3.00	0
16.	ALTO PARAGUAY	238	--	--	--	--	--	--	--	--
17.	CHACO	66	--	--	--	--	--	--	--	--
18.	NUEVA ASUNCION	62	--	--	--	--	--	--	--	--
19.	BOQUERON	1,976	13	5	--	--	--	--	13	5

1/ Only Forestry Plantations cultivated in a compact form on farms are included. SOURCE:

PARAGUAY
AGRICULTURAL SECTOR REVIEW
TECHNICAL VOLUME ANNEXES

- A. Statistics
- B. Environmental Issues in the Agricultural Sector
- C. Marketing
- D. Livestock
- E. Crops
- F. Forestry
- G. Agro-industry
- H. Institutions
- I. Land Use and Tenure
- J. Actual and Potential Land Use
- K. Agricultural Finance and Credit
- L. Evolution of the Policy Environment
- M. Rural Poverty
- N. Rural Women
- O. Indigenous People
- P. History of Agricultural Development
- Q. The Chaco: Issues in Natural Resource Management and Agricultural Development

IMAGING

Export No: 1000000000
Type: 99