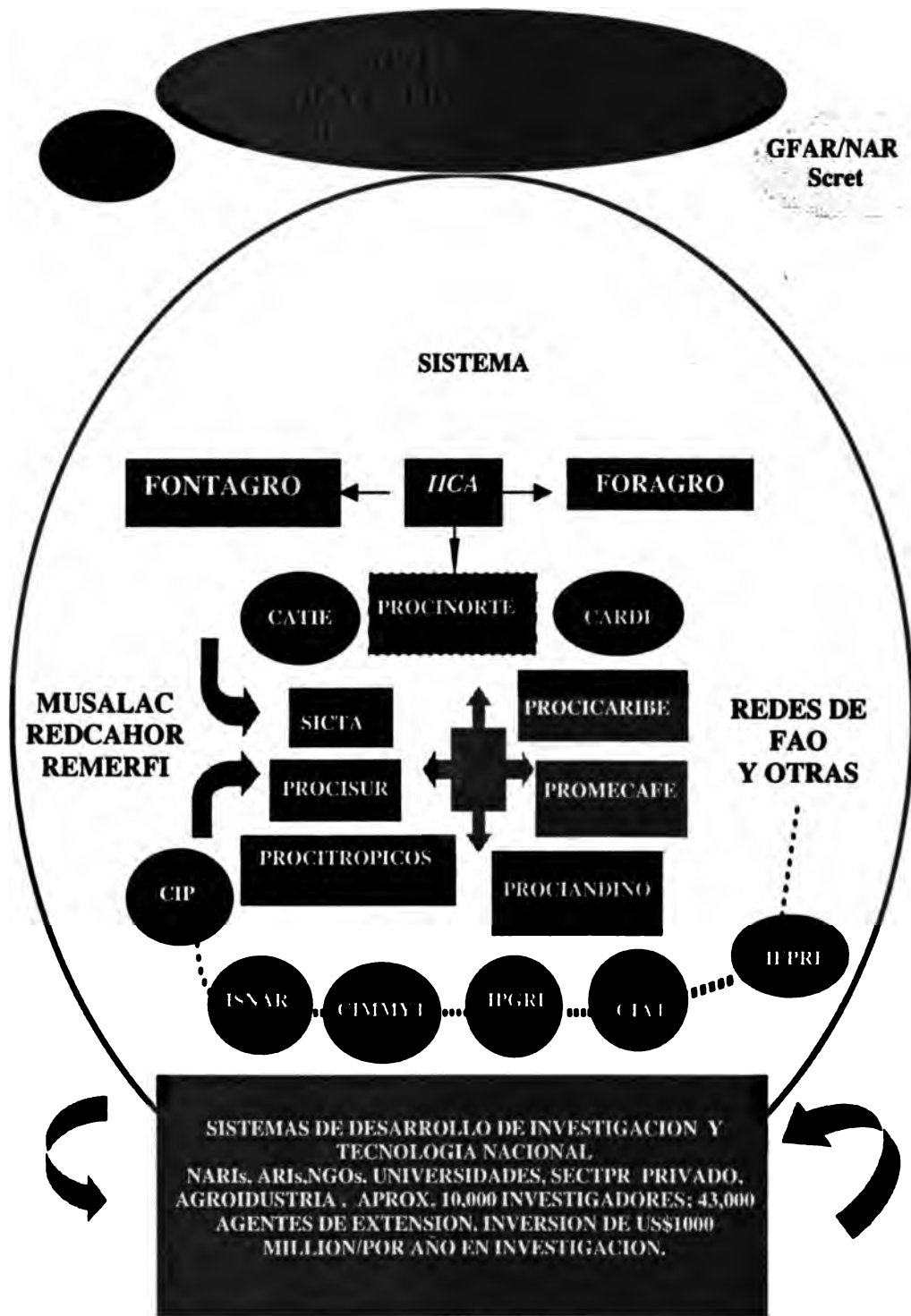




Foro de las Américas para la Investigación y
Desarrollo Tecnológico Agropecuario (FORAGRO):
**SU PAPEL EN LA COOPERACION
REGIONAL Y GLOBAL**

San José, Costa Rica
Mayo, 2000

FIGURA 4. SISTEMA REGIONAL DE INVESTIGACION AGRICOLA

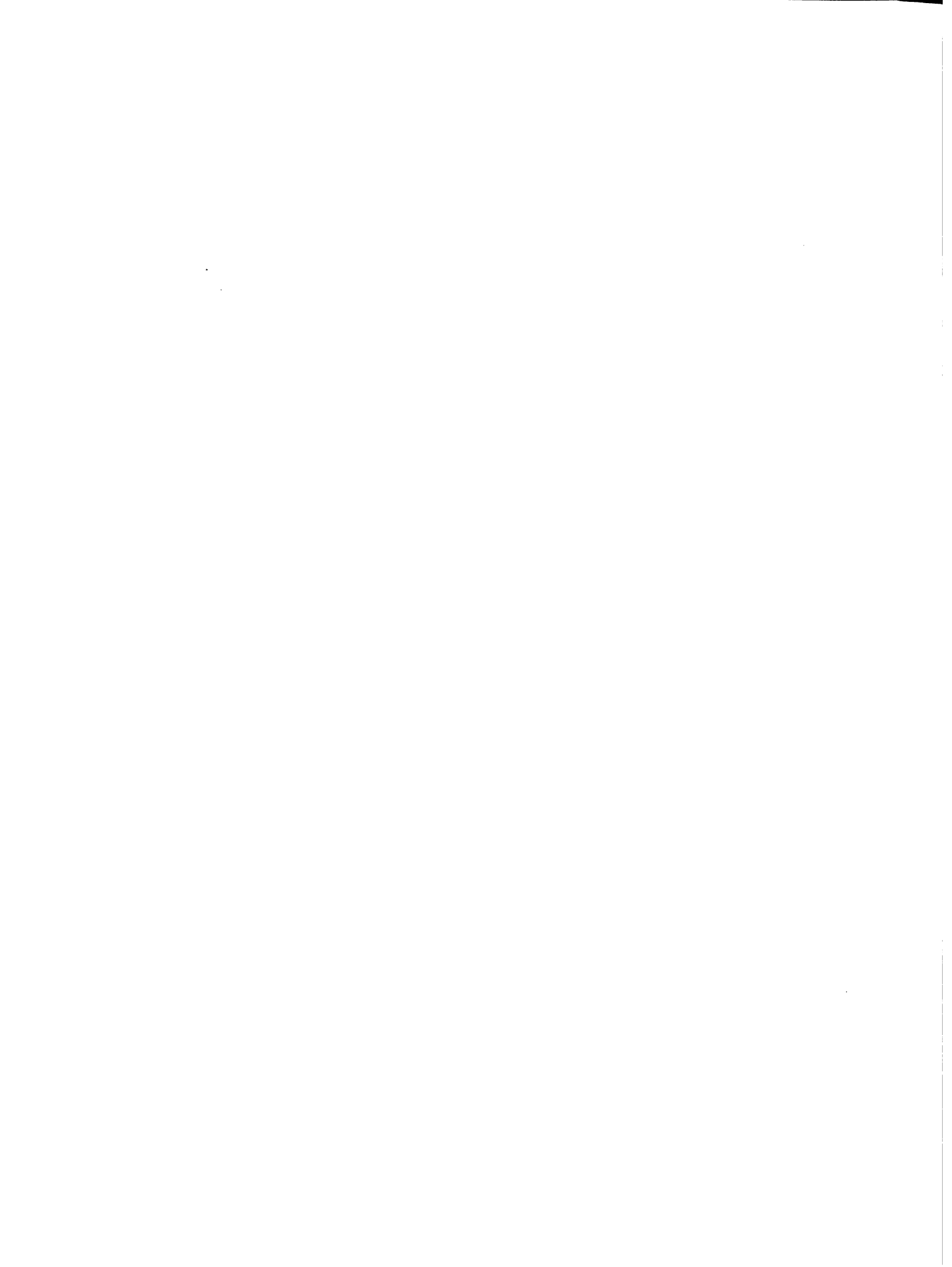


FUENTE: IICA Area II. 1998

Word-FORAGRO PAPER
16 octubre. EA/méxico. 16.5.2000

IICA
BIBLIOTECA VENEZUELA
* 02 MAYO 2001 *

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SOURCE: IICA Area II, 1998

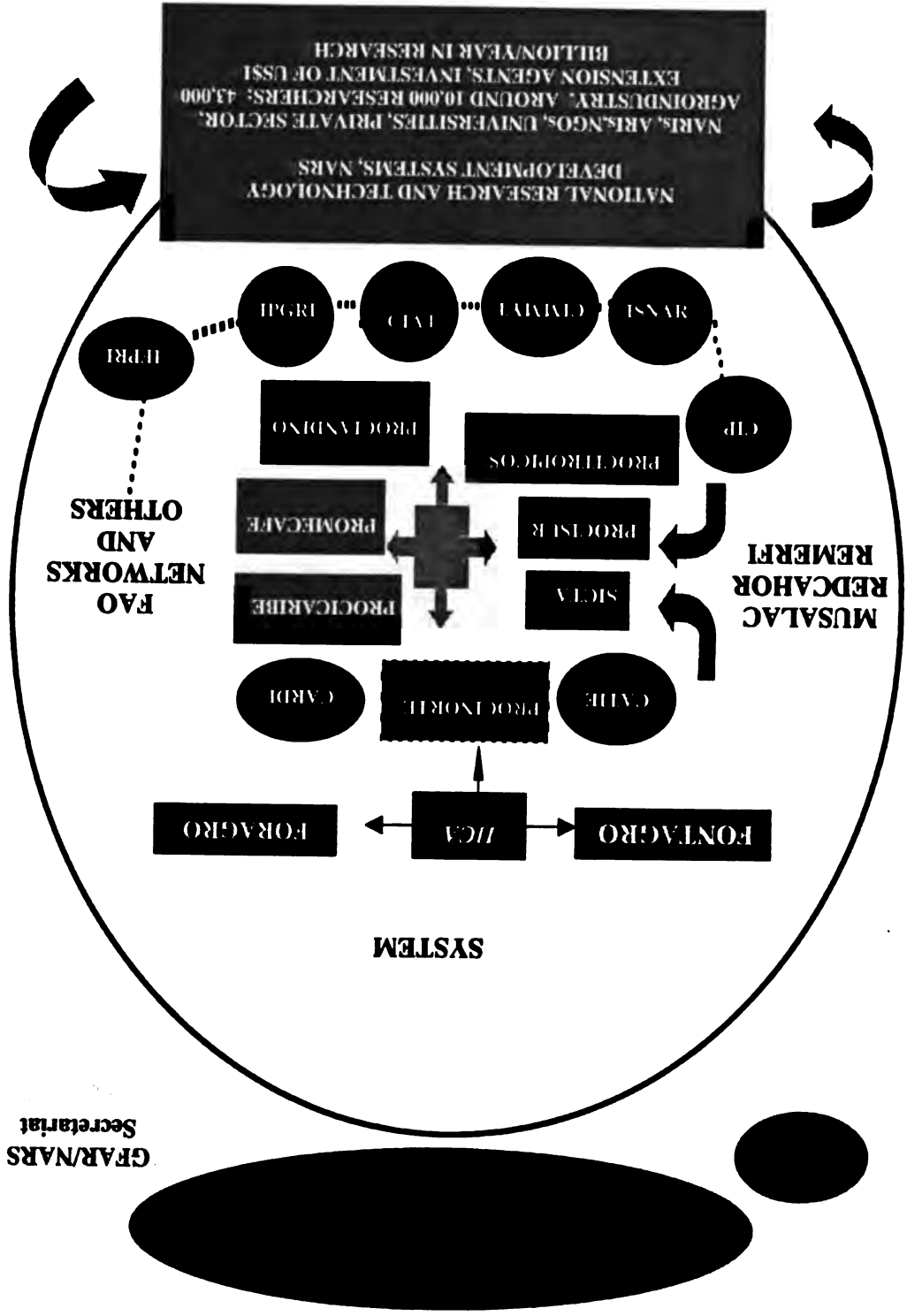


FIGURE 4. REGIONAL SYSTEM OF AGRICULTURAL RESEARCH

FIGURE 3. Mega-domains for FONTAGRO

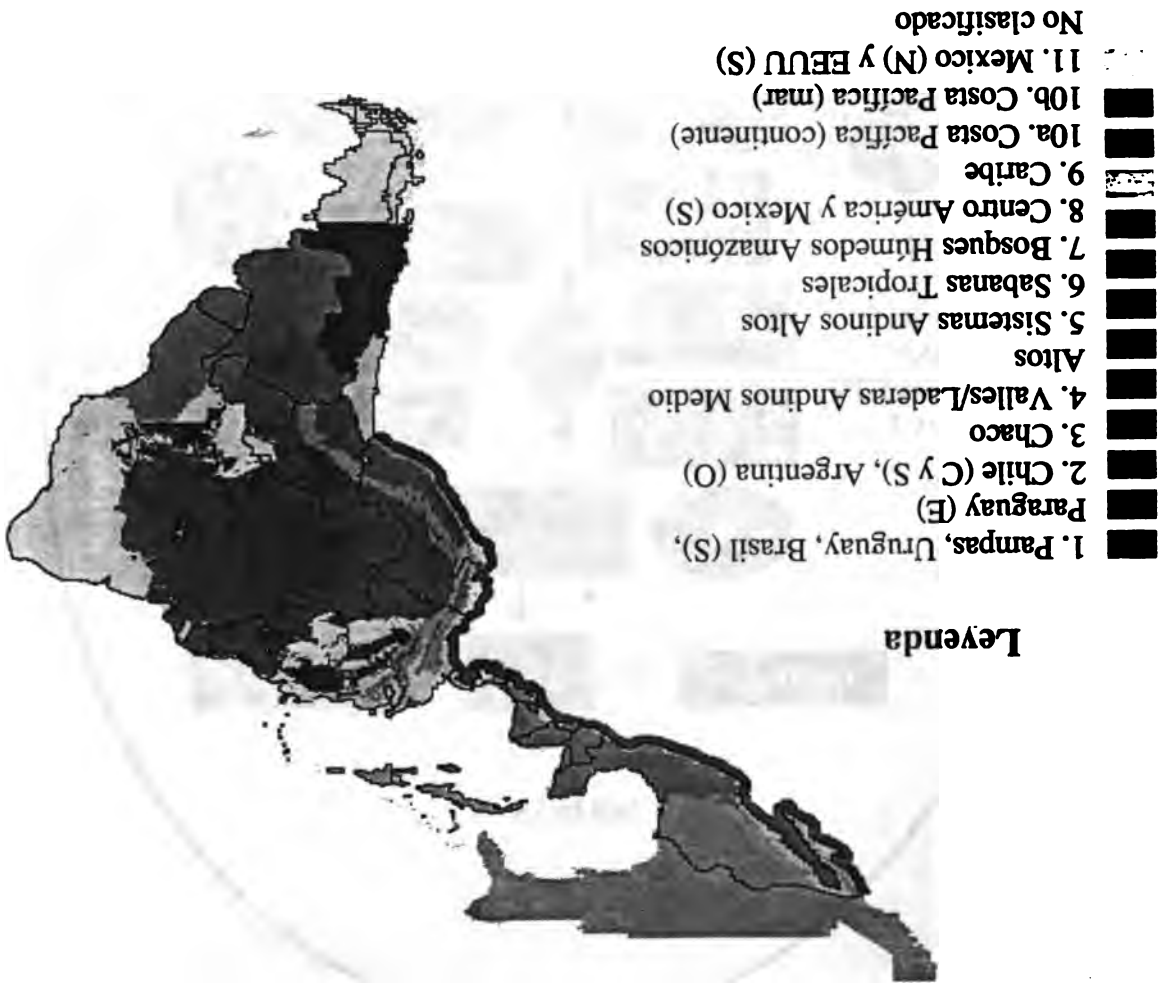


FIGURE 3. Geographic, Thematic and Institutional Scope of the Cooperative Programs on Agricultural and Technology Development Research, PROCI of IAC

<p>PROCIANDINO</p> <p>Countries: MAG-CORPOICA Colombia; SIBTA Bolivia, INIAP Ecuador; INIA Peru; FONAIAP Venezuela</p> <p>Programs:</p> <ol style="list-style-type: none"> 1. Soil conservation and management 2. Plant genetic resources 3. Fruit cultivation for export 4. Edible legumes and oleaginous crops 5. Basic food crops 6. Policy, management and institutional organization 7. Information and communication 	<p>PROCIUR</p> <p>Countries: INTA Argentina; SIBTA Bolivia, EMBRAPA Brazil, INIA Chile, MAG Paraguay; INIA Uruguay</p> <p>Programs:</p> <ol style="list-style-type: none"> 1. Biotechnology 2. Genetic resources and agricultural sustainability 3. Natural resources and agricultural sustainability 4. Agroindustry 5. Institutional development 6. Regional Technological Integration (Project on Globalization and Integration)
<p>PROMECAFE</p> <p>Countries: ICAFE Costa Rica; UNICAFE Nicaragua; SEA/Dep. Café Republica Dominicana; IHCAFE Honduras; ANACAFE Guatemala; PROCAFE El Salvador</p> <p>Programs:</p> <ol style="list-style-type: none"> 1. Biological control and integrated pest management 2. Evaluation and selection of nematode-resistant germplasm 3. Genetic enhancement for disease resistance 4. Evaluation of liming levels in acid soils 5. Agroindustry diversification of coffee 6. Promotion and technology development for shade tree management in coffee plantations 	<p>PROCIPTROPICOS</p> <p>Countries: MAG-CORPOICA Colombia; SIBTA Bolivia, EMBRAPA Brazil; INIAP Ecuador; MA Guyana; INIA Peru; MAAHF Suriname; FONAIAP Venezuela</p> <p>Programs:</p> <ol style="list-style-type: none"> 1. Conservation and sustainable use of plant genetic resources 2. Conservation and sustainable use of renewable natural resources 3. Production and dissemination of agricultural information 4. Rural agroindustry 5. Institutional Sustainability
<p>PROCI CARIBE</p> <p>Countries: Antigua, Bahamas, Barbados, Belize, British Virgin Islands, Cuba, Curacao, Dominica, Dominican Republic, French Guiana, Grenada, Guadalupe, Guyana, Haiti, Jamaica, Martinique, Montserrat, St. Lucia, St. Kitts and St. Nevis, St Vincent, Suriname, Trinidad and Tobago</p> <p>Programs/Networks: CARIFRUIT, CRIDNET (Rice), CIPMNET, (Int. Pest. Mang) CAPGERNET (Genetic Resources), CLAWRENET (Land and Water Res) CARINET (Bioprotection), CASRUNET (Small Ruminants)</p>	<p>SICTA</p> <p>Countries: DGI-MAG Costa Rica; CENTA El Salvador; INTA Nicaragua; DICTA Honduras; ICTA Guatemala; IDIAP Panama; SNIITAs; Universities, Private Foundations for Innovation, NGOs; Producers Associations</p> <p>Programs:</p> <ol style="list-style-type: none"> 1. Technology Generation and Transfer; 2. Information and Dissemination; 3. Policies and Institutional Development 4. Training and Professionals Exchange
<p>PROCI NORTE: (under implementation)</p> <p>Countries: Canada, Agriculture and Agri Food Canada, Mexico INIFAP, United States USDA/ARS</p> <p>Programs: 1. Agricultural Libraries and Documentation; 2. Genetic Resources; 3. R&D Regional Task Force</p>	

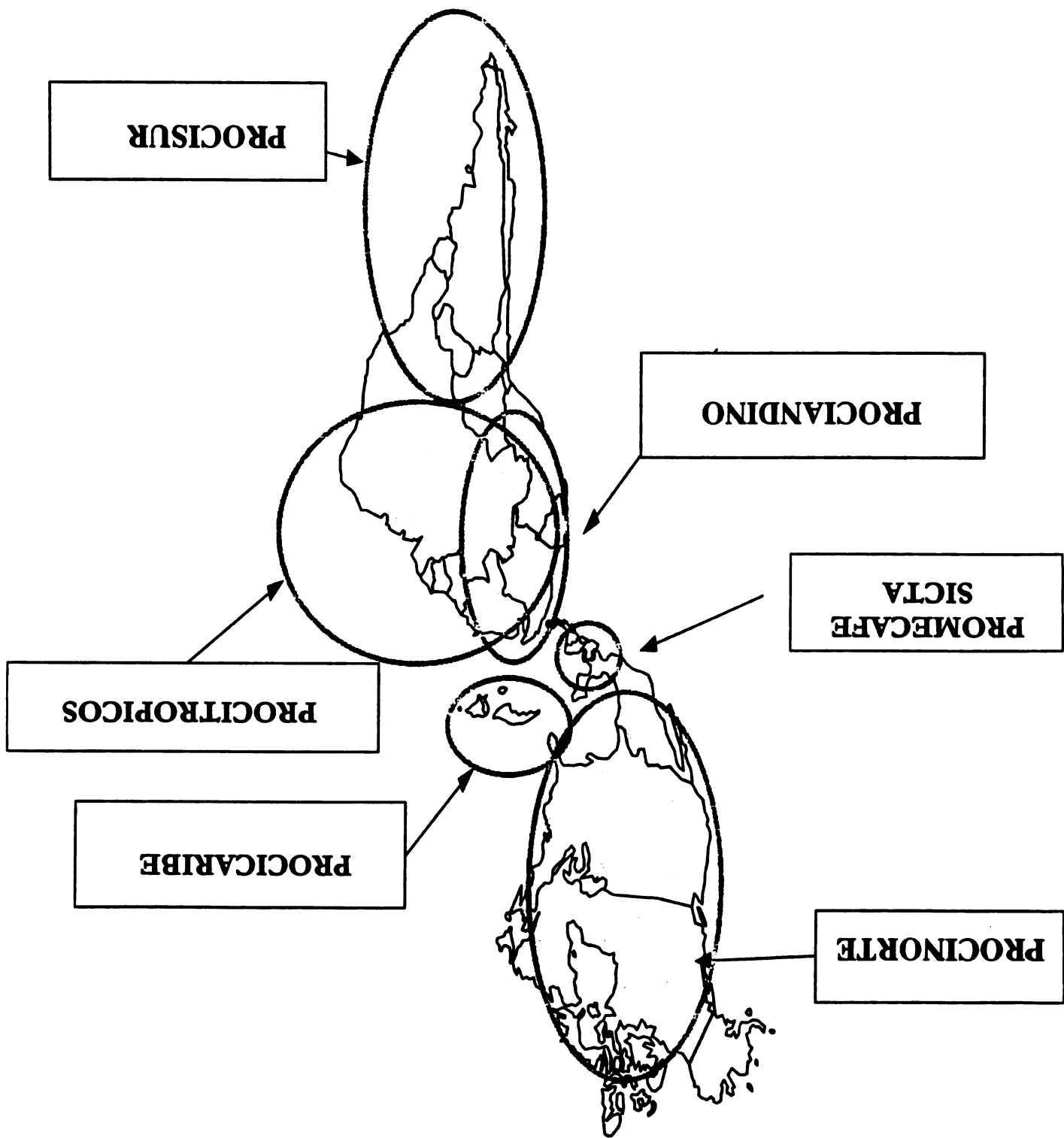


FIGURA 1. LOCALIZACION DE LOS PROGRAMAS COOPERATIVOS EN LAS AMERICAS, 1998

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PRLAG	Programa Regional de Reforzamiento a la Investigación Agronómica sobre los Granos en Centroamérica
PROCI	Programas Cooperativos de Investigación y Transferencia de Tecnología Agrícola
PROCIANDINO	Cooperative Agricultural Research and Technology Transfer Program for the Andean Subregion
PROCCARIBE	Caribbean Agricultural Science and Technology System
PROCNORTE	Programa Cooperativo de Investigación Agrícola para la Región Norte
PROCSUR	Programa Cooperativo para el Desarrollo Tecnológico Agropecuario del Cono Sur
PROCTROPICOS	Programa Cooperativo de Investigación y Transferencia de Tecnología de los Tropicós Suramericanos
PROMECAFE	Cooperative Program for Coffee Cultivation in Mexico, Central American, Panama and the Dominican Republic
REDBIO	Red de Investigación en Biotecnología
RELACO	Red Latinoamericana de Agricultura Sostenible
RIMISP	Red Internacional de Metodologías de Investigación de Sistemas de Producción
SIAGRO	Sistema de Información Tecnológica de Colombia
SICTA	Central America Agricultural Technology Integration System
SIRIDET	Regional Technology Research and Development System of America
NARS	National Agricultural Research System
EU	European Union

ACRONYMS

AID	Agency for International Development
LAC	Latin America and the Caribbean
BID	Inter-American Development Bank
CARDI	Caribbean Agricultural Research and Development Institute
CATIE	Tropical Agriculture Research and Higher Education Center
ECLAC	Economic Commission for Latin America and the Caribbean
IARCS	International Agricultural Research Centers
CIAT	International Center for Tropical Agriculture
CIFOR	Center for International Forestry Research Center
IDRC	International Development and Research
CIMMYT	International Center for the Improvement of Maize and Wheat
CIP	International Potato Center
CIRAD	Center for International Cooperation in Agricultural Research for Development
CONDENSAN	Consortio para el Desarrollo Sostenible de la Ecoregión Andina
CORPOICA	Colombian Agricultural Research Corporation
COSUDE	Agencia Suiza para el Desarrollo y la Cooperación
CRISPs	Collaborative Agricultural Research Programs
EMBRAPA	Brazilian Enterprise for Agricultural Research
EPAGRI	Enterprise for Agricultural Research of Santa Catarina-Brazil
FAO	Food and Agriculture Organization of the United Nations
IFAD	International Agricultural Development Fund
FONTAGRO	Regional Funds for Agricultural Technologies
FORAGRO	Regional Forum for Agricultural and Technological Development
CGIAR	Consultative Group on International Agricultural Research
GFAR/NARS-SECRETARIAT	Global Forum on Agricultural Research/National Agricultural Research Secretariat
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
R&D	Research and Technological Development
ICRAF	International Center for Research in Agroforestry
IFPRI	International Food Policy Research Institute
IICA	Inter-American Institute for Cooperation on Agriculture
IIRI	International Livestock Research Institute
INIFAP	International Network for the Improvement of Banana and Plantain
INFOTEC	Regional Information System of Science, Technology and Innovation for the Agricultural Sector of LAC
NARS	National Agricultural Research Institute
INIBAP	Instituto Nacional de Investigación Forestal, Agrícola y Pecuaria
INTA	Instituto Nacional de Tecnología Agropecuaria
IPGRI	International Plant Genetic Resources Institute
ISNAR	International Service for National Agriculture Research
MUSALAC	Red de Investigación y Desarrollo de Plátano y Banano en América Latina y el Caribe
NGO	Non-governmental organization
PCCMA	Programa Cooperativo Centroamericano para el Mejoramiento de Cultivos Alimenticios
GDP	Gross Domestic Product
PRECODEPA	Programa Regional Cooperativo de papa

- The topic of the development of true societies and networks of knowledge is still in the initial stages in the region. While there have been successful cases of NARS-IARC partnerships, it is necessary to develop more true consortia for collaborative research. The role of national research institutions has been more one of recipient than partner.

- The participation of the countries in the governing bodies of the CGIAR, from a regional perspective, is not organic or strong enough to influence significantly and collectively the priorities and strategies of the CGIAR for the region. Increased opening of the CGIAR, which is under way, and the consolidation of the For, if they play their expected role, can contribute to increased participation for LAC, based on a shared vision of challenges and opportunities, which will facilitate the discussion of new priorities.

- Several countries in LAC and regional cooperative mechanisms are moving in the direction of supporting technical change in agriculture, not only through linear processes of technology generation and transfer, but also through support for the creation of true national research systems and through the gradual adoption of a new institutional paradigm, built around technological innovation. This implies developing capabilities not only to generate know-how and new technologies, but also to access, market, negotiate and, in general, incorporate knowledge already available in the agroindustrial chain.

- Considering the above, the countries must make efforts not only to strengthen their capacity for generating technologies for the agri-food complex, but also technologies for organization and information management and linkage. In this context, it would be important to analyze how the CGIAR and the IARCs are internalizing these processes, and their potential role in providing support to the countries, above all in those centers which support the design of policies and the management of research.

In the context of the CGIAR, global priorities are very important and are shared by LAC. However, when these are translated in terms of thematic coverage and the actions of the International Centers, from the perspective of the Region's "geography, commodities and agricultural production systems", there are gaps and differences. It is important to promote a reorientation of the priorities of CGIAR and its centers, together with a new "geographic accounting of its priorities". There is plenty of scope and opportunities for enriching links between NARIS- IARCs in pursuit of technological engagement in the Region, particularly among tropical countries, and even for countries in temperate areas, to avoid loss of competitiveness in the productive systems dedicated to the production of food and agroindustrial raw materials.

Some of the aspects to be considered in order to bring international research agendas even more into line with the needs of the region are as follows:

- The region's general research priorities focus on support for the competitive development of agriculture, within a framework of equity and the sustainable use of its natural resources, at the same time generating better living conditions in rural spaces and greater food security. Achieving competitiveness in the region is not incompatible with support for the goals of combating poverty and achieving greater food security. Broadly speaking, these priorities coincide with those of the CGIAR.
- There is a need to review the CGIAR's geographic accounting in order to meet the specific needs of subregions and regional ecosystems. If LAC continues to be viewed as a homogeneous region -using indicators that combine the situation in the Southern Cone with that of the Caribbean and Northeast Brazil or highland ecosystems- research priorities will be maintained that are not relevant to the entire LAC region, given the great diversity that exists in terms of ecological-cultural factors, needs and opportunities.

- Consequently, and in the way of example, those commodities and topics which in the tropics can create comparative advantages, based upon new knowledge, do not coincide completely with the priorities of the international centers. This is happening precisely at a time when investment in and, in general, the institutional framework of, research is declining in the region, especially in the tropical countries.

- The region must continue to produce staple foods, but using systems that incorporate new technological innovations, as it is the case in northern Mexico or in several countries of the Southern Cone. The CGIAR can introduce changes intended to make the development of staple crops more competitive, with a view to offsetting the increased importation of foods which, in the past, were produced almost totally at the local level. Again, this situation is more severe in the tropical countries.

- The priorities of the CGIAR should be aimed at working together with the countries of LAC, focusing on those crops with the greatest potential for adding value and establishing links with agroindustrial complexes. For example, tropical fruits, "nutraceuticals" ("nutraceuticals" or health foods), vegetables, certain animal products and others derived from the genetic resources native to the region.

- The countries are faced with the need to access knowledge in disciplines and fields not traditionally addressed, such as genetic engineering, protocols for biotechnological diagnostics, the analysis of gene flows, food safety, development of bio-fertilizers, bio-pesticides and even "soft" technologies for the management and valuation of technology. This issue deserves our best efforts. The role of the international centers is to provide support, as was the case in the past with the training of professionals in short-course programs. At the present time, not all countries have specialized critical masses. This situation is made worse by an increase in the number of people retiring due to age, leading to a great loss of human capital, especially in the public sector, versus a private sector which is playing a more active role today, but it has fewer human resources.

to the role played by the different institutional actors, such as the private sector, universities, and nongovernmental organizations (NGOs). This context provides an excellent opportunity for the mutual collaboration between Latin America and other regions of the world.

1. Inter-regional Cooperation

Although there have been mutual collaborative efforts among the Region's countries and with other continents, these have usually resulted from specific bilateral agreements or from traditional collaboration offered by technical cooperation organizations from the developed countries (GTZ, CIRAD, COSUDE, the Governments of Holland, Spain, Britain, the European Union, ICDF of Taiwan, among others).

Mechanisms such as the Regional Research Forums and the Global Forum for Agricultural Research, GFAR play an important role in enhancing this type of cooperation, taking into account the differences between continents. Given the reduction in assignments of public resources for research and the growing importance of the private sector's role, the Region's insertion in the global context is likely to lead to the development of new alliances and partnerships to improve the efficiency and efficacy of research, both intra and inter regionally.

The existence of GFAR, seen from the perspective of the National Research Systems and of the Regional Forums, should foster this inter-regional cooperation facilitating the identification of common priorities for joint action and opportunities for discussions, agreements and the implementation of operational mechanisms to help overcome possible obstacles to closer cooperation. In essence, a culture of reciprocal Cooperation has been created among countries in Latin America and the Caribbean among countries. It is now necessary to promote the development of a "*culture of inter-continental or inter-regional cooperation*". Among the areas for the inter-Region's cooperation, some being worked already by the GFAR, are the following:

- a. compatible systems for the exchange of technical and scientific information and documents
- b. interchanges of experiences in institutional development (technology policies, national institutional models for R&D, public-private linkages, funding mechanisms, among others)
- c. development of regional networks or programs for multinational collaborative action among institutions in the countries
- d. identification of and support in creating worldwide networks to address specific areas of research; for example, studies of the rice genome
- e. a shared prospective vision of agriculture in the context of globalization, from the perspective of R&D.
- f. Research topics: the members of FORAGRO (NARS, PROCI, etc.), in several ways and individually, have priorities in terms of topics, commodities/products/crops, and this is clearly expressed in national, subregional and regional strategies and plans, such as the case of FONTAGRO. What needs to be done now is to take these priorities to an inter-Region discussion, which can lead to a more interesting identification of topics not necessarily covered by the international agricultural research systems, so that they will lead to the design of mutual cooperation projects through inter-Regional cooperation.

2. Expectations with respect to the international research system

The International System of the CGIAR is undoubtedly the most important and influential global system of agricultural research. Its contribution to the world's food security, based on increased output and productivity of the crops and commodities under its mandate, has been very significant, along with scientific and technological development, especially in support of developing countries.

a key institution in the promotion of research, with close links to the political levels and the capacity to contribute and submit ideas for discussion, a task that cannot be undertaken at subregional level alone, but with the active participation of the PROCLs and other components of the Regional System.

The Forum is working to develop a "shared vision of agriculture" with a view to establishing a regional work agenda in those thematic areas that the Executive Committee has recommended for priority attention: i) Repositioning and strategic evaluation of agriculture from a technological perspective; ii) Financing for research and technology development; iii) New institutions for technological innovation; iv) Technology integration in the sphere of economic and commercial integration; v) Competitiveness, technology and poverty; iv) Insertion technological de la Region in the global context.

The above-mentioned issues are based on the following premises, aimed at facilitating the construction of a shared vision among the members of FORAGRO:

1. Premise: Agriculture and the rural milieu are strategic to the development of the Americas, particularly in Latin America and the Caribbean.

2. Premise: The competitive development of agriculture and the rural milieu and the sustainable use of the Region's natural resources in a global economy depend on knowledge and technologies.

3. Premise: Creating and maintaining technological capacity requires political will, appropriate incentives and modern management.

4. Premise: Taking advantage of new opportunities for the region's agriculture requires new institutional arrangements focused on innovation and competitive and sustainable development.

5. Premise: The strengthening of scientific and technological capacities in agriculture should contribute to the reduction of rural and urban poverty as a priority.

6. Premise: Local technological capacity, especially in tropical agriculture, is insufficient. Therefore, actions are required to strengthen the central research infrastructure and adapt it to the new challenges.

7. Premise: Political and economic interdependence derived from the processes of globalization, imply the strengthening of technological cooperation and integration among countries, to reduce the technological gap that separates LAC from the rest of its competitors.

8. Premise: Mechanisms of cooperation, integration and regional financing of research and technology development such as FORAGRO, FONTAGRO, the PROCLs, and other equivalent networks should be strengthened. These in turn can help to create synergistic and multiplying effects with a view to developing technologies under a great alliance in the Americas giving priority to the problems and opportunities of LAC.

VI. THE REGION'S INSERTION IN THE GLOBAL CONTEXT

One of the main reasons for creating FORAGRO was to highlight the growing importance of cooperation and strategic alliances between research centers, international research centers, international research centers, and the technological developments derived from same, are no longer only the result of the work of national and international research centers, but rather of the joint efforts of different public and private national, regional and international institutions. Also, there is sufficient maturity in the region, despite problems and vacuums that have led to the process of institutional strengthening and diversification that has taken place in many countries, to re-define the function of several of the National Agricultural Research Institutes and attach growing importance

- Facilitating an organic participation by LAC in the research systems of other regions of the world and in international systems; serving as an indicator and a vehicle to express the region's demands; influencing, in the good sense of the word, the priorities and actions of the international research system in response to the Region's needs.

- Supporting the consolidation of an Inter-American technological innovation system to facilitate the interaction of institutional actors involved in R&D, and promote joint action on common problems.

Main results of FORAGRO. The Forum was established two years ago, and during that time has gradually developed its role and functions. Below is a brief summary of the main actions and results obtained to date:

- Consolidation of the Forum: a. Development of a shared vision of its role, mission and areas of work on the part of its members. Meetings in Bogota, Brasilia and San Jose and b. Development of the Technical Secretariat by IICA;

- Studies and analysis for the hemispheric dialogue: a. Agricultural production scenarios of LAC from a technological perspective; b. Elements to guide research and the agricultural development of LAC (with FONTAGRO); c. Technological capacities and institutional development in LAC; d. Agricultural Research and its financing (with FONTAGRO); e. Definition of a vision of agricultural research and technology development and a shared agenda in the Americas; f. Situation of the Biotechnologies in LAC: the case of transgenic plants; g. Intellectual Property, innovation, trade and agriculture. (these documents will be distributed at the International Meeting of FORAGRO in Mexico).

- Presence and technical and political influence: Resolutions, Minutes and Publications of Meetings of Ministers of Agriculture; Meetings of the Inter-American Board of Agriculture; International Event EMBRAPA: Science for Life; Executive Councils of FONTAGRO and PROCI; Meetings of the GFAR/NARS-Secretariat Rome, Beijing, Washington, Dresden; ISNAR Board of Directors.

- Information Development: Proposal to create the Information System for Science, Technology and Agricultural Innovation of Latin America and the Caribbean: INFOTEC (support from GFAR and IICA/CRMA)

- Dissemination of FORAGRO's work: Information leaflets; Publications and Web site: www.iicanet.org/foragro

- Promotion and support to new hemispheric networks, "partnership": MUSALAC (NIBAF/countries, sponsors); INFOTEC, PROCINORTE (Canada, Mexico, USA with support from IICA)
- Documentation of cooperative efforts (partnership) in Research in LAC: PROMECAFE, PROCISUR, PRECODEPA, FONTAGRO, EPAGRI, RELACO, SIAGRO (support from GFAR).

- Hemispheric Dialogue among Constituents: Meeting Mexico 2000 "AGRICULTURE WITH KNOWLEDGE". (To be held in September 2000; IICA-INIFAP agreement).

- Inter-Regional Relations and Relations with GFAR: Meetings on Information Systems, Rome; C.E. FORAGRO, C.E. GFAR, Case Studies on Partnership, Exchange of Information.

III. ISSUES TO DEVELOP A SHARED AGENDA

Having been endorsed by the Inter-American Board of Agriculture, in consonance with the objectives of the Ministerial Meeting held on the occasion of the Board, FORAGRO, once consolidated, is expected to become

In May 1998, a meeting of FONAGRO was held in Brasilia, with the participation of its members, including representatives of public and private research institutions, cooperative research programs, such as the PROCI, universities, NGOs, FONTAGRO and international research centers. The purpose of the meeting was to review the steps taken in setting up the Forum, report on the establishment of the IICA Technical Secretariat and discuss participants' proposals regarding the Forum's role, key topics and operational aspects. There was strong support both for the initiative itself and for the proposals concerning its role. Since the meeting of Brasilia (1998) and of the Executive Committee of San Jose (1999), the member countries have endorsed the Forum's importance, highlighting the initial efforts of its creation and defining its mission and its role.

Nature of FORAGRO. The Forum was conceived as an independent mechanism to facilitate discussion and work towards the definition of a Regional agricultural research and technology agenda that responds to its members' needs and to the phenomenon of globalization. One of the Forum's key roles is to influence policies to promote agricultural development from the perspective of technology. This conception of the Forum takes account of the fact that its members - and the Forum itself - act within the context of political and economic integration in the Americas and globalization, where it is increasingly necessary to operate through information networks. FORAGRO therefore promotes efforts to strengthen and develop integrated actions of hemispheric scope with subregional mechanisms such as PROCANDINO, PROCARIBE, PROCISUR, PROCINORTE, PROCIPTROPICOS and SICTA and equivalent networks.

In addition, it complements its institutional innovation actions with FONTAGRO, a fund created to support the financing of agricultural research in the region. The NARIs, FORAGRO, PROCI and FONTAGRO, among others, are an essential component of the Regional System of Research and Technological Development of the Americas, "SIRIDET".

Mission and objectives of the Forum. FORAGRO works to facilitate dialogue, coordination and strategic alliances among the different actors that comprise the National and Regional Agricultural Research and Technology Development Systems, and between these and the international system of agricultural research. The idea is to develop a technical agenda with political influence, in the most positive sense of the word, aimed at:

- Reassessing agriculture in LAC, adopting a renewed vision of the sector as a central component of economic development in the region.

- Repositioning of R&D on the political and economic agendas of the countries and of the Region, to influence the design and instrumentation of policies.

- Supporting the definition of a regional R&D agenda (regional priorities, strategies for collaborative action, information, actors) based on a shared prospective vision of agriculture.

- Establishing a hemispheric presence, adding value to national and subregional action, participating in the definition of policies at regional and international level.

- Supporting development of an organic vision of the regional research system (FONTAGRO, PROCI, SICTA and other networks and Regional Centers, such as CARDI and CATIE, University research networks).

- Facilitating homogeneous access by countries to new knowledge and technologies developed in the Region and worldwide.

technological dimension whereby eleven "families" of technologies that are of critical importance to LAC have been identified:

1. Plant breeding
2. Optimum use of inputs
3. Post-harvest and agroindustry
4. New uses of agricultural products
5. Improvements in the management of agricultural enterprises
6. Integrated pest management
7. Use and management of abiotic resources
8. Use and management of biotic resources
9. International environmental regulations
10. Technologies for small-scale agriculture
11. Policy design and institutional strengthening

The research priorities within each mega-domain represent opportunities and/or problems that have multiple spillover effects in/through/out those countries that comprise each mega-domain. Research priorities have also been identified for the regional as a whole; in other words, those with opportunities and/or problems shared by the region through the mega-domains. For further information on FONTAGRO's 1998-2000 Medium Term Plan, see: www.fontagro.org.

Figure 4 shows the richness and interactions of the four components and the two new mechanisms described above, in support of cutting-edge agricultural research, both at national as well as at regional and subregional level. Even while admitting that this organizational structure can and should be perfected in its components and support mechanisms – the latter of recent creation and in the process of consolidation – there is no doubt that the regional system constitutes a valuable platform to respond to the technological challenges facing in the region in the new millennium.

The challenge now lies in determining how this institutional system can be more successful at promoting technical change and adequate investment in regional agricultural research to guarantee competitive and sustainable agriculture that can contribute to a reduction in rural poverty. This question is pertinent since under-investment in research can be demonstrated from two points of view: it is low compared with more developed countries and even with some developing nations such as China and India and it is also low when compared with the economic returns generated by agricultural research.

2. Development of FORAGRO

Background. In response to the phenomenon of globalization, the growing inter-dependence that characterized the end of the twentieth century and the process of institutional development and diversification that has taken place in the science and technology sector during the late nineties, countries have become increasingly aware of the need to strengthen hemispheric and global cooperation in technology research and development (R&D) beyond the subregional level. In February of 1996, the *First Consultation Meeting among the National Agricultural Research Systems of Latin America and the Caribbean* was held in Bogota, Colombia. The purpose of this event was to analyze recent successful cases of regional R&D cooperation and technology transfer in the agricultural sector and find ways to strengthen regional cooperation in this field. The Meeting proposed the creation of a Regional Forum for Agricultural Research and Technology Development (FORAGRO).

In October of 1997, the Inter-American Board of Agriculture (IABA), comprising the Ministers of Agriculture of Latin America and the Caribbean (LAC), approved resolution No. 327, which endorsed the creation of FORAGRO and instructed IICA to establish its Technical Secretariat.

PROGINORTE for Mexico, the US and Canada, currently in the process of being formalized; and SICTA (Central American Integration System for Agricultural Technology) for the Central American countries and Panama. Figure 1 and 2 show the geographic, thematic and institutional scope of these mechanisms whose impact has been very positive for the agricultural technical change of the countries. The economic impact of the PROCIAs has been measured. The rate of return of the investments has been very high and it varies from 23 to 110%.

Nearly all these initiatives have received support from IICA and the IDB during their process of institutional development. Other consortia and specialized networks also deserve mention, such as CONDESAN (Consortium for the Sustainable Development of the Andean Ecoregion), RIMISP, PRECODEPA, PROFRIJOL, RELACO, the Regional Maize Program coordinated by CIMMYT, various networks sponsored by FAO such as REDBIO and International Centers and other product networks such as the CRISPs (Collaborative Programs to Support Agricultural Research), administered by Universities in the United States with funding from AID and PRLAG (Research Program on Basic Grains) in Central America, which recently concluded.

Four components are usually mentioned when describing the region's institutional architecture. The three described previously: NARIs, the Regional Centers (CATE and CARDI) and subregional programs such as the PROCIAs and specialized networks. The fourth component consists of the International Research Centers of the Consultative Group on International Agricultural Research (CGIAR). Four of these centers are based in the Americas (CIMMYT, CIAT, CIP and IFRJ), and form part of the main worldwide agricultural research network. They undertake important technological development work alongside scientists working on national programs. Other centers, for example ISNAR, IPGRI, IIRI, CIFOR and ICRAR have offices or direct activities in IAC. The main focus of research has been the genetic improvement of food crops such as wheat, maize, rice, beans, potatoes and cassava. More recently these establishments have carried out research on natural resources, conservation of genetic resources and on agricultural policy and institutional strengthening.

This institutional panorama was enriched at the end of the nineties with the implementation of additional regional mechanisms, FORAGRO and FONTAGRO, which attempt to fill two gaps observed in the operation of the four components described previously. The first mechanism is described in the second section of this chapter.

The second mechanism FONTAGRO (Regional Fund for Agricultural Technology) was initially established by the countries of the region, with funding from the IDB, IICA, the IDRC (Canada) and the Rockefeller Foundation, as a competitive mechanism for the financing of regional agricultural research projects (those involving two or more countries). In addition to sharing the main characteristics common to similar competitive mechanisms, there are three other aspects of FONTAGRO that are worth mentioning: (1) projects are financed with the income generated by an endowment fund (the goal is to amass US\$200 million by 2003), so that the sustainability of the financing of the mechanism is assured; (2) FONTAGRO is not a new institution but rather a cooperative program with no legal status that relies on the support of the sponsoring organizations (mainly the IDB and IICA) for its operations in the region; and (3) the member countries can make contributions to FONTAGRO's capital development fund using IDB loans related to the agricultural sector.

FONTAGRO began its activities in 1998 and has so far made two calls for project proposals (1998 and 1999). Some 12 projects worth a total of US\$3 million are currently being implemented.

The document that provides FONTAGRO's frame of reference for the projects that are submitted as a result of the annual call for proposals is the 1998-2000 Medium Term Plan, approved by the Regional Fund's Board of Directors. The Medium Term Plan constitutes the first attempt to identify research priorities and opportunities at the regional level. The prioritization model developed by FONTAGRO consists of two dimensions: a spatial dimension whereby the region is divided into eleven "mega-domains," (Figure 3) and a

The examples of PROMECAFE and PROCISUR were followed by other similar programs in the region, known generally as PROCI, PROCIANDINO for the countries of the Andean region, from Bolivia to Venezuela; PROCIOTROPICOS for Brazil and the countries of the Amazon basin; PROCCICARIBE for countries associated with CARDI in the Caribbean, including the Dominican Republic, Suriname and Belize;

Regional and subregional reciprocal cooperation programs on agricultural research, involving mainly the NARIs, and in some cases private sector institutions, have grown notably both in the number and scope of the topics covered. Recently, research initiatives - ranging from exchange of information to joint research programs - on natural resources, institutional development and agroindustry have been incorporated.

Recognition of common problems and opportunities for developing agricultural technology at regional and subregional level on the one hand, and the inability of smaller countries to develop comprehensive agricultural research programs on the other, gave rise to the first initiatives for the exchange of knowledge, information and cooperative research. The oldest of these is IICA (40 years), in Turrialba, which later evolved into the Tropical Agriculture Research and Training Center (CARTB), and the other Subregional Center, the Caribbean Agricultural Research and Development Institute (CARDI), which operates as a network among PROCISUR are the oldest mechanisms of reciprocal cooperation, date from the end of the seventies and the beginning of the eighties, for the exchange of information, development of regional research projects and informal training, among other activities.

growing participation by the private sector. going even further towards the configuration of *National Systems of Technology Innovation*, in some cases with a is gradually being replaced and enriched by another of *National Agricultural Research Systems*. Some countries are technological innovation, is gradually changing. As new R&D actors emerge, the model of a single institution major transformations in several countries. The concept of the NARIs, long regarded as the only source of cutbacks in public resources and the outmoded notion of a public research model, the NARIs are undergoing also adapted those used in more developed countries. Hence the concept of "technology converter". Despite development and in technology transfer. In their early stages, in addition to generating new technologies they The NARIs, currently operating in most countries of the region, have played a vital role in research

The LAC region is well known for its wealth of experiences, structures and mechanisms of agricultural research. The visionaries of the fifties and sixties understood that an agricultural sector that did not incorporate technology, could not survive in the new paradigm of "industrial production for the domestic market". Thus, the experimental stations were later transformed into semi-autonomous agricultural research institutes - NARIs - to adopt and generate technologies that would increase agricultural productivity and improve the welfare of the producers, many of whom have become involved in transferring this technology.

1. The Regional System

III. COOPERATION AMONG INSTITUTIONS AND COUNTRIES: THE REGIONAL RESEARCH SYSTEM OF THE AMERICAS WITH EMPHASIS IN FORAGRO

Under this general panorama, the institutional response to technology has occurred in a context of major disparities between stated priorities and what happens in practice, something that is reflected in the institutional reality.

What is certain is that in terms of reducing poverty, the direct and indirect effects are important. This has not been fully incorporated in the Region's research agendas. If we analyze the indirect effects (reduction of food costs, employment) of technology, the there are several examples of the fact that technology does have direct effects in combating rural poverty. panorama is clear; but when it comes to the direct effects, the matter is more difficult, even though speaking. If we analyze the indirect effects (reduction of food costs, employment) of technology, the

Investment in public research has declined alarmingly and there has been a de-capitalization of specialized human resources, particularly in the national institutions of the countries where, paradoxically, agriculture is an important economic factor. Total funding for public research infrastructure in LAC decreased by around 10% (in 1985 dollars), between the periods 1981/85 (US\$424 million) and 1992/93 (US\$384) according to IICA figures. It should be noted that in 1999 there were substantial cutbacks in the regional budget, from nearly \$1 billion dollars at current prices in 1997, to a figure close to \$640 million. It should be noted that the total amounts are highly influenced by the budgets of EMBRAPA, INIFAP, INTA and CORPOICA and as a result, the rest of the investment is very low. In the last two decades LAC has been the only continent with negative growth in annual public investment in research.

4. Synthesis of agricultural problems from a technological perspective

The above shows that LAC is in a process of "disengagement" from knowledge and the technology development, at least for tropical agriculture, at a crucial point in the development of sources of competitiveness. In fact, growth was based in good part on the availability of natural resources, incorrectly assumed to be plentiful.

In the past, public research institutions concentrated their efforts on primary production, placing less emphasis on other value added activities in the productive chain. Research in tropical countries focused more on traditional food crops that offer fewer competitive advantages in national and international trade, neglecting products such as fruits and vegetables, where the region enjoys clear advantages.

The challenge is to reposition agriculture, not only within LAC, but also globally, and develop strategies to avoid continuing with inefficient production on the first link of the chain, despite the opportunities, but with little horizon expansion based on an increasing the area under cultivation.

The agricultural scenarios of LAC are not homogeneous. Those in the temperate zones of the north and south differ from the scenarios of the high mountain plains or those of the wet and dry tropical lowlands and medium-elevation hillsides, such as those in Central America, the Andean countries and some Caribbean nations.

Consequently, it is not possible to speak of absolute regional priorities, given the region's diversity. In the case of agriculture in temperate ecosystems, the situation of technological engagement is better than in the tropical areas. This is the case with soybean and wheat, where the results of other areas have been used, including the recent import of transgenics such as "RR soybean". In tropical areas, with the exception of rice, there is no available technological counterpart for the Region. The differentiation of technological strategies is a matter that must be resolved.

Another aspect is the challenge facing countries with respect to environmental problems, which often appear to be separated from the issue of natural resources. The Region's technology development system has adopted these environmental problems as a priority and this has represented another disengagement from technology. Degradation takes place within an economic context where producers face high interest rates, high inflation, the need to expand or intensify production, and where the need to conserve natural resources is not fully incorporated within the technology strategy and the investment required for this purpose.

With regard to food security, this is a mainly urban problem with political repercussions, though it is also associated with efficiency in the production and distribution of food. At the same time, a large proportion of the region's small producers farm lands with less productive potential, and therefore the production strategy is not efficient. Therefore poverty as a subject for research has not been attractive, politically

animal feed and staple grains. Production has increased, in essence, because a greater area is under cultivation, and the effect of increased yields has been very limited. Despite the above, the region has substantially increased its share of international trade in fruits.

One issue that unfortunately remains relevant, especially in some countries, is urban and rural poverty. There are nearly 200 million poor people, of whom nearly 35% live in rural areas. One important fact is that in most of the countries located in the tropical belt (Andean and Central Regions, Northern Brazil, Southern Mexico and some parts of the Caribbean) the proportion of people who live from agriculture is above 50%, in contrast with those with temperate ecosystems. In other words, poverty persists in the Region and is concentrated in the tropical and subtropical areas.

Despite its strategic wealth in natural resources, such as biodiversity - the Region contains five centers of origin and diversity of species and crops of major economic importance to the world - it is suffering the consequences of an accelerated deterioration in its ecological capital. Three major reasons for this are: a development model that excludes rural dwellers and producers who live in fragile zones; the use of technologies and development of productive systems that are not environmentally-friendly and are based on a notion that the supply of resources is inexhaustible and an excessive transfer of agricultural and rural resources to the rest of the economy. This has meant that the agricultural frontier, in terms of land, cannot be expanded. For example, there are 11 countries in LAC that may no longer have productive soils in the next 25 years.

3. Agriculture from the perspective of technology

The technological gap with the world's leading countries is widening with respect to many crops. Regional research has responded to a political and economic model that prioritized the contribution of agriculture to the food supply and to facilitate the development of other sectors.

Although significant efforts have been invested in technology development, these have proven to be inadequate compared with the results achieved in other continents at a time of economic and commercial liberalization. This highlights the region's lack of competitiveness in many food items, except for the grains and oils complex in the Southern Cone.

In recent decades, research in many countries of the tropical belt did not give priority to investment in tropical crops such as fruits, because it was given a low priority in the prevailing economic model, for the reasons stated. According to studies carried out by IICA with support from the IDB, in the early nineties barely 14% of total investments in the NARIs were assigned to the category of fruits, compared with nearly 70% to staples food.

The above shows that in the past the Region, with some exceptions, has focused more on products with comparative disadvantages, especially in predominantly tropical countries. By contrast, countries with temperate ecosystems, have been able to take better advantage of these priorities, which are later seen to coincide with comparative advantages. Meanwhile, the supply of available foreign technology, has certainly coincided more with the temperate countries.

Products with comparative advantages that require technology reinforcement in the region already have major competitors, not only in developed temperate countries but also in other developing countries. If the region fails to strengthen its production structure and adapt knowledge and apply it to the market, and does not influence the priorities of international agricultural research, it may fall into a strategic error in the immediate future.

conceived beyond that of supplying food, supporting processes of urbanization and industrialization, as happened with the development model of the period 1960-80. The new role contemplates four basic functions for this sector: contribution to economic growth; contribution to social development as provider of food at reduced prices; source of employment contributing to the relief of poverty; sustainable use of the Region's natural resources and environmental protection; for example, by increasing productivity, it is possible to reduce the pressure on the land.

New rurality. This concept was developed in the Americas through a participatory and inclusive process, under a cooperative alliance in the hemisphere (IICA, IDB, FAO, ECLAC and IFAD), and in conjunction with governments, leaders and professionals. The region is moving towards a new reading of rurality and of the urgent actions that must be undertaken, both in the national and international spheres, to achieve sustainable rural development. This new vision approaches the issues of rurality from the perspective of land, of rural-urban relationships and of the numerous options these offer, both in the agricultural as well as the non-agricultural spheres. It also offers many opportunities to contribute to development from the rural and to the strengthening of democracy as has been reiterated by heads of state and government in the summits of the Americas. This new vision is mindful of the favorable change in the international climate in terms of prioritizing development in the rural setting and combating poverty. To implement the new rurality, some basic strategies have been proposed: reduction of poverty, integrated territorial planning, development of social capital, strengthening of the multisectoral economy, participation and the promotion of competitiveness through innovation, among others.

2. Situation of agricultural production and productivity in IAC

The aggregated agricultural production indexes in the Region showed an improvement during the nineties, but as mentioned previously, from the perspective of food production, it is necessary to take steps to prevent the sector's performance and per capita growth from turning negative at any moment, as happened in past decades. Below are some aspects to consider:

- The Region shows dynamism in its exports, but also in imports. Thus, in most cases, the growth in exports has barely been sufficient to pay for growing food imports. In per capita terms, the region today exports less agricultural value than it did 20 years ago. Certain sub-regions, such as the Caribbean, show negative balances in their agricultural trade balance, while some countries that are considered agricultural producers are joining the ranks of net food importers.

- Significant changes have occurred in the composition of production, with the substantial growth of products in the oil, fruit and vegetables complex, and to a lesser extent meat products and their derivatives. At the same time, there has been decreased production of sorghum, cotton, cassava, potatoes, wheat and to a lesser extent, coffee, rice and beans. This situation has resulted in a major change in the production structure in the past 20 years, improving the market share of products with better commercial prospects and integration with the agro-industrial sector, and substantially reducing market share of basic staples.

- Changes in the production structure and the expansion differential in production have occurred mainly because of increases in area under cultivation, a total of 23 million hectares in 22 years. These conditions have led to a marked subregional specialization in agriculture, and in fact to a geographic concentration of capacities, which have yielded better results for the countries of the Southern Cone, compared with other sub-regions.

- There is an important impact of yields on foods and basic grains, where changes in production occur basically due to greater productivity. However, the Region has reduced its cultivated areas by nearly 2.5 million hectares. In terms of fruits, particularly tropical fruits, the situation is exact opposite to that of

INTRODUCTION

This document has been prepared on information drawn from several sources, including documents and fora and workshops held in different parts of Latin America and the Caribbean (LAC) to address the problems and opportunities that exist in the region regarding agriculture and the rural milieu, from the perspective of technological development. In addition to this introduction, the document consists of four sections. The first provides a brief summary of the context in which agriculture operates in LAC, including the different scenarios vis-a-vis production and productivity. The second section describes the regional agricultural research system, including a presentation on FORAGRO, whose main objective is to develop and strengthen the system's institutional framework. The third presents the main issues that have emerged in LAC related to the construction of a common agenda on the question of research and technological development in a broad context of rural development. Lastly, the fourth section highlights the role of LAC in the context of global cooperation, and makes reference to the CGIAR.

I. PROBLEMS AND CHALLENGES IN AGRICULTURE FROM THE TECHNOLOGICAL PERSPECTIVE

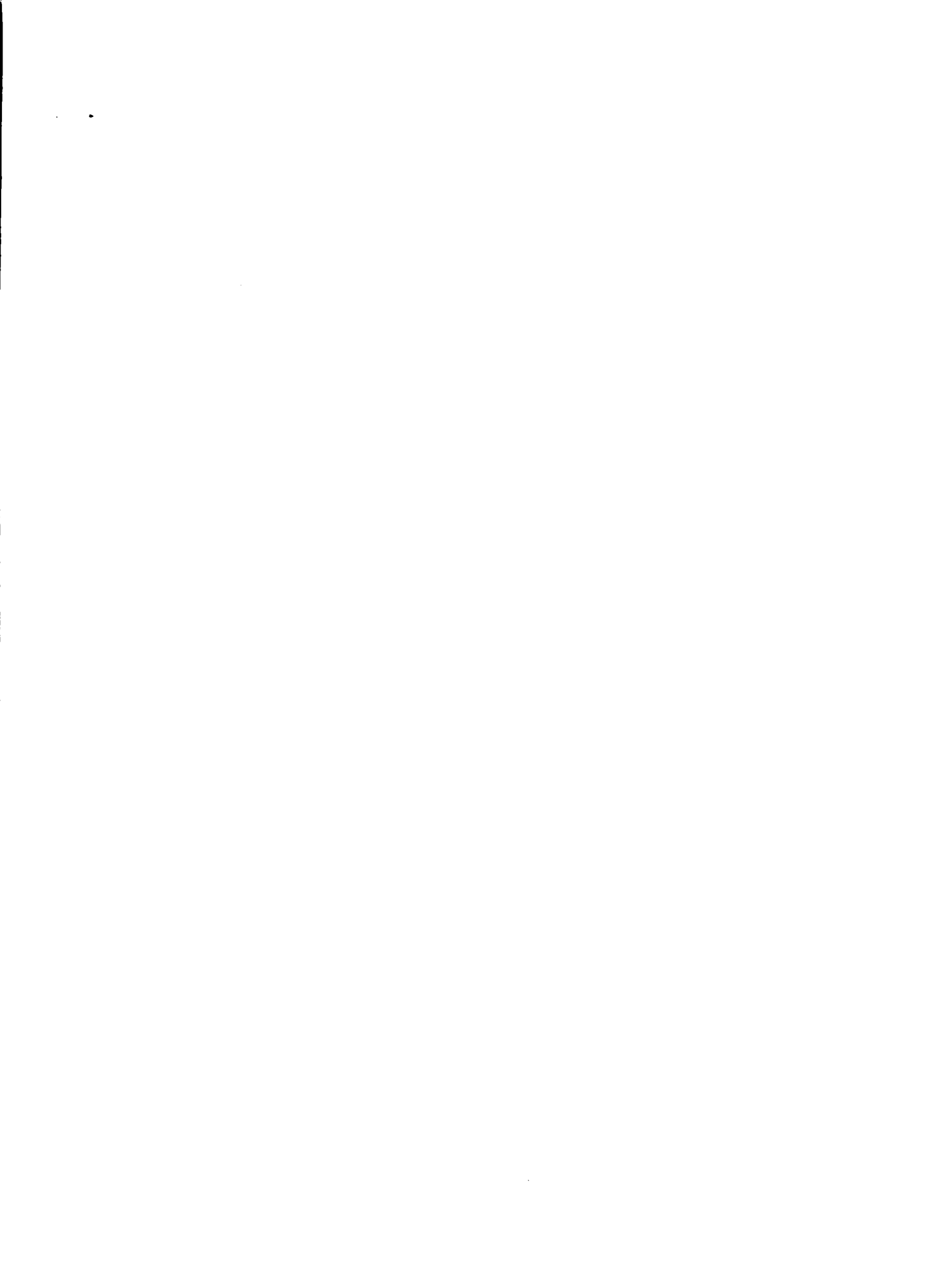
1. Context and new vision

Primary agriculture contributes approximately 8% to the Gross Domestic Product of Latin America and the Caribbean (LAC). Under an expanded concept of this sector, including its linkages with industry, this contribution, on average, accounts for 20% of the total value of the economy. However, despite the relative decrease in agriculture's contribution to the region's economy, its economic importance remains unchallenged. The aggregated indices of agricultural production in the Region show an improvement in the last decade, with annual growth agricultural GDP of between 2 and 3%. Nevertheless, in terms of production of basic foods, LAC is caught in a situation where there is a relative balance between production and population growth, with a danger that this (per capita) growth may turn negative without warning, as happened in past decades.

The challenges and opportunities offered by the new world political and economic order are great, but the scenarios that emerge for overall economic growth and for the Region's agriculture, especially in the tropical areas, are of great concern. In general terms, the Region is unlikely to attain 6% average growth in GDP, as projected at the end of the millennium, at least not in the short term. But most worrying of all, it will not emerge from poverty unless it adopts a development model that incorporates a new vision of the rural setting and of agriculture itself, with a substantial capitalization of human resources, positively confronting the competitive pressure in a context of trade liberalization. Specifically, we suggest that it is not viable to begin a process of sustainable development without strengthening the agricultural sector and promoting its growth.

Renewed vision and role of agriculture in LAC. Given the systemic influence of the agricultural sector, the need to implement reforms and actions to supersede the traditional notion of it solely as a primary sector, has become evident. The countries of the Region are adopting new approaches and ways of interacting to create a renewed vision of agriculture with three basic elements: a. Rural areas defined as the socio-political scenario where relations are articulated among the different social and economic agents, agricultural production, the environment and the rest of society; b. Commercial-agrifood chains, under which primary agricultural activity is articulated with the rest of the economic system backwards (inputs) and forwards (transformation processes and markets) and sideways with the inclusion of trade and consumption; c. Interaction of production chains and rural areas. Implementation of the new vision has led the Region to work towards a decisive process of productive, commercial, human and institutional transformation.

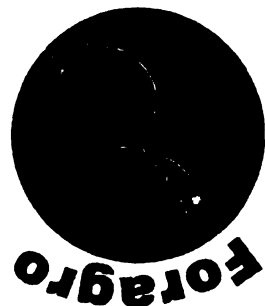
Based on the above, and on the consensus of hemispheric meetings with top government authorities of the agricultural sector, (for example in the context of the Ministerial Meeting organized by IICA in Chile and Brazil, IDB's Agrifood Strategy and the meetings of FORAGRO itself), we can say that as we begin the third millennium, agriculture in LAC is the basic motor that will drive economic development. Its role is now



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**FORUM FOR THE AMERICAS ON AGRICULTURAL RESEARCH AND
TECHNOLOGY DEVELOPMENT (FORAGRO): ITS ROLE FOR REGIONAL AND
GLOBAL COOPERATION¹**

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