

Project Name Nicaragua-Agricultural Technology Program (@)
 Region Latin America and Caribbean Region
 Sector Other Agriculture
 Project ID NIPE64915

Borrower(s) REPUBLIC OF NICARAGUA
 Implementing Agency

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1. Country and Sector Background

Over the last decade, Nicaragua has consistently ranked among the poorest countries in Latin America in terms of per capita GDP. Much of this poverty is concentrated in the rural sector, with the 1993 LSMS showing 75 percent of rural households living in poverty, with a third in extreme poverty (World Bank, 1995). The most recent LSMS provides evidence, however, that the incidence of extreme and moderate rural poverty is significantly lower in 1998. Perhaps not coincidentally, the agricultural and livestock sector has been the most dynamic sector of Nicaragua's economy since 1994. The high levels of rural poverty, in combination with the predominant role of the primary sector in Nicaragua, has led the current government to single out the agricultural and livestock sector as key to the recovery and economic growth of the country (MAG-FOR, 1998). This strategic focus on agriculture appears sound, as Nicaragua is among the countries in Latin America with the highest share of the primary sector in GDP (34 percent in 1998 (World Bank, 2000)), with approximately 35 percent of the economically active population working in this sector during the 1990s. Agricultural and livestock constitute the most dynamic sector of the economy, with an average annual growth rate of over seven percent, and over four percent in per capita terms, from 1994 to 1998 (BCN, 1999). In general the agricultural and livestock sector has undergone wide policy shifts over the last two decades. The reversal of the state intervention in the agricultural sector characterizing the Sandinista period (1979-1990) was a key tenet of the Chamorro government. This included a drastic reduction in credit, the liberalization of input prices, curtailment of government technical assistance services, and liberalization of foreign and domestic output markets. However, government retreat was not timely accompanied by the promotion of institutions that would facilitate competition in input and output markets, or the provision of credit and/or technical assistance. As such, markets became highly segmented, and few households had access to services (Davis, Carletto, and

Sil, 1997). The current government has recognized the existence of these microeconomic problems, and at least in its public discourse and programmatic documents has identified them as key bottlenecks that inhibit the productivity and response capacity of producers, particularly small and medium-scale farm households, such as failures in labor, land, and product markets; the absence of agrarian institutions; and the lack of public investment (de Janvry and Sadoulet, 1997). In particular, the current administration policy program is focusing on the following unresolved sectoral issues:- Land market - The government has properly titled and registered only a quarter of the nation's farms, and a tangled web of laws on land tenure issued over the past two decades has added insecurity of tenure over land. Rental fees overshadow the relative selling price, leading to speculations, and indigenous people lack clear rights over their territories.- Rural financial services - The rural financial market is highly segmented. The supply of funds does not meet the demand due to failure in the market and incomplete government regulations, particularly on small loans. Following the withdraw of the public rural development bank (BANADES), the Nicaraguan private banking system has not yet developed a network outside the major urban areas. - Agricultural Technology - Once at the vanguard of agricultural productivity in Central America, Nicaragua has dramatically lost its competitive advantage for both export and staple food crops. Agricultural scientists conduct researches in isolation, responding just modestly to the needs of domestic or international markets, agricultural technical assistance covers only ten percent of the small and medium-scale farm households, and the technical and vocational training system is obsolete and mostly beyond the reach of the poorest and the illiterate.- Infrastructure and trade - Despite government emphasis on commercialization, staple crop markets remain highly segmented. The share of households participating in corn markets has fallen. Further, there is evidence of significant increase in transaction costs. Most silos lie in urban areas and belong to the government. Slaughter houses, facilities for processing food, and infrastructure of communication (including air and sea ports) lie in or next to the capital and need repair. The country does not have a packaging industry for food, proper standards for food labeling, and an up-to-date system to publicize statistics on domestic production and prices.- Forestry - Rural poverty and inadequate government policies have driven watershed destruction and catchment areas deforestation. The western region of the country has been shorn of trees and once rich farmlands contain compacted and eroded soils. Nicaragua's main watersheds have been wrecked by encroachers as they clear forest to make ends meet, by logging firms as they search for a few valuable timber species, by poor consumers as they search for firewood, and by commercial farmers as they expand their fields to the limit in search of quick profits. Besides promoting macroeconomic stabilization measures directed at keeping inflation low, maintaining the real exchange rate relatively competitive, and controlling public expenditure, since early 1998 the government has designed a sector policy which includes measures for the the short, medium and long term. In the short term the government aims at eliminating price distortions by banning most food donations from abroad and removing import quotas on food, import licenses, export restrictions, and price controls on food. Import duties are being harmonized between farm and non-farm products. Machines and inputs for agriculture enter the country free of duty and exempt the sector from the quasi value-added tax of 15%. In order to make the land market work better, the government

introduced a flat land tax. Taken together, these measures are raising the price farmers receive for their production. The medium term policy goal is to improve use of idle capacity by promoting sectoral reforms to remove distortions in the markets for land, financial services, agricultural technology, infrastructure and trade, and forestry. The government is removing information barriers and is modernizing the cadastre and land registry. New private financial services, technologies for rural financial intermediation, and second-tier financial institutions are being encouraged. A larger participation of universities, NGOs, farmer's associations and private providers in a national, agricultural knowledge and innovation system is expected to increase generation and adoption of low-input technologies and information for small and medium-scale farm households. The Ministry of Construction and Transport is repairing roads in areas which show potential for agricultural growth, while the Ministry of Agriculture, Livestock and Forestry (MAG-FOR) is drafting legislation to auction silos to association of producers and investors. Besides privatizing silos, research to develop new technologies for storing and processing food on farm is being promoted and the increase in the demand for transactions in the commodities exchange is being supported by tax policies. Assisted by a Bank funded project, Forestry legislation is being revised to introduce a corporate income tax and increase logging royalties to better reflect the economic value of forestry resources. In the long term, the sector policy aims at: (i) continuing and strengthening the policy measures initiated during its medium term program; and (ii) increasing agricultural productivity by investing in human capital, agricultural information and knowledge, strategic research and technology transfer. A research matching grant, the FAITAN, has been established with this purpose, while a strategy for a collaborative agricultural education system is being prepared. Agricultural technical schools will be strengthened and agricultural training supported. The Ministry of Education (MECD) will revise the curriculum studiorum as to eliminate its current urban bias. An agricultural information system providing information on markets, best practices, agrometeorology and services is expected to improve the decision making and disclose opportunities to farmer groups, traders, service providers and decision makers.

2. Objectives

The project development objective is to establish an efficient, demand-driven, agricultural technology, knowledge and innovation system. At the end of the project, it is expected that: (i) the main public agricultural technology institutions will be providing effective, coordinated sector policy guidance and client-responsive services; (ii) the private sector, the non governmental organizations, and the educational institutions will be participating significantly in providing agricultural services to client farmers; (iii) the public sector will be proactively undertaking strategic and basic research and providing advisory services that generate positive externalities; (iv) a national agricultural technical education training strategy will have been defined and a pilot begun; and (v) a timely, high quality agricultural and market information will be available to technicians and farmers.

3. Rationale for Bank's Involvement

The Bank is a major financier of improved agricultural technology generation and transfer systems worldwide and has strong commitment to these instruments to stimulate economic growth and alleviate rural poverty

(Vision to Action Plan; October, 1997). The Bank has extensive experience in Latin American in design and implementation of competitive funding systems for agricultural technology, i.e., Chile, Colombia, Brazil, Bolivia, Ecuador, and Venezuela. The Bank is also providing support for development of an agricultural sector strategy in Nicaragua, strongly focusing on agricultural technology and sustainable agriculture.

4. Description

The Project is the first phase of a long term program for the generation/enhancement of an efficient, demand-driven, agricultural technology knowledge and innovation system. The Project consists of five components to address the key issues identified in Section B. These include: (i) development of institutional capacity; (ii) establishment a competitive fund for agricultural services; (iii) strengthening of INTA's operations; (iv) establishment and piloting of an agricultural technical education & training system; and (v) establishment and piloting of an agricultural information system.

Development of institutional capacity [US\$9.5 m] - The government will reform and strengthen the public institutions of strategic significance to the sub-sector and establish institutional arrangements to encourage the involvement of both public and private institutions in agricultural technology and agricultural technical education & training activities. MAG-FOR, as the legal authority to coordinate project activities among the different public and private executing agencies, will manage the overall project through a new Directorate for Agricultural Technology. A council representing public and private sector institutions, including MAG-FOR, INTA, INATEC, NGOs, farmers' organizations and universities, will constitute the governing assembly of a Foundation that will manage a competitive fund with grant facilities for agricultural services. The council will act as a national scientific forum for consulting and agreeing on agricultural technology issues and policies. The Nicaraguan Institute for Agricultural Technology (INTA), an autonomous public institution under the umbrella of the MAG-FOR, will assume responsibility for managing and executing public-sector services on research and technical assistance to small and medium scale farm households. The Agricultural Department of the National Institute for Technical Training (INATEC), a public institution under the umbrella of the Ministry of Labor, will be in charge of executing the Agricultural Education & Training component, sharing management responsibilities with INTA and MAG-FOR. The Institutional capacity development component will fund salaries, premises, vehicles, equipment, training, studies and operating expenses for MAG-FOR, INTA, INATEC and the Foundation. Costs for Monitoring & Evaluation and for preparing new investment operations are included under this component.

Establishment a competitive fund for agricultural services [US\$ 8.3 m] - This component will promote grant facilities to fund agricultural services responsive to client demands. Under a competitive fund, the grant facilities will be tested at a reduced scale during the first phase, and then on the basis of evaluation of their effectiveness will be expanded with improved administrative procedures and institutional arrangements. The Support Facility for Nicaraguan Agricultural Technological Research (FAITAN), created in 1997 under the on-going ATLMP, will finance innovative agricultural adaptive research projects presented by agricultural research organizations, domestic and foreign, and by institutions which have been previously certified by or prepared with the participation of SMFs associations or unions. The grant will also fund projects aimed at

strengthening local research capacity to develop integrated technologies and pathways of change toward profitable and sustainable natural resources management. It is expected that these projects will develop strategic alliances between local institutions and regional or overseas universities and research centers. Around 45 research project contracts and 10 alliance project contracts would be awarded over the project's life. INTA would be eligible to participate in the calls for research proposals. Competitive allocation of funding would improve research project planning and quality, and contribute to increase the country's overall availability of technological solutions to SMFs. The Support Facility for Technical Assistance (FAT) will be created to help stimulate the development of competitive private agricultural technical assistance services. The design of this component will take into consideration the lessons learned from previous INTA experiences under the ATLMP, particularly with regard to Private Technical Assistance module (ATP2). Mainly under an IFAD credit, FAT will be first field-tested in Leon, Chinandega and Managua, targeting 5,600 SMFs families. Following evaluation of FAT performance in year 2, services will be expanded to cover a second area (to be defined during project implementation) targeting about 1,600 additional SMFs families. The possibility of establishing a grant facility for agricultural education & training will be studied during project implementation.

Strengthening of INTA's operations [US\$ 16.8m] - The project will support six sub-components including five strategic services: (i) agricultural research and development; (ii) technology transfer; (iii) seed production; (iv) in-service training of front line extension staff and diffusion of information; (v) post harvest technology and market development with farmers' associations; and (vi) planning and supervision of activities and agricultural technology transfer responding to small and medium-scale farm households needs. Research and Development activities will include materials, equipment and training events related to diagnosis, priority-setting and analysis of demands for new technology; capture and analysis of potential new profitable and environmentally friendly technology available nationally and internationally; implementation of agreements with national and international agricultural research institutions and networks; design and implementation of experimental trials and farmers-managed validation plots; processing of research results and diffusion to subject matter specialists and extension staff; and the rehabilitation and equipment of INTA's regional centers to become professional centers of technology diffusion. Under the Technology Transfer sub-component, INTA will attend on a regular basis a total of 60,000 SMFs, of whom about 37,000 will be new clients. Seed Production activities will ensure the production of basic and registered seed. A national seed system will be developed to encourage private farmers to produce and distribute seed. The Training and Diffusion sub-component will support activities of the training unit of the INTA and will strengthen the institution's ability to provide in-service training to extension and research staff and subject matter specialists and to diffuse technical and methodological information. The Post-harvest Technology and Market Development sub-component will support strategic alliances with public and private service providers of post harvest technology, providing technical and marketing advisory services in developing entrepreneurial skills, and the evaluation of impact development. Planning and supervision activities will ensure the delivery of client-responsive agricultural advisory services. Establishment and piloting of an agricultural education & training system [US\$ 3.2m] - In line with the orientations of a new

strategy for rural education and training to be defined during the first 18 months of project implementation, the project will fund civil works for the rehabilitation of agricultural training centers, vehicles, equipment, consultants, training and operating costs for: (i) carrying out an assessment of the technical capabilities of the public and private extension staff and teaching staff of agricultural training institutions; (ii) carrying out a demand and supply survey of technical training services; (iii) workshops and in-service training for extension staff and agricultural educators; (iv) carrying out an inventory of available training documentation and materials; (v) the establishment of documentation centers in three pilot areas; (vi) pilot distance education via mass media for extension staff and farmers; (vii) and for equipping centers on the basis of recommendations from the study in (ii) above. Establishment and piloting of an agricultural information system [US\$1.1m] - A national, virtual, web based Agricultural Information System will be established within MAG-FOR. The system will capture and make available technical, market, environmental and other information to farmers, extension agents, researchers, trainers, government planners, development NGO's, universities, and producers associations. The project will finance: (i) system analysis studies, such as demand and availability of information, strengths and weaknesses of participating institutions information processing, and other countries experiences in agriculture technology information systems; (ii) design and deployment of the software; (iii) a central computer node for Managua; (iv) installation and piloting of the system; (v) development of promotion and training plans and their implementation; and (vi) vehicles, salaries and recurrent costs of the system.

Development of institutional capacity.

Establishment of a competitive fund for agricultural services.

Support to INTA's operations.

Establishment and piloting of an agricultural education & training system.

Establishment and piloting of an agricultural information system.

5. Financing

	Total (US\$m)
Government	5.87
IBRD	
IDA	23.63
INTERNATIONAL FUND FOR AGRICULTURAL DEVELOPMENT	3.62
SWISS DEVELOPMENT COOPERATION	2.34
BENEFICIARIES	3.04
Total Project Cost	38.28

6. Implementation

Implementation period: The loan is expected to become effective October 1, 2000 for a four year period through September 2004. The proposed Project is the first of four planned phases supporting a long-term national program. Executing agencies and institutions: The Ministry of Agriculture (MAG-FOR), the National Institute for Technical Training (INATEC), the Nicaraguan Institute for Agricultural Technology (INTA) and the COSINTA through a Foundation will be the executing agencies. Universities, NGOs, and representatives of SMFs will play an important role as part of the COSINTA and as potential clients of the competitive fund. Project management: The Directorate for Agricultural Technology (DAT) within

MAG-FOR will be responsible for the overall technical implementation of the project. Besides the Director, the DAT will be staffed with support specialists in planning, agricultural technology, rural technical education, environment, monitoring and evaluation, information technology and communication. Administrative and procurement functions will be carried out by a separate Administration Unit under MAG-FOR's General Directorate for Administration and Finance. The Administration Unit will be composed of a financial administrator, an accountant and two procurement specialists. The Administration Unit will work closely with the administrative units of INTA, INATEC and the Foundation. The unit will advance financial means to support operations of these three entities for a 6 month period. The advances will be subject to properly agreed financial reporting on previous disbursements. The Planning Officer and Monitoring and Evaluation Officer will be in charge of ensuring that current activities correspond to planned activities. Before the loan is effective, the Administration Unit will prepare procedures and operational manuals describing all administrative procedures, including how to plan, prepare, select, contract, finance, and supervise all activities to be financed under the Project. These manuals will guide the implementation process by setting the requirements and rules of project operations for the MAG-FOR and other implementing agencies. Accounting, financial reporting and auditing arrangements: Each of the entities in charge of managing project resources will maintain separate project records and will periodically report on those resources to the Administration Unit. Such records will be maintained in order to reflect, in accordance with sound accounting practices, the operations, resources and expenditures of each project activity. Implementing entities will be staffed at all times with qualified financial and accounting professionals. Adequate financial management arrangements for the project will be included in the Operations Manual. The Administration Unit will prepare combined financial statements for the project as a whole. The project accounts maintained by the Administration Unit and all the other executing entities will be audited periodically by independent qualified auditors acceptable to IDA, and in accordance with International Standards on Auditing and the guidance provided in the "Guidelines and Terms of Reference for Audits of Project with Financing by the World Bank in the Latin America and Caribbean Region" (the Guidelines) and other guidelines. The auditors will be in place by project effectiveness and before the beginning of each year to be audited, and will perform interim audit work bi-annually. All implementing entities will submit their audited financial statements timely so that the Administration Unit submits to IDA a certified copy of the agreed audit reports no later than six months after the end of each year. Financial management: In order to be in full compliance with Bank requirements per OP/BP 10.02, the Administration Unit and the executing entities will implement planning, budgeting, accounting and reporting systems that substantially satisfy the needs of the project. Also, Project Management has agreed to take the actions needed to have an integrated system which will allow for LACI PMR-based disbursements. Traditional disbursement methods (SOEs) will be used for the first two quarters of the project, or a longer period, if due to valid reasons such system is not in place by the loan effectiveness date. Officials of INTA, the foundation and INATEC will be properly trained to manage IDA's financial and procurement procedures during the first 18 months of the project. The goal is to have each of these entities certified with a procurement and financial management assessment within the first two years. This will ensure

executing agencies manage their program responsibilities in a more autonomous fashion. The MAG-FOR will sign an agreement with INTA, the foundation and INATEC specifying the parties detailed financial and procurement responsibilities in program execution both for pre and post financial and procurement management certification. Procurement arrangements: The Administration Unit would be responsible and would follow standard Bank procedures for all Project procurement. A four year Procurement Plan is included in the Project Implementation Plan. Procedures for procurement would be incorporated into a specific Operational Manual for the Administration Unit. Procurement would include consultant services, goods and equipment, training, minor civil works, and grants. Contracts for execution of the grants would stipulate that the executing agencies would follow Bank Guidelines for all procurement under the contracts. The Administration Unit would carry out spot checks of procurement under grants and would audit them for compliance with Bank Guidelines. Management Information System: An integrated management information system will be established in the MAG-FOR Agricultural Technology Directorate, in the Administration Unit and in the decentralized units of INTA, INATEC and the Foundation. The system will cover procurement, financial management, monitoring and evaluation, communication, scheduling and planning components. The procurement activities will include establishing software for preparing and processing procurement contracts and procurement reports for the LACI PMRs. The financial management system will include accounting software to track the flow of project funds and will also produce the LACI financial PMR reports. The communication module will utilize web based software to function as a the central hub for information exchange internally within the project and for informing external audiences on the advancement of the project. The scheduling and planning module will use off the shelf software to develop the annual operating plans and monitor and control them. Monitoring and Evaluation: The Agricultural Technology Directorate will be in charge of M&E activities, in coordination with the MAG-FOR's Directorate of Monitoring and Evaluation and the Directorate of Statistics. The system will track development objective (impact) and component (process) indicators from the project's logical framework. An external beneficiary assessment will be carried out at the end of the second year to elicit qualitative feedback from a representative sample of SMFs. An initial baseline survey before project effectiveness will provide a quantitative benchmark for assessing key impact indicators through regular panel survey. Cost-effectiveness of the different models of agricultural technology service provision will be assessed and the conclusions incorporated in the design of support during the next phase of the national program.

7. Sustainability

The project carries three risks affecting sustainability. These vary in severity as follows:- Financial sustainability is a major issue for agricultural technology systems throughout the world. The project will incorporate strategies as described above to address this risk and to enhance financial sustainability of the project.- Institutional sustainability is a moderate risk due to the participation of a large number of institutions and the need for these to relate in new ways, i.e., public-private partnerships for research and extension.- Environmental sustainability presents a minor risk. Project activities will improve knowledge and diffusion of environmentally friendly technologies.

8. Lessons learned from past operations in the country/sector

Other Countries' experience Private sector services for agricultural technology are generally confined to commercially produced, often high value commodities with a considerable bias towards the specialized needs of medium to large scale farms. However, even in countries with more modern agricultural economies than Nicaragua, the costs of agricultural research and technical assistance are still largely borne by the state. In Europe, only the UK, Denmark and the Netherlands have moved towards the provision of agricultural research and advisory services which are predominantly funded by farmers or farmers' associations. In Italy, Portugal, Spain and Belgium the state still ensures research and technical assistance services as a fully-funded public service, while in Germany, France and Ireland, farmers contribute to, through direct and indirect taxes, between 25% and 50% of the cost of the service. Small holders, if organized into associations, can be strong customers for agricultural technical services. Fiscal constraint is a pervasive problem in both developing and developed countries, and thus strategies for (i) streamlining and cost recovery measures (e.g., Mexico, Chile and the United Kingdom) and (ii) promoting the development of private sector extension (as in China and Colombia) have been pursued. Experience with direct cost recovery for the provision of extension services remains inconclusive for low-income countries with agricultural economies composed mainly of small-scale poor farmers. Public sector provision of agricultural services does not necessarily imply public delivery of these services and there has been recent interest in subcontracting extension to the private sector as a viable option. Bank experience worldwide Bank experience indicates that success of agricultural research and technical assistance projects depends upon: (i) fiscal capacity, past support for extension and commitment of government to improved services and to a policy framework that favors the adoption of technology; (ii) acknowledgment of specific requirements of potential clients, their access to resources and their capacity to pay for services; (iii) definition of the scale, type and intensity of face-to-face service needed for particular areas and client groups. Full involvement of clients in program planning and implementation will ensure needs are identified and met; (iv) the technology stock for sustainable development in each of the farming systems and the capacity of the private and public sectors to generate new technology; (v) prioritization of client groups for public extension services; (vi) the capacities of public agencies and their staff to provide different types of services, and the potential of private agencies for providing services; (vii) the importance of gender as it affects farm tasks, household decisions and service requirements; (viii) the potential of mass media and information technology for complementing other private or public forms of extension; (ix) needs-based staff training programs that focus not only on relevant technology but also on methods of understanding and interacting with farmers' groups, so as to involve clients fully in defining and resolving problems and hence make extension more responsive; (x) the benefits of a service culture in which the provider understands he or she is accountable to the client rather than to a public sector bureaucracy, and of a system for monitoring performance (individuals' and agencies' effects on client behavior) that reflects this expectation. Successful experiences of Bank projects shared the following principles - programming of activities, continuous training of staff, program supervision, close links between research and extension and use of feedback from farmers to allow technology to be adapted to farmers'

circumstances. Weaknesses included research agencies which were not responsive to farmers' needs, focus of extension on contact farmers, lack of training of field staff in how to select and facilitate farmer groups and application of uniform package of investments and extension ill-adapted to local circumstances (World Bank, 1999). Experience in Nicaragua There has been little analysis of the cumulated experience of the multiple projects, funded over recent years, both through MAG-FOR and through other Government Ministries, notably IDR projects under the President's Office. The ATLMP, co-financed by an IDA and COSUDE, provides relevant experience and lessons for the new project. The project introduced methodology for cofinancing of extension costs by some 30,000 small and medium-scale farm households, encouraging private companies and individuals to provide technology transfer services, and created a competitive fund for agricultural research (FAITAN). Although the project has recorded generally satisfactory performance, there are indications that assumptions about the capacity/willingness of farmers to co-finance extension services and the criteria for sub-contracting private extension providers need to be revised: (i) recovery of farmers' contributions under the ATP1 mode (cofinanced services provided by INTA) for the provision of extension services have not exceeded 60 percent of dues as an average over the past three years; however, the figure may be largely due to the low repayment rates in 1998 resulting from damage done by Hurricane Mitch; (ii) complex formula for calculating the subsidized payment to private extension companies have introduced distortions and resulted in a drop of farmers receiving cofinanced advisory services under the ATP2 mode; (iii) the application of different methods and levels of cofinancing by different service providers (notably under ATP1 and ATP2 modes) in the same district has led to charges of unfair competition and confusion about the charges to be recovered from farmers; (iv) attempts to outreach new technology to large numbers of small holder farmers in remote areas (ATPm) using mass media, community meetings and reference farmers has yet to be evaluated, but there is little evidence of significant uptake of new technology beyond the reference farmers and designated members of local community committees, who have direct access to inputs distributed under the program. Recent inter-institutional collaboration, facilitated by INTA, with local, regional and international institutions has provided recent positive results. New technology developed include recommendations for soil conservation, integrated pest management, ox-drawn tillage and grain storage. Lessons learned from the disaster provoked by Hurricane Mitch in October 1998 include: (i) the importance of more widespread and generalized adoption of soil conservation and other sustainable agricultural development technology; (ii) the need to accelerate capital accumulation in the rural areas; and (iii) the need for mitigation measures and emergency response teams to help farmers in hard hit disaster areas. The design of the present project The project design has benefitted from an extensive review of global experience and lessons learned from Bank and other agencies' technology development programs. These lessons are also reflected in the main principles included in the Government's new strategy: a client-oriented, knowledge based system which promotes the interaction of agricultural research, technical assistance and agricultural technical education & training to generate, promote and diffuse economically profitable innovations and information which respond to the needs and possibilities of adoption of small and medium-scale farm households. The strategy defines principles to be respected for all future, and to the extent feasible, ongoing publicly funded research,

extension and training programs. The design of the Project took in consideration important lessons learnt during the implementation of the Nicaragua ATLMP, of which it is considered a follow-up of the Agricultural Technology component. The system design includes strategic support for agricultural technology generation and transfer, along the lines of the ATLMP project. However, it broadens its scope by including an Agricultural Education and Training component, and an Agricultural Information System component. The inclusion of the Agricultural Education & Training component recognizes the role that knowledge plays in adopting new agricultural technology. Agricultural education, broadly conceived, has an unprecedented opportunity to contribute to generating new employment and advancing rural development (Coombs and Ahmed, 1974), while farmers who have access to basic education have shown to be more likely to adopt new technology than those who lack access (Jamison and Lau, 1982). Although the idea of including an Agricultural Information component is innovative, some preliminary studies find a strong potential demand across the LAC countries (AKIS, 1998). It is believed that while most of the information needed by farmers exist, due to absence of a delivery system this information is largely inaccessible to farmers and service providers. The project design included the establishment of an Agricultural Information System as a platform for further training extension service providers, a media to demonstrate success stories from adapting new technology and to share best practices (local, regional, national and international), a forum for collaboration among the different actors in the sector, and a tool to enhance participatory and interactive approach.

9. Program of Targeted Intervention (PTI) N

10. Environment Aspects (including any public consultation)

Issues : The project's Environmental Analysis has taken into account the environmental and socioeconomic characteristics as well as ecological vulnerability of the seven agroecological regions of the country. It has demonstrated that the Project overall is both directly and indirectly environmentally beneficial. The Project will contribute to the development, the local adaptation and the diffusion of improved and profitable technologies compatible with sustainable agricultural and animal husbandry practices appropriate to the circumstances of SMFs. In addition, through training, education and capacity building activities, the Project will provide the appropriate social and environmental information and a knowledge base to the major stakeholders, including researchers, extensionists and producers to ensure the practice of sustainable agriculture, consistent with economic, social and environmental criteria. There are no major negative environmental issues expected from project implementation. Potential environmental impact is related to the testing and adoption of technology promoted through INTA's field services and by those funded by the FAT and FAITAN competitive research grant facilities. These are intended to promote locally adapted "pathways" of changes toward sustainable agriculture, through improved, cropping patterns, integrated nutrient and pest control practices and soil and water conservation techniques. If implemented according to prevailing best practices, the environmental impact of these changes will be positive. In the Pacific, Central and Northern Regions, the project will increase the water and soil quality, help decrease erosion rates and promote the implementation of agroforestry system. In the Atlantic Region, the project will help moderate the advance of the agricultural

frontier by encouraging sedentary agricultural practices and production systems adapted to the ecological conditions such as cocoa, oil palm and agroforestry. Technical themes will include those which encourage reforestation. The only major issue is related to efficient and effective implementation of the Project. Although there is a risk of promoting technology options which rely on short term profit and marketing opportunities without taking full attention to medium and long-term environmental and social sustainability, the outlook for successful implementation of the Project is positive. To mitigate this risk, there will be a need to ensure: (i) persistent attention to training in cost-effective and environmentally sustainable technology; and (ii) a ready supply of environmentally friendly recommendations developed by research. Operation manuals for soliciting, preparing, evaluating and selecting proposals submitted for FAT and FAITAN funding include environmental criteria of compliance. INTA already is developing sustainable technology under a specific program, including soil and water conservation measures, no-tillage and legume covercrops management and IPM technology. An environmental specialist will sit on the evaluation committee for the FAT and FAITAN competitive funds. Environment specialists and extension staff will be trained on the principles of agroecology and sustainable agriculture under the training program. The agricultural technical Directorate will have access to funds to recruit the services of environmental specialists to advise on specific aspects of environmental management concern. The Project complies with the objectives of OP 4.01, Environmental Impacts, OP 4.09 Pest Management and OP 4.36 Forestry, which includes "to reduce deforestation, enhance the environmental contribution of forested areas, reduce poverty, and encourage economic development."

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Note: This is information on an evolving project. Certain components may not be necessarily included in the final project.

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