

RURAL AGROENTERPRISE DEVELOPMENT PROJECT

**ANNUAL REPORT
1999**



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PREFACE

CIAT's Rural Agroenterprise Development Project was formally established in April 1996. The project falls under the framework of the Center's strategy for resource management research. In this strategy, the development of economically viable value-adding post harvest processing and marketing enterprises is considered to be a critical component of the efforts oriented towards motivating and achieving the sustainable use of natural resources in fragile ecosystems where small holder farming predominates.

The purpose of the Rural Agroenterprise Development project is

To develop, in collaboration with our partners, methods, tools and institutional models that facilitate the design and execution of successful projects that integrate market opportunities and post harvest processing technologies with environmentally sound production practices.

The project integrates its work closely with the activities of CIAT projects on Overcoming Soil Degradation (PE-2), Community Management of Hillside Resources (PE-3), Sustainable Systems for Smallholders (PE-5), and Participatory Research Approaches (SN-3) that provide input to the project on participatory techniques, production economics and agronomic evaluation of market opportunities. In turn, the Rural Agroenterprise Development project provides information on commodity alternatives for the design of sustainable production systems. Collaboration with the Land Use in Latin America project (PE-4) seeks to harness the use of GIS tools for optimizing the localization of rural agroenterprises. A close link is maintained with the Cassava Improvement project (IP-3) in activities related to the post harvest processing of cassava.

Strategic alliances for the execution of collaborative activities have been formed with CIRAD, IDRC's MINGA and SMMEIT program initiatives, and the Cooperative Program for Rural Agroindustrial Development. The project also participates in projects with CIP and IFPRI. Collaborative projects with CIP-UPWARD and IITA are in the process of being established as a means of projecting the activities of CIAT's Rural Agroenterprise Development Project to Asia and Africa respectively.

As has become custom, the planning period at the end of December 1998 and January 1999, offers the possibility of reflecting on the progress that the project has made over the previous 12 months and introduce modifications to the logical framework, based on our experiences over the period. On this occasion we were joined in December by François Boucher and Hernando Riveros of PRODAR, both of who provided important input into our deliberations and helped us to incorporate relevant activities into our work plan.

The modified project work breakdown structure and logical framework are presented in the section on the Project Overview. Compared to previous versions of the project description, the goal has been modified to bring it into line with the goal of the Natural Resources Research Directorate. The purpose of the project remains the same. There are no changes to Output 1, on market identification and development. In Output 2, on post harvest technology, the previous Activities 2.2 and 2.3, both of which focused on the development of participatory approaches, have been fused into one. The new Activity 2.2 is based on the practical experiences that are being developed around the collaborative projects with our partners in the reference sites. An additional activity 2.3 has been incorporated on the generation of basic knowledge and the incorporation or adaptation of 'cutting edge' technologies for adding value to selected products with potential for entering novel markets (such as those that are demanding nutraceuticals, health-enhancing foods, biologically active components, exotic aromas, etc.). No changes have been introduced into Output 3 on enterprise organization. Output 4 incorporates an additional activity 4.3 that is concerned with issues of replication, scale-up and extrapolation of results from the microregional level. Included are the implications for regional or national interventions (policy, provision of services, technology development, human resource development etc.) in support of sustainable development of enterprises at the local level. There have been no modifications to Output 5 that is concerned with external projection and the establishment of strategic alliances.

In August 1999, the Project team was complemented with the incorporation of Mark Lundy, a Rural Agroenterprise Development specialist, who will become responsible for coordinating our efforts to establish rural agroenterprises and local support systems in the reference sites.

This report has been compiled from contributions submitted by Veronica Gottret, Carlos Ostertag, Christopher Wheatley, Nadine Zakhia, Mark Lundy, Mireille Totobesola, Miguel Angel Valdivieso and Rupert Best. We wish to thank our collaborators for their support throughout the year and acknowledge the dedication and very important contribution of the other members of the Rural Agroenterprise Development Project team. Our appreciation is extended to Stella Narváez and Gladys Cedeño for their support in formatting and correcting this report.

Project Overview

Project Description¹

Project SN-1 Rural Agroenterprises: Linking Smallholders to Growth Markets for Improved Resource Management

Objective: To develop methodologies for designing and establishing small-scale, rural agroindustries that link market opportunities and processing technologies with environmentally sound production practices.

Outputs: Methods for identifying viable market opportunities that incorporate small-scale farmer selection criteria. Decision-making tools and institutional models for the organization of rural agroenterprises and complementary support services. Diagnostic and priority setting methods for post harvest technology development. Information and technology for the post harvest processing of selected commodities. National personnel trained in the design and execution of agroenterprise development projects.

Gains: Central American and Andean Region hillsides and forest margins beneficiaries gain enhanced capacity to establish small-scale agroprocessing enterprises. Linkages between conservation, production, added value processing, markets and consumers improved. Sustainable production practices catalyzed and adopted more widely. Through strategic alliances, experiences extended to eastern and southern Africa and Southeast Asia.

Milestones:

- 1999 At least three pilot production processing, and marketing projects established in targeted regions. International workshop on rural agroenterprise development.
- 2000 Case studies on rural enterprise development completed. Guidelines available for designing institutional support structures for rural agroindustry.
- 2001 Conceptual framework developed and methodological options defined for organizing and integrating production, processing and market functions for the establishment and/or strengthening of rural agroenterprises.

Users: The immediate beneficiaries are the technical personnel of organizations in rural agroindustrial R&D and rural policy makers. Ultimate beneficiaries are the inhabitants of rural areas, especially female small farmers, and entrepreneurs, who benefit from training and information on post harvest processing technologies, market analysis, and support services.

Collaborators: Development of methods and technology components: CIRAD, NRI, PRODAR (Costa Rica), IDRC, CIP, IFPRI, IITA. Execution of pilot projects: CIPASLA (Colombia), CLODEST (Honduras), CODESU (Perú), training and networking: PRODAR-IICA (Perú), members of the Global Collaborative Post-Production Research Network. CORPOICA, Univalle, F. Carvajal, Univ. Nac. Agraria - Nicaragua.

CGIAR system linkages: Protecting the Environment (20%); Crop Systems (20%); Training (10%); Information (10%); Networks (10%); Organization and Management (30%). Participation in the Global Collaborative Post-Production Network and the Working Group on Root and Tuber Post Harvest Technology and Marketing.

CIAT project linkages: Provides information on market opportunities in target ecosystems of PE-3 and PE-5. Information on agronomic adaptation and economic viability of specific crops provided by PE-3 and PE-5. It receives support from PE-4, SN-2, SN-3, and BP-1 in GIS tools, participatory methods, network development, and impact assessment.

¹ As presented in Doing Research Together. An update of CIAT's Medium Term Plan. 1999-2001

Rural Agroenterprise Development Project: Work Breakdown Structure

Goal Knowledge, tools, technologies, skills and organizational principles that contribute to improved land management developed and applied
Purpose To develop, in collaboration with our partners methods, tools and institutional models for the design and execution of successful rural agroenterprise development projects that integrate market opportunities and post harvest technologies with environmentally sound production and processing practices

Output 1 Tools, methods, and information for market opportunity identification and development, as an input for the design of economically viable and sustainable rural agroenterprises.	Output 2 Tools, methods, and information for the development of appropriate post harvest technologies for small-scale rural agroenterprises.	Output 3 Information, options and recommendations for the design of efficient and effective organizational schemes for small-scale rural agroenterprises and their support services.	Output 4 Institutional models and policy options for the establishment and strengthening of rural agroenterprises and their support systems at the micro-regional level.	Output 5 Enhanced capacity to design and develop successful agroenterprise projects, among partner institutions and within CIAT
Activity 1.1 Development of methods for market opportunity identification at the ecosystem and microregional level to the needs of small agroenterprises (Link with PE-5, PE-3, PE-4 and SN-3) Activity 1.2 Development of an accessible information system on alternative national and international trade channels oriented to small agribusiness. Activity 1.3 Development of methods for the formulation of marketing strategies and plans adapted to small-scale rural agroenterprises	Activity 2.1 Development of inventories and systemized information for products and processes with market potential to define information and technology needs Activity 2.2 Adaptation of participatory methods for improving processing efficiency and product quality for existing and new agroenterprises (Link with SN-3) Activity 2.3 Generation of basic knowledge and adaptation of cutting edge technology for adding value to selected products with novel market potential	Activity 3.1 Design of options and recommendations for the internal organization and operation of existing and new rural agroenterprises Activity 3.2 Design of options and recommendations for enterprise linkages in the agribusiness chain. Activity 3.3 Synthesis of information, options, and recommendations for the organization and delivery of support services for rural agroenterprises (saving and loans, technical assistance, market information and commercialization, and agroenterprise management).	Activity 4.1 Design of conceptual frameworks and methodological options for organizing and integrating production, processing, and marketing functions for the establishment and/or strengthening of rural agroenterprises (Link PE-3 and PE-5) Activity 4.2 Development of guidelines for the design of local support systems for promoting agroenterprises that contribute to sustainable development at the micro-regional level (Link with, PE-3, PE-4 and PE-5). Activity 4.3 Development of guidelines for the design of policy options and national support systems for promoting rural agroenterprises (Link to PE-3, PE-4 and PE-5)	Activity 5.1 Training of national personnel in the design and execution of rural enterprise development projects. Activity 5.2 Enhancement of the awareness of the potential of rural agroenterprises to contribute to rural development (Link with BP-1) Activity 5.3 Consolidation and establishment of collaborative links and strategic alliances

Rural Agroenterprise Development Project: Logical Framework Matrix

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Goal Knowledge, tools, technologies, skills and organizational principles that contribute to improved land management developed and applied.	- Use of CIAT NRM Research outputs in at least 3 reference sites in 5 years is related to changes in land management associated with increases in per capita income and food availability; improved soil-water-nutrient use efficiency; increased biodiversity in production systems; and stakeholder participation in land use planning. - Use of the CIAT NRM research outputs beyond the 3 reference sites in the 3 target agroecosystems (savannas, hillsides, forest margins) by stakeholders within 5 years). - CIAT NRM research outputs applied by at least 3 other institutions outside the LAC region by the end of the 5th year.	Projects, plans and reports of national public sector agencies, donors, NGO's and community-based organization in the 3 reference sites and mandate agroecosystems which refer to use of CIAT NRM research outputs	
Purpose To develop in collaboration with our partners methods, tools and institutional models for the design and execution of successful rural agroenterprise projects that integrate market opportunities and postharvest technologies with environmentally sound production and processing practices.	By the end of the year 2000, a set of methods, tools and institutional models are being used by partner institutions in the reference sites in Latin America, and are being adapted by partners in Asia and Africa	Reports and project documents of our partner institutions	Political and institutional support for sustainable rural and agricultural development at the reference sites and target countries is maintained. Natural disasters or civil strife do not impede progress towards contributing to the goal
Outputs 1. Tools, methods, and information for the identification and development of market opportunities (as an input for the design of economically viable and sustainable rural agroenterprises).	By the end of the year 2000: Training materials for market opportunity identification available and being used by partners in LA and Asia.	Manual published	Collaborating institutions have adequate resources to utilize the materials and tools developed
	- Market opportunities identified and in the process of being developed in the reference sites - Information system on alternative trade available and - Training materials for the design of market plans and strategies for small agroenterprises available	Annual reports and project proposal documents Project home page Training materials in draft	Natural disasters or civil strife do not impede progress towards achieving the purpose of the project

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
2. Tools, methods, and information for the development of appropriate post harvest technologies for small-scale rural agroenterprises. 3. Information, options and recommendations for the design of efficient and effective organizational schemes for small-scale rural agroenterprise and their support services. 4. Institutional models and policy options for the establishment and strengthening of rural agroenterprises and their support systems at the micro-regional level. 5. Enhanced capacity to design and develop successful agroenterprise projects, among partner institutions and within CIAT	- Information system on products and post harvest processes for cassava, selected fruits and milk products available on the project's www home page - Series of manuals on techniques for the participatory development of post harvest technology for improving the efficiency of existing rural agroindustry - Manuals in preparation on techniques for the participatory development of new rural agroindustrial products and processes - Case studies of small rural agro-enterprises, documenting best practices, key success factors and lessons learned, complete for Latin America and Asia - Different options for the organisation of enterprises, their links in the agri-food chain, and the organisation of support services are being tested in the reference sites - Two or more agroenterprise projects in execution in each of the reference sites in Latin America - Manual on the identification and development of integrated R and D rural agroenterprise projects complete - Guidelines for the design of local support systems for promoting agroenterprises at the micro-regional level 50 trained NARS personnel in aspects related to agroenterprise development in Latin America - Case studies on the adoption and impact of agroenterprise R and D completed - Project www home page operational and updated periodically with project outputs - Strategic alliances with research and development partners	Project home page Manuals published Annual reports and working documents Case studies published Project proposal documents and annual reports Project proposal documents and reports Manual in final draft Working document Training documents, course evaluation and annual reports Case studies published Project home page Letters of Understanding, project contracts and inter-institutional agreements	

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
Activities 1.1. Development of methods for market opportunity identification at the ecosystem and microregional level adapted to the needs of small agroenterprises (Link with PE-4, PE-5, PE-3, and SN-3). 1.2. Development of an accessible information system on alternative national and international trade channels oriented to small agribusiness (Link with SN-2). 1.3. Development of methods for the formulation of marketing plans and strategies for small-scale rural agroenterprises. 2.1. Development of inventories, and systematized information for products and processes with market potential to define information and technology needs (Link with SN-2). 2.2. Adaptation and refinement of participatory methods for improving processing efficiency and product quality for existing and novel rural agroenterprises (Link with SN-3). 2.3. Generation of basic knowledge and adaptation of cutting edge technology for adding value to selected products with a novel market potential	• 1998 Methodology developed for the microregional level and adapted through application in three reference sites in Latin America. • 2000 Methodology developed for the ecosystem level, using Latin American hillsides and forest margins as models. • 1998 Information searches completed. • 1999 Project formulated for the development and maintenance of an information system on alternative trade markets. • 1998 Literature review complete • 1999 Methods applied in reference site. • 2000 Manual on business and market plan development completed. • 1998 Procedures for the development of product information system established. Model for cassava completed. • 1999 Information system extended to other key small holder products. • 1998 Project on cassava sour starch quality completed. • 2000 Manual on research methods for the technological improvement of rural agroprocessing enterprises. • 1999 Technology diagnosis for arracacha and cheese completed • 1998 Projects on selected fruits and roots and tubers formulated and presented for financing. • 2000 Manual on research methods for new product development for small rural agroprocessing enterprises. • 1999 Identification and selection of Andean & Amazonian promising products informal collection	Journal article published Published manual Journal article published Annual report Project proposal document Annual report Annual report Published manual Report on information system Internet Home Page Project report Published manual Diagnosis completed Project proposal documents Published manual Selection completed	Identification of and collaboration from appropriate partner institutions. Availability of key secondary information. Input available from PE-3, PE-4, PE-5 and SN-3. No similar information systems exist. Input available from SN-2 Literature reveals unavailability of appropriate materials for small rural enterprises Secondary information readily accessible. Input available from SN-2 Partner institutions identified Timely input from partner institutions Projects financed Timely input from partner institutions. Donor institutions provide resources and suitable collaborating institutions identified for

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
3.1. Design of options and recommendations for the internal organization and operation of existing and new rural agroenterprises. 3.2. Design of options and recommendations for enterprise linkages in the agribusiness chain. 3.3 Synthesis of information, options, and recommendations for the organization and delivery of support services for rural agroenterprises (savings and loans, technical assistance, market information and commercialization, and agroenterprise management).	• 1998 Information on small agroenterprise organization collected synthesized and analyzed. • Research needs and partners identified. • Case studies of small rural agroenterprise in Latin America completed. • Vietnam cassava starch processing enterprise study completed. • 1999 Case studies of small agroenterprises in Asia available. At least one project proposal per continent developed and submitted to donors. • 2000 Options developed and tested at reference sites. • 2001 Decision support or expert system developed. • 1998 Information on enterprise organization at the level of the agribusiness chain in Latin America and Asia collected synthesized and analyzed. • Research needs and partners identified • Vietnam cassava starch production and marketing system study completed • 1999 Case studies in Latin America and Asia completed. • At least one project proposal per continent developed and submitted • 2000 Options developed and tested in reference sites • 2001 Decision support or expert system developed. • 1998 Information on support services in Latin America and Asia collected, synthesized and analyzed. • Research needs and partners identified • Andean regional study of supply and demand for support services completed • 1999 At least one project proposal per continent developed and submitted to donors • 2000 Options developed and tested at reference sites.	Draft review paper Action plan Case Study report for Latin America Project report Project proposal documents Annual project reports to donors Manual/software package Draft review paper Action plan Project report Case study report for Asia and Latin America Project proposal documents Annual project report to donors Manual/software package Draft review paper Action plan Report and directory/database Project proposal documents Annual report to donors	case studies and projects. Timely and effective input from partners Surveys completed and analyzed on time Project proposals funded Donor institutions provide resources and suitable collaborating institutions identified for case studies and projects. Timely and effective input from partners Surveys and data analysis completed on time Links with other CIAT projects made Project proposals funded Donor institutions provide resources and suitable collaborating institutions identified for case studies and projects. Timely and effective input from partners Project proposals funded

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
4.1. Design of conceptual frameworks and methodological options for organizing and integrating production, processing, and marketing functions for the establishment and/or strengthening of rural agroenterprises (Link with PE-5). 4.2. Development of guidelines for the design of local support systems for promoting agroenterprises that contribute to the sustainable development at the microregional level (Link with PE-3, PE-4 and PE-5). 4.3 Development of guidelines for the design of policy options and national support systems for promoting rural agroenterprises that contribute to sustainable development at the regional level (in collaboration with PE-4 and other CIAT projects) 5.1 Trained national personnel in design in execution of rural enterprise development projects. 5.2 Enhanced awareness of the potential of rural agroenterprises to contribute to	• 2001 Decision support or expert system developed. • 1998 Integrated R and D projects for priority products (sour starch, fruits, milk products, panela) formulated for Cauca, Colombia • 1999 Integrated R and D projects for priority products formulated for Yoro, Honduras and Pucallpa, Perú. • 2000 Manual on the identification and development of integrated R and D rural enterprise projects completed. • 1998 Schematic document prepared as a basis for diagnostic studies at the reference sites. • 1999 Diagnostic study of needs completed and priorities set for the reference sites in Colombia, Honduras and Perú. • Project proposals formulated. • 2000 Projects financed and initiated in reference sites • 2001 Manual on local support systems completed. • 1999 Outline document prepared for the design of the market and enterprise component of an integrated land use management decision support tool for use at the regional level • 2000 Diagnostic study of needs completed in target countries • 2001 Market and enterprise component of decision support tool complete • 1998 One month training course on rural agroenterprise development undertaken • 1999 Further course on rural agroenterprise development • 2000 Further course on rural agroenterprise development. • 1998 Adoption and impact study of integrated R and D cassava project in NE	Manual/software package Project proposal documents Project proposal documents Published manual on integrated agroindustrial projects design Journal article on integrated R and D agroprocessing enterprise projects Terms of reference for diagnostic studies Report on diagnostic study outcomes Project proposal documents Annual project reports to donors Published manual Annual reports of project Annual reports of project Expert system Training documents, course evaluation and annual report Training documents, course evaluation and annual report Training documents, course evaluation and annual report. Impact study reports	Timely and effective input from project partners. Donor funds are made available for implementing R and D projects at the reference sites. Timely and effective input from project partners Donor funds are made available for implementing R and D projects at the reference sites. Timely and effective input from project partners Financial resources approved by OEA and collaboration forthcoming from PRODAR, UNIVALLE, and Fundación Carvajal Demand for this type of course is manifested. Financial resources available. Demand for this type of course is manifested. Financial resources available. Timely partner input

Narrative Summary	Measurable Indicators	Means of Verification	Important Assumptions
rural development (Link with BP-1). 5.3 Strategic alliances consolidated and new alliances established.	Brazil and panaia in Colombia completed. • Design Project Internet Website. • 2000 International meeting on Rural agroenterprise Development. • 1999 Vision and Strategy document for postharvest research on root and tuber crops in the CGIAR completed. • Third round of Global Collaborative Post Production Research Network's Small Grant Fund completed • New proposals financed to support work outlined above.	Website on-line Meeting proceedings Vision and strategy paper Proposals and contract documents Project contract documents	Interest manifested by donors to support meeting. IITA, CIP and IFPRI provide information for paper Institutions present quality proposals Donors approve submitted projects.

Research Highlights in 1999

OUTPUT 1: Tools, methods and information for market opportunity identification and development, as an input for the design of economically viable and sustainable rural agroenterprises

- The market opportunity identification and evaluation methodology for small rural producers has been successfully executed for the reference sites in Pucallpa, Perú and Yoro, Honduras. This brings to a close the formal validation of the methodology originally developed in Cauca, Colombia. The methodology, which has generated a great deal of interest, is also being used and adapted to local circumstances, in Puerto López (Colombia) and Carchi (Ecuador). A proposal for its implementation in San Dionisio, Nicaragua has been developed together with local partners.
- The market identification manual or guide was published in Spanish and afterwards translated and published in English. The manual in English is an improved version that incorporates comments from farmers, trainees and colleagues. This manual has been used in nine workshops and training events in Honduras, Nicaragua, Colombia and Ecuador throughout the year in Latin America, plus Kenya (Africa) in November 1999.
- The design of the internet information system on alternative trade has progressed with the execution of a quick market survey among potential clients in Latin America to identify the key system components and topics to be included. Additionally, a European Union-based consultant prepared a basic document on "Alternative trade in the European Union", and a data base of 40 alternative trade organizations in Europe, which will enrich the database developed last year.
- Three computerized presentations were prepared on Basic Marketing Concepts, Promotion and New Product Development, the first step toward the formulation of marketing plans and strategies adapted to small-scale rural enterprises. These presentations were prepared for the IICA-CIAT-PRODAR marketing training course held in Quito, Ecuador and directed to local personnel focusing on rural enterprise and rural agroindustry development.

OUTPUT 2: Tools, methods and information for the development of appropriate post harvest technologies for small-scale rural agroenterprises

- An information system for cassava postharvest and processing has been completed and placed on the website.
- A simple method for the quality assessment of sour cassava starch developed, adopted and systematically used by the cooperative which commercializes the product, as a means of quality certification and as an incentive commercial strategy for producers.
- Constitution of a multidisciplinary and interinstitutional group for working on selected promising (health-enhancing and biologically active) products from Andean countries with novel market potential, and prioritization of the research needs.

OUTPUT 3: Information, options and recommendations for the design of efficient and effective organizational schemes for small-scale rural agroenterprises and their support services

- Draft review of literature on enterprise organization completed, and future research needs defined.
- The Post Harvest Technology Institute (Hanoi, Vietnam) IFPRI and CIAT completed a study of the root crop starch sector in Vietnam. In addition to policy recommendations for enhancing the role of rural industry in income generation, the study also provided information on enterprise organization in this sector, especially as regards enterprise scale. Following completion of the study, a concept note for a second phase proposal was prepared, which includes organizational innovations to enhance the role of the sector in providing sustainable livelihoods.

- Agroenterprise case studies completed or in progress in Central America, Colombia and Philippines, based on or adapting the methodology developed in the case studies reported in 1998.

OUTPUT 4: Institutional models and policy options for the establishment and strengthening of rural agroenterprises and their support systems at the microregional level

- A conceptual framework and a methodology for the design of integrated agroenterprise development projects (IAPs) was further developed through the preparation of a draft which has been used as the basis for discussion with partners, and to initiate the implementation of the methodology at the microregional, regional and national levels.
- Guidelines for the design of local support systems for rural entrepreneurial development, and the conceptualization of an operational scheme for the provision of support services, were well advanced this year. A draft document, outlining the conceptual framework and guidelines for putting a local support system into place, was developed, discussed and modified in collaboration with a range of our partners. Projects have been prepared to test, adjust and validate the proposed schemes, and the process has been started at two of CIAT's reference sites with the holding of workshops.
- The Community Watershed Management, Sustainable Smallholder Systems, Land Use and Rural Agroenterprise Development projects obtained strategic research funds to integrate their efforts in the development and application of user-friendly methodologies for incorporating GIS and economic models for the identification of locations for sustainable agroenterprises in CIAT's ecosystems.

OUTPUT 5: Enhanced capacity to design and develop successful agroenterprise projects, within CIAT and other institutions

- The Manual on Market Opportunity Identification and Evaluation for Small Rural Producers has been validated and used in nine workshops and training events. Over 150 national personnel have been exposed to the methodology and more than 300 copies have been distributed to interested parties.
- A strategic alliance link with IICA-Ecuador has been established to provide technical support to the actions of IICA in Ecuador directed at the promotion and support of rural agroindustry and rural enterprises. IICA is the executing agency for Ecuador's National Rural Development Program and a series of other initiatives in support of local development.
- The Rural Agroenterprise Development project has made a bid for a project to design and implement a Support Program for the Marketing and Transformation of Agricultural Products in Nicaragua, Honduras and El Salvador. The program that will be financed by COSUDE is scheduled to run for 12 years at a cost of around US\$ 8 million.

Summary of Progress towards Achieving Outputs during 1999

The Rural Agroenterprise Development aims to contribute to sustainable rural development through the generation of tools, methods, information and organizational principles for identifying and establishing viable agroenterprise options that diversify and add value to the production of small holder agriculture in fragile ecosystems. As a relatively young project, we have needed to maintain a constant interchange and sharing of experiences with our partners in order to correctly orient our research. In this sense, each year the project logical framework is reviewed and adjusted, as we better understand the demands of and opportunities for supporting our principal clients, the personnel of governmental and non-governmental agencies and rural enterprises. One of the principal achievements over the last two years has been the building, in collaboration with our partners, of a conceptual framework for the promotion of rural agroenterprises within the context of sustainable rural development.

The project's four research outputs have been chosen in direct response to the identification of concrete problems that have led, in the past, to a very incipient development of agroenterprises in rural areas. These are the absence of information to identify and develop market opportunities, the inappropriateness of post-harvest technology alternatives, untapped entrepreneurial skills and the often highly restricted access to support services. During 1999, progress has been made in further developing and refining concepts, methodologies and generating tools, and in disseminating to our partners the results of our research. An important development has been the opportunity to link with and complement the work of CONDESAN (the high Andes natural resource management consortium of which CIP is a partner) in their reference sites in Ecuador and Perú.

Output 1. Market opportunity identification, evaluation and development

Verifiable indicators:

- Methods for market opportunity identification at the ecosystem and microregional level adapted to the needs of small agroenterprises.
- Information system on alternative national and international trade channels.
- Methods for the development of marketing plans and strategies.

The process conceived for developing and validating a methodology for identification and evaluation of market opportunities has been completed with the successful implementation in the Yoro (Honduras) and Pucallpa (Perú) reference sites. The manual is also being used to guide market opportunity identification in the Puerto López savanna reference site in Colombia and Carchi (Ecuador). Additionally, a proposal has been developed with local partners for execution of the market opportunity methodology in CIAT's reference CIAT in Nicaragua, San Dionisio.

This year, a concerted effort has been made to make the methodology available to our partners. The training manual, one of the set of nine manuals on decision-making tools for natural resource management, has been used in nine workshops and training events in the Andean region, Central America and the Caribbean. The manual, which has generated a great deal of interest among rural development staff, was improved and translated into English for use in a rural marketing course in East Africa, with the participation of IITA, CIP and ICRAF, to be held in November 1999.

The design of the information system on alternative trade to be placed in the Internet has progressed with the execution of a quick market survey encompassing sixty potential clients in Latin America to identify the key system components and topics to be included. Additionally, a European Union-based consultant prepared a basic document on "Alternative trade in the European Union", and a data base of 40 alternative trade organizations in Europe, which will enrich the database already developed last year.

Three computerized presentations were prepared on Basic Marketing Concepts, Promotion and New Product Development, the first step towards the project activity of "formulation of marketing plans and strategies adapted to small-scale rural enterprises". These presentations were prepared for the IICA-CIAT-PRODAR marketing training course held in Quito, Ecuador and directed to local development personnel focusing on rural enterprises and agroindustry.

Output 2. Selection and adaptation of appropriate post-harvest technology

Verifiable indicators:

- Inventories and profiles of products and processes with market potential to define information and technology needs.
- Participatory methods for improving processing efficiency and product quality for rural agroenterprises.
- Knowledge and adapted technologies for the adding value to promising products for novel markets

The model information system on the post harvest management and processing of cassava, which is aimed at providing information to help select appropriate technology, is now ready for placing on the project's website. A similar system is in the process of being developed for selected Andean and Amazonian fruits, that have been prioritized in the process of market identification and evaluation at CIAT's reference sites in Cauca (Colombia) and Pucallpa (Perú).

Based on the demands identified by our partners in the reference sites, collaborative technology development projects are underway in Cauca (cassava sour starch and aromatic plants), and Cajamarca (cheese and arracacha). Cajamarca is a CONDESAN reference site, where we are working in collaboration with CIP and PRODAR. These efforts will provide additional insights (best practices and lessons learned) for the elaboration of a generalized set of principles for participatory technology post harvest research with clients.

A new initiative this year has been the establishment of an Andean research group, involving food science and technology research institutions in Colombia, Ecuador, Perú and Bolivia, on promising fruits, medicinal and aromatic plants. Through the project's links with CIRAD, the real potential of these commodities will be investigated by generating basic knowledge on their quality attributes and the possible deployment of 'cutting edge' technology for adding value to them. An example is the use of membrane filtration technology for clarifying passion fruit juice.

Output 3. Agroenterprise organization

Verifiable indicators:

- Options and recommendations for the internal organization and operation of existing and new rural agroenterprises.
- Options and recommendations for enterprise linkages in the agribusiness chain.
- Synthesized information, options, and recommendations for the organization and delivery of support services for rural agroenterprises (savings and loans, technical assistance, market information and commercialization, and agroenterprise management).

Research on small enterprise organization initiated in 1998, and the time since then has been spent in undertaking a thorough review of the literature with a view to obtaining a better understanding of the constraints that face the rural enterprise sector and formulate a set of researchable issues. This process is complete and reflection is now required as to how best move forward. To complement the desk review of experiences, case studies on factors that have influenced the success of enterprises and policy implications for the development of the sector have been or are in the process of being completed in Latin America and Asia. Early next year a review, that synthesizes options, best practices and lessons learned will be produced.

Output 4. Integrated Agroenterprise Projects and Local Support Systems

Verifiable indicators:

- Conceptual frameworks and methodological options for organizing and integrating production, processing, and marketing functions for the establishment and/or strengthening of rural agroenterprises.
- Guidelines for the design of local support systems for promoting agroenterprises that contribute to the sustainable development at the micro-regional level.
- Recommendations on policy and other support functions required at the regional and national levels to promote rural agroenterprise development at the local level

Significant progress has been made this year in developing, in close consultation with our partners, the first draft of a conceptual framework, the definition of the principal methodological steps and an operational scheme for the design and execution of integrated rural agroenterprise projects and the local system that will be required to support them. Using this draft as a basis, and following up on the market opportunity identification studies that has led to the prioritization of a portfolio of most promising options, a process has been put into place to validate the concepts and methods in each reference site. Beyond the reference sites, satellite projects have been initiated with local development organizations, Corpoversalles and Corpotunia (Colombia) and the local CONDESAN supported Carchi consortium (Ecuador), to incorporate the concepts into their activities. Integrated agroenterprise projects are in the design and/or implementation phase for tropical fruits, milk products and panela.

A new initiative this year has been the linking and integration of the GIS and economic modeling work being undertaken in CIAT's reference sites to define and optimize the localization of rural agroenterprises. This will lead to the development of a powerful tool for providing information for better targeting of rural agroenterprise interventions at the local level, and which could subsequently be extrapolated for use at the regional and national levels.

A strategic alliance has been formed with IICA-Ecuador, in which CIAT together with PRODAR, provides intellectual input and technical assistance into the initiatives, that IICA manages on behalf of the Ecuadorian government, to promote rural agroenterprise development on a country-wide basis. This provides an important opportunity for the products of our research to be incorporated into national level support actions.

Output 5. External projection and strategic alliances

Verifiable indicators:

- Training of national personnel in design and execution of rural enterprise development projects.
- Enhanced awareness of the potential of rural agroenterprises to contribute to rural development.
- Strategic alliances consolidated and new alliances established.

Over the year it has become evident that there exists a significant demand for human resource development activities related to the products of the Rural Agroenterprise project. More than 100 technical personnel from national governmental and non-governmental institutions have been exposed to the market opportunity identification methodology in workshops and training events, and 200 copies of the manual have been distributed to other interested parties. Discussions are being held with partners in East Africa and South East Asia for the organization of joint courses that incorporate our methodologies in the year 2000. With the better understanding that we now have of the potential demand, a training strategy for the project is required.

Adoption and impact studies on rural enterprise research and development interventions have been completed. Two of these, one on cassava processing and one on sugarcane processing into panela (natural unrefined sugar), the latter in collaboration with CORPOICA were presented at the recent international conference on the contribution of agricultural research to poverty alleviation held in Costa Rica. Both studies illustrated the need for an integrated approach to research and development interventions that explicitly tackle the constraints to post-harvest transformation and marketing and associated enterprise development, in order to make any significant contribution to improving the welfare of small holder farmers.

During the year collaborative links and strategic alliances were consolidated and/or established with important partners, including PRODAR, IICA-Ecuador, IDRC's MINGA and SMMEIT program initiatives, EARTH College in Costa Rica and CIRAD. Together with PRODAR, the Agroenterprise project has bid for a project to establish a support program for the marketing and transformation of agricultural products in Nicaragua, Honduras and El Salvador. This would be a 12 year program supported by COSUDE. Success with this bid would position the project excellently in the Central American context, and provide the opportunity for making a real contribution to alleviating rural poverty in the region.

Output 1: Tools, methods, and information for market opportunity identification and development, as an input for the design of economically viable and sustainable rural agroenterprises

The purpose of Activity1 is to generate marketing-related methods and information for the small farmer economy and rural agroenterprises with the intention of facilitating their linkages with growth markets. Activity 1.1 is a participatory methodology for selecting agricultural, animal and forestry products, in fresh and processed form, with market potential as an input for the design of economically viable and sustainable production systems for small farmers located in three reference sites representing fragile hillsides and tropical lowland ecosystems in Latin America. Activity 1.2 is a dynamic, user-friendly Internet-based information system on alternative trade, encompassing segments such as fair trade, green/organic and ethnic trade, etc. The information system will be client-oriented and will include a directory of commercial contacts, a glossary, information on products and market trends, a calendar of events and technical guidelines. Activity 1.3 is a guide for developing marketing plans and strategies adapted for small-scale rural agroenterprises.

Highlights

- The market opportunity identification and evaluation methodology for small rural producers has been successfully executed for the reference sites in Pucallpa, Perú and Yoro, Honduras. This brings to a close the formal validation of the methodology originally developed in Cauca, Colombia. The methodology, which has generated a great deal of interest, is also being used and adapted to local circumstances, in Puerto López (Colombia) and Carchi (Ecuador). A proposal for its implementation in San Dionisio, Nicaragua has been developed together with local partners.
- The market identification manual or guide was first published in Spanish and then translated to publish an improved version in English that incorporates feedback from farmers, trainees and colleagues. This manual has been used in nine workshops and training events in Honduras, Nicaragua, Colombia and Ecuador throughout the year in Latin America, plus Kenya (Africa) in November 1999.
- The design of the Internet information system on alternative trade has progressed with the execution of a quick market survey among potential clients in Latin America to identify the essential system components and topics to be included. Additionally, a European Union-based consultant prepared a basic document on "Alternative trade in the European Union", and a database of 40 alternative trade organizations in Europe, which will enrich the database developed last year.
- Three computerized presentations were prepared on Basic Marketing Concepts, Promotion and New Product Development, the first step toward the formulation of marketing plans and strategies adapted to small-scale rural enterprises. These presentations were prepared for the IICA-CIAT-PRODAR marketing training course held in Quito, Ecuador and directed to local personnel focusing on rural enterprise and rural agroindustry development.

Activity 1.1 Development of methods for market opportunity identification at the ecosystem and microregional level adapted to the needs of small agroenterprises

1999 milestone

1.1.1 Methodology developed for the microregional level and adapted through application in CIAT's reference site in Pucallpa, Perú

Execution of the market opportunity identification methodology by CODESU and DEPAM, under the supervision of the Rural Agroenterprise Development Project, has ended. CODESU is the local consortium of institutions working towards the sustainable development of the Ucayali region, while DEPAM is the Pucallpa-based Participatory Amazonian Development Project. Within DEPAM, the Rural Enterprise Development specialist has been in charge of supervision.

It should be recalled that this methodology was adapted to initially include only the exotic Amazonian product portfolio proposed in a base document published by the Amazonian Cooperation Treaty (TCA in Spanish). Based on market demand and other criteria, CODESU selected a final eight-product portfolio that includes camu-camu (*Myrciaria dubia* Mc Vaugh, a small tree fruit with a high vitamin C content used for juices, ice cream, marmalades, alcoholic beverages); pijuayo or pejiyabe or chontaduro (*Bactris gasipaes*, a palm tree used for extracting palmito); uña de gato or cat's claw (*Uncaria guianensis*, a natural medicine obtained from huge vines and shrubs and used mainly against inflammations and cancer); castaña or Brazil nut (*Bertholletia excelsa*, a nut produced by a large Amazonian tree and used for direct consumption or in ice cream and sweets); cocona or topiro or "peach tomato" (*Solanum sessiliflorum* Dunal grows as a shrub and is processed into fruit pulp for juice, nectar, marmalade, sweets, pickles, baby food and fresh consumption); aguaje (*Mauritia flexuosa* L., a palm fruit used for refreshments, ice creams, sweets, alcoholic beverages); barbasco, timbo or derris (*Derris urucu/Derris nicou* or *Lonchocarpus*, a plant with roots that contain the natural poison 'rotenone') and copoazú or cacao blanco (*Theobroma grandiflorum*, a tree fruit similar to cocoa whose pulp is used for juices, refreshments, ice cream, sweets, baby food, liquor and yogurt, whereas the seed is processed into white powder or tablets similar to cocoa).

Characterization of exotic portfolio

In collaboration with personnel from national agricultural research institutions such as INIA and IIAP, CODESU core staff executed the agronomic, commercial and economic characterization of the exotic product portfolio. This work included collection of secondary information, interviews with key informants, preparation of maps regarding the geographical distribution of products extracted from the forest, characterization of current and potential production and processing technology, profitability and cost estimates, and a summary of market information. The main conclusions of this characterization stage are as follows:

- More agronomic information is still to be generated for the options; the best-defined production technology corresponds to pijuayo and camu-camu, followed by castaña and barbasco. The technology for aguaje, cocona and copoazú is less developed, but uña de gato requires agronomic research the most urgently, to obtain its domestication.
- With respect to adaptation to soil conditions, barbasco and cocona are first, followed by pijuayo, aguaje and uña de gato. Castaña and camu-camu are the most demanding in this regard.
- Barbasco is the product which is the most resistant to pests and diseases, followed by aguaje, uña de gato, castaña, pijuayo or palmito and camu-camu. Cocona (nematodes) and copoazú ("escoba de brujas") are the riskiest in this sense.
- The product with the highest market potential is camu-camu, followed by palmito and uña de gato. Castaña and barbasco enjoy less advantages. However, market demand for aguaje, cocona and copoazú has to be stimulated, especially in the internal market, which implies a market development strategy. *Note: Shortly after the delivery of this report, international palmito prices declined due to Brazil's entry into the global market. This has constrained the expansion of palmito in countries such as Perú and Costa Rica, which are presently pursuing the development of internal markets through product promotion and new-product development. In addition, the internal market for copoazú in Brazil is enormous.*
- With respect to the level of investment required, barbasco and copoazú demand the least, followed by palmito and uña de gato. The most demanding in this aspect are castaña and the fruits aguaje, cocona and camu-camu. Aguaje and cocona generate the greatest demand, for labor.
- The most profitable crops are camu-camu, followed by cocona, copoazú, uña de gato, although variability in income is high. Barbasco, palmito and aguaje exhibit an intermediate profitability, whereas castaña is the least profitable and does not repay the cost of capital.
- Cocona and pijuayo-palmito have the shortest pre-harvest period, followed by copoazú and barbasco. Castaña and aguaje both mature very slowly.
- In relation to the level of investment required for the processing of these crops, the least amount corresponds to cocona and palmito, and the greatest to uña de gato and barbasco (for obtention of rotenone).
- Finally, if we compare the market options along nine equally-weighted criterions (market, availability of technology, level of risk, crop adaptation, investment in production, employment generation, investment in processing, profitability and maturation period), the ranking would be the following:

1. Pijuayo-palmito (see note above)
2. Camu-camu, barbasco, and cocona
3. Copoazú and uña de gato
4. Aguaje
5. Castaña

Participatory evaluation of exotic portfolio

The participatory evaluation is the methodological stage in which the small farmers, classified according to pertinent socioeconomic variables (in this case location and land use), express their preferences relative to the market options, in this case the selected exotic Amazonian portfolio. The following four farmer typologies were defined: native riverside farmers from the río Ucayali; mestizo riverside farmers from the río Aguaytía; road farmers growing short-cycle crops from the San Alejandro sector; and road farmers growing perennial crops from the Campo Verde sector. A quick survey of small farmer criteria for decision-making when selecting crops for planting was conducted, as an input for the design of product concept boards that contain enough information so that farmers can make acceptance or rejection decisions. These concept boards were presented in the participatory evaluation meetings. In total, 168 small rural producers from 60 communities participated.

Overall, the winner was cocona or “peach tomato” (*Solanum sessiliflorum* Dunal), a fruit similar to lulo or naranjilla that grows as a shrub and is processed into fruit pulp for juice, nectar, marmalade, sweets, baby food and fresh consumption. Additionally, cocona is also used as fresh fruit pulp as a vegetable or pickled. In that order, road farmers preferred cocona, camu-camu and uña de gato, while riverside farmers chose camu-camu, cocona and pijuayo-palmito. In general, castaña was the most rejected alternative and will be discarded. Cocona was preferred mainly because of its short growth cycle and in lesser degree due to market demand and yields.

In general, the importance of market demand and profitability as reasons for preference can be underlined. Also, market options around which Integrated Agroenterprise Development projects (IAPs) are executed can vary according to the small farmer category or type. In addition, work with market options with different growth cycles is recommended. It is anticipated that IAPs will have a strong market development component, based on promotion and new product development. The Pucallpa-based Rural Enterprise Development Committee (see Output 4.), decided to formulate an IAP around cocona, in part because business development projects around the other preferred options, camu-camu, uña de gato and palmito, have already been established.

Linear programming model

Production information on the resulting seven exotic products is being incorporated into a linear programming small-farm model for the Pucallpa region. When finished, this model will indicate which market options are the most viable, given the regional socioeconomic context, and/or will impact the greatest in employment, income and natural resource base conservation.

Identification of non-exotic market alternatives for Pucallpa

To complement the aforementioned process of identification and evaluation of market opportunities for exotic Amazonian products, it was decided to execute a similar process but focused on non-exotic products. By non-exotic products, we mean products that are either traditional or new in the region, but not indigenous. The first stage, the rapid market study, was conducted in 1999 by a Lima-based consultant. The market study sought market opportunities for three types of markets: regional, national (Lima) and export. Questionnaires were applied to intermediaries in Pucallpa and Lima, and interview guides for contacts in agroindustries, supermarkets, producer and exporter associations, and development agencies. Additionally, secondary information was obtained in government institutions. A total of 48 intermediaries and 53 organizations were contacted, mainly in Perú's capital and by far the largest market, Lima. This was complemented with a search in the Internet.

It should be noted that an important input for this activity was the work by DEPAM's rural enterprise development specialist, consisting of a prioritization of indigenous and non-indigenous crops for the

Pucallpa region. The proposed Amazon portfolio (forty products) was determined after reviewing TCA documents, other pertinent Amazonian development literature and government statistics on agricultural production in Ucayali.

The main market options identified, listed by the survey strategy, were as follows:

Strategy 1 (Products with high demand growth): “rough” cotton, carambola and guanábana

Strategy 2 (Products that are scarce): none

Strategy 3 (Products related to natural resource conservation): cacao, bolaina

Strategy 4 (Products in which Pucallpa has a comparative advantage): oil palm, pepper, pineapple

Strategy 5 (Products that are traditional): “Castilla bean”, lemon, peanuts, Valencia orange, plantain and cassava

The market options are potentially destined to the following markets:

Regional	peanuts, plantains, lemon, cassava
Regional/export	Castilla bean, Valencia orange
National/export	rough cotton, bolaina, cacao, carambola, guanábana, oil palm, pepper, pineapple

All of these market options are currently grown in Pucallpa. As with the exotic portfolio, the next stages will be the characterization of these non-exotic market options and the participatory evaluation with small rural producers.

If additional information is required, the final reports of all these project activities are listed at the end of this annual report.

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1.1.2 Methodology developed for the microregional level and adapted through application in CIAT’s reference site in Yorito-Sulaco, Honduras

The market opportunity identification methodology has been in execution since 1998, including the rapid market study which was finished that same year and the initiation of the characterization of market options. These activities have been contracted with a local consultant, Agrogenet, under the supervision of the Rural Agroenterprise Development project and its representative in Central America. The market options identified in the rapid market study were: avocado, cassava, tomato, red onion, sweet chili, plantains, cabbage, lettuce, cheese, butter, sawed wood, wooden furniture, coffee, beans and maize.

Characterization of market options

The purpose of the methodological stage is to generate basic agronomic, marketing and economic information and to establish priorities, and discard options if pertinent. Primary and secondary information was used to fill in the three matrix formats. The following were the main results of the characterization:

Agronomic aspects

- Basic grains and vegetables have the shortest growth cycles.
- Plantains are the fruit with the shortest growth cycle, compared to coffee and avocado. Avocado has to be grafted.
- Basic grains require a low-to-medium technological level, high for vegetables and coffee and medium in the case of avocado and cassava.
- Although dairy products demand a low production technology, they require the adoption of hygienic practices.
- Sawed wood implies low technology, although the production of wooden furniture does not, due to the equipment used and the quality expected by consumers.

- The soil and pH types demanded by basic grain, vegetables, fruits and cassava are found in the region, which means their production is feasible. In addition, all of the options are adapted to the range of altitudes found in the region.
- With the exception of tomato, sweet chili, red onion, lettuce and cabbage, the rest of the agricultural and forestry options do not require irrigation.
- Vegetables, and to a lesser extent coffee and plantain, are susceptible to pests that can seriously affect production and, hence, natural resource-friendly control methods must be identified.
- Planting densities for basic grains, vegetables and fruit trees are low and is a production factor that should be improved.
- Yields for all options are low and can be improved.
- In the case of grains, vegetables and fruits, postharvest loss is generally high.
- Dairy product loss is unimportant, although the quality is low and the by-products such as whey are not used appropriately.
- Maize and beans are considered important crops due to their contribution to food security, they enjoy a good market in Honduras and in Central America and are profitable.
- Crops such as coffee, plantains, and avocado contribute to soil conservation and enjoy a good market internally and in Central America. They are also profitable and are adapted to the region. However, because they have long growth cycles, they are not so attractive to small farmers, who prefer options with shorter growth cycles.

Marketing aspects

- With the exception of lettuce, plantain, avocado, cassava and wood, the rest of the products are produced and commercialized in the region.
- With the exception of tomato, lettuce, cabbage and butter, the selected products exhibit medium to low perishability, which is adapted to the deficient road access in the region.
- The main clients are the markets and supermarkets, who generally do not provide services to the producers.
- All of the selected products display high levels of commercialization at the local, national level and, as is the case of tomato, sweet chili, red onion, coffee, plantains, avocado, cassava, cheese and butter, in the Central American and US market. They also exhibit a high demand growth.
- With the exception of tomato, avocado, and cassava, the products selected require medium-to-low quality requirements nor do they demand sophisticated packaging.
- The majority of the products selected are sold in the region to intermediaries, signifying low prices to producers. Relations between buyers and farmers are informal, and to the disadvantage of the latter.

Economic aspects

- Dairy products, beans, coffee, avocado, and tomatoes present a low price stability compared to the other options. The products with the most stable prices are maize, plantains, cabbage and cassava.
- Avocado, coffee, and plantains require extended preproduction investment (1-4 years), which makes these alternatives less attractive.
- The production of sawed wood, furniture and milk-processing demands lots of man labor; this region has a scarcity in this respect and thus may not be attractive to farmers.
- The market options selected exhibit Financial Rates of Return above 20%, which indicates their profitability even with credit involving real interest rates.

Using the following set of indicators: feasibility in the small farm context, business attractiveness and contribution to sustainability, nine market options were ranked as more important. These were, by order of ranking: maize, beans, sawed wood, plantains, avocado, cheese, butter, wooden furniture and coffee. However, it was decided not to discard any market option at this stage, but after the participatory evaluation with small farmers.

Participatory evaluation with small farmers

The participatory evaluation is the methodological stage in which the small farmers, classified according to pertinent socioeconomic variables (in this case economic level), express their preferences relative to the market options selected. This was an interinstitutional process led by the representative of the Agroenterprise Development project in Central America, in collaboration with Agroenet, Sertedeso, IPCA and the CIAT Hillside project.

The region was subdivided according to type of access (permanent, temporary and by horse trail). Sertedeso conducted a quick survey among 42 small farmers of the region to identify their key criteria when deciding which crops to plant, as an input for the design of product concept boards. These concept boards contain basic information that will allow farmers to determine their preferences relative to the market options. This survey indicated that small farmers like crops that (a) require low technology (are resistant and adapted to the region), (b) have a market, and (c) have experience or have access to technical assistance. The concept boards were presented in the participatory evaluation meetings. A total sample of 64 small farmers participated in the evaluation process.

Table 1.1 is a summary of the market options preferred by the small rural producers, according to the subregion and farmer type. The options in bold were the overall winners. In the subregions of temporary access and horse-trail access there are no "high economic level" producers.

Table 1.1. Summary of the market options preferred by the small rural producers, according to the subregion and farmer type – Yorito-Sulaco, Honduras.

Farmer type			
Subregion	High economic level	Medium economic level	Low economic level
Permanent Access	Dairy products , coffee, red onion, beans, avocado, cassava and plantains	Coffee, dairy products, avocado, tomato, cabbage, red onion, sweet chili	Maize , beans, coffee, dairy products, plantains, tomato, cabbage, red onion, lettuce
Temporary Access	NA	Coffee , maize, avocado, red onion, plantains	Coffee , red onion, maize, avocado, cabbage, dairy products, sawed wood
Horse-trail Access	NA	Coffee , maize, beans, avocado, cabbage	Coffee , maize, beans, avocado, red onion

In general, the market options preferred by the small farmers in the region were coffee, avocado, plantains, maize, beans, red onions, and dairy products. However, as Table 1.1. clearly shows, preferences vary by subregion and farmer type. The main reasons for preference were adaptation to the region, good market demand, and good price and profitability. The reasons for discarding sawed wood and wooden furniture are due to doubts regarding their ability to develop and implement a sustainable forestry management plan, conflicts among indigenous communities and high levels of investment.

Bioeconomic simulation to evaluate market opportunities

This activity was executed jointly by PE-3 and SN-1 (Agroenterprise project), in collaboration with a thesis student from the Escuela Agrícola Panamericana de Zamorano, to (a) evaluate the profitability and sustainability of the production systems that include the market options that were the most preferred in the participatory evaluation with small farmers, and (b) develop and apply a method for improving farm-level planning by using mathematical simulation to determine crop combinations that will maximize income while protecting the natural resource base.

Eight base models representing eight producer categories were designed to support the participatory method for instant farm modeling with small farmers using linear programming. Based on these models, scenarios were developed to aid in decision-making relative to which options were the most profitable

taking into account the resources available for each farm type and making different hypotheses. An example of a hypothesis is: changing the available capital to simulate a credit system and evaluate its impact on the optimum production system and the resulting income.

Some key conclusions were the following:

- The base models designed based on interviews with the farmer types provide similar results as the existing production systems. The traditional system includes maize, beans, coffee, all grown with low inputs and labor. Other crops that can be found are bananas, sugar cane and cattle. The farmers interviewed were unable to evaluate their annual income. Producers with few resources (land and capital) sell their labor to increase income.
- The maximum incomes attainable with traditional crops are much lower (ranging from 4 to 100 times less) than the top incomes displayed by the scenarios with new market options. This confirms that the optimum adoption of these new options, accompanied by efficient marketing, can help increase small-farmer income.
- The combination of activities that permits maximum income does not necessarily imply the use of all available farmland due to a lack of resources, such as capital. In general, considering an optimum use of currently available resources, the best options would be tomato and avocado. Tomato should be sold preferably in non-peak harvest period.
- In the case that capital was available, the models point to dairy products as one of the most profitable market options. However, its feasibility depends on the supply of milk in the region; individually farmers are incapable of having cows in their farms. Other profitable alternatives are semi-technified beans, sweet chili, cassava, red onion, plantains, and cabbage. However, the best combination of productive activities depends on the land, capital and labor available to each small farmer.
- In general, diversification with short-cycle crops may result in increased erosion, but the difference would be quite small due to the fact that new crops are not much erosive compared to the traditional crops. Furthermore, perennial options such as avocado, coffee and pastures contribute directly to soil conservation.

Project proposal prepared for Nicaragua

A project proposal for the identification of market opportunities for small farmers in San Dionisio (CIAT's reference site in Nicaragua) was written in collaboration with REDAR Nicaragua. REDAR is a national network of organizations that promote rural agroindustry. This proposal was presented to IDRC and was not approved for funding. Other sources of financing will be sought.

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Activity 1.2 Development of an accessible information system on alternative national and international trade channels oriented to small agribusiness

1999 milestone:

1.2.1 Main components of information system defined

The alternative trade theme is gaining importance for sustainable rural development in developing countries. For this reason, the Agroenterprise project is in the process of designing this information system and placing it in the Internet. The objective is to facilitate access to relevant information and contacts. By alternative trade we mean the institutions, activities and marketing chains focused on fair trade, social justice, solidarity, organic and biological products, and ethnic products.

A rapid survey was conducted to study the relative market demand for different potential information system components or themes. A short questionnaire was applied to a convenience sample of 62 individuals working in rural development. The survey was undertaken through personal contact in Colombia, Bolivia,

Perú and by means of the Latin American-wide PRODAR electronic network. The main results are summarized as follows:

- Using a four-point semantic scale, 43% of the sample thinks that alternative trade is very important, whereas 79% considers that it will be very important in the future.
- By far, the winning topic was “directory of contacts in the alternative trade chain”, followed by “options to establish an alternative trade chain”, “information on world market trends”, and “procedure to penetrate the international market”.
- Another four topics were suggested in the questionnaire but they were not considered as important by the sample.
- The sample also proposed new topics for the information system. The most frequently mentioned topics can be grouped in “quality norms”, “credit”, “case studies” and “marketing strategies”.

A two-phase plan was made for developing the Alternative Trade Information System (ATIS). The first phase anticipates the preparation of a directory of contacts plus brief descriptive documents on the four aforementioned winning topics. In addition, a document on certification and case studies will be included. This initial phase will be executed in-house and by consultants, and includes the formulation of a project proposal for the second phase. ATIS will offer linkages to pertinent websites. Phase 2 will encompass the improvement (longer, more analysis) of the material prepared in the first phase and the preparation of Phase 3, and will be executed by thesis students and consultants.

1.2.2 Key information developed and identified for ATIS

Documents for ATIS have been developed and identified as follows:

- with the collaboration of two international consultants, a data base of more than 250 worldwide contacts is ready
- a consultant has provided a complete document on FLO (fair trade) guidelines, contracts, questionnaires and directories
- PRODAR/OIT have prepared a comprehensive manual on procedures for exporting agroindustrial products
- More than 15 case studies, including analysis of success factors, have been developed in-house and by PRODAR

ATIS will be placed in the Agroenterprise Development project's website before March 2000 and the components that are still lacking will be developed during the year.

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Activity 1.3 Development of methods for the formulation of marketing plans and strategies adapted to small-scale rural agroenterprises

1999 milestone:

1.3.1 Participation in a marketing course in Ecuador

Progress in this activity has been delayed due to significant additions to the main contributor's workplan in 1999. However, the participation of the principal contributor as main instructor in a “Market opportunity identification” course organized by IICA, CIAT and PRODAR in September 1999 has helped identify key demands in the area of marketing for rural development. The audience of this course were almost thirty development professionals from Ecuador, focusing on rural agroenterprises.

For the aforementioned course, three presentations were prepared, as follows: Marketing Basics, Promotion and New Product Development. Other topics of priority are Marketing Plans, Marketing Strategies, Basics of Alternative Trade, Marketing Research for Small Agroenterprises. Work in year 2000 will concentrate in preparing and/or improving presentations and manuals on Marketing Basics, Marketing Plans and Marketing Strategies.

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Output 2: Tools, methods and information for the development of appropriate postharvest technologies for small-scale rural agroenterprises

The purpose of Output 2 is to generate information and technology on post harvest processing for a selected number of products and specific agroecosystems. The agroecosystems that have been prioritized are (i) unfavored hillsides or upland ecosystems, (ii) the intervened forest margins, (iii) the subhumid lowland tropics and (iv) the savannahs. Within these ecosystems, commodities or groups of commodities are selected according to the competitive advantage of small farmers to produce these commodities. Initially, roots and tubers, selected neo-tropical fruits and milk products have been selected for attention. Activity 2.1 seeks to develop user friendly information systems that permits users' access to basic information required to take decisions about post harvest technology selection. Activity 2.2 is focused on adapting, developing and implementing a set of participatory methods for undertaking post harvest technology research with clients and beneficiaries in a given socioeconomic context. While these methods have been successfully developed for preharvest research, the principles are only recently being adapted for the post harvest area. Activity 2.3 deals with the generation of basic knowledge and adaptation of cutting edge technology for adding value to selected products, that have been prioritized through our work in the reference sites, with a novel market potential.

Highlights

- An information system for cassava postharvest and processing placed on website.
- A simple method for the quality assessment of sour cassava starch developed, adopted and systematically used by the cooperative which commercializes the product, as a means of quality certification and incentive commercial strategy for producers.
- Constitution of a multidisciplinary and interinstitutional group for (a) working on selected promising (health-enhancing and biologically active) products from Andean countries with novel market potential, and (b) prioritization of the research needs.

Activity 2.1 Development of inventories and systematized information for products and processes with market potential to define information and technology needs

1999 milestones:

2.1.1 An information system for cassava completed and placed on website for consultation

The post harvest technology information system on cassava that was reported last year, has been completed. Starting with a general presentation on cassava physiological and microbial deterioration and the need for cassava post harvest techniques, the information system deals with five areas: (i) fresh root storage techniques, (ii) cassava processing, (iii) different scale equipment used for cassava processing, (iv) uses of cassava products, co and by products and residues (solid and waste water), and (v) common methods for assessing and controlling the quality of cassava-based products.

Data and secondary information has been compiled and synthesized. For points (ii) and (iii), a series of information sheets have been prepared that summarize both technical and economic aspects of the processes for the elaboration of each product, including scale options, equipments, mass balance, investment and processing costs. For those products that CIAT and CIRAD have generated technology, this information has been given in greater detail, based on the research and development undertaken by these two institutions. For other cassava products, and in particular for the secondary transformation of intermediate cassava products into finished products, the reader will be directed to literature or contacts on the subject. A total of 433 references were compiled, synthesized and classified in the project's library using the EndNote software for easy further consultation.

The system is to ensure a wide diffusion and information access to cassava farmers and processors, local development agents, rural agroenterprises, NGO's and governmental decision makers.

The system is being placed on the project's website for consultation using the FrontPage software. A review paper based on the cassava information system is to be submitted by the end of 1999 for publication.

2.1.2 Extension of the commodity information system to the neo-tropical fruits mora and lulo

The information system developed for cassava was used as a model and extended to two selected neo-tropical fruits, mora (*Rubus glaucus*) and lulo (*Solanum quitoense*). A total of 44 references were collected up to now, synthesized and classified in the project's library using the EndNote software for easy further consultation. The synthesis showed that the majority of existing documents deal with agricultural and market studies on these fruits. It pointed out a huge lack on postharvest handling and processing which is of a high concern for industry and is valuable for orienting future research works. It is to be noted that mora and lulo still suffer around 40% of postharvest losses. The compilation of documents on these fruits is in process and the system would likely be placed on the project's website next year.

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Activity 2.2 Adaptation and refinement of participatory methods for improving processing efficiency and product quality for existing and novel rural agroenterprises

The activity 2.2 focuses on defining and implementing technological interventions on prioritized products based on needs and demands, in the specific socioeconomic context of the reference sites. The process, based on a multidisciplinary and interinstitutional approach, deals with a participatory diagnosis for identification of the critical points, implementation and validation of proposed recommendations, monitoring and feedback. This participatory process aims at identifying and supporting, at the different stages of intervention, the roles and responsibilities of the local, regional and international institutions involved in technology research and development, the farmers and processors, the marketing intermediaries, consumers and clients.

1999 milestone:

2.2.1 A series of technological interventions on prioritized products have been initiated in the reference sites

Cauca Department (Colombia)

Sour cassava starch quality. Financing for this project, that seeks to improve the quality of the sour starch produced by the small-scale cassava starch processors in Cauca Department in Colombia, has been obtained from the Colombian Ministry of Agriculture and Rural Development. The agreement was signed at the end of 1997. The project forms part of a larger, integrated research and development initiative on the strengthening of the cassava sour starch industry in the Cauca Department.

The initial activities of the project were concerned with consulting with the producers and consumers on their perceptions of and requirements in terms of quality, and defining the need for a standard method, accepted by both parties, by which product quality can be measured. Following induction and training of project members in participatory techniques, research is now under way in the following areas: (1) concertation between processors and consumers to define quality specifications; development of a standard and simple method for determining product quality; (2) product quality evaluation of promising genetic materials; (3) standardization of quality through control of raw material and sour starch mixes; (4) improvement and control of key unit processing operations affecting quality.

This simple standard protocol was evaluated and validated with the participation of sour starch processors and food industries using this ingredient. Both were positively impressed by the easiness and rapidity of the method. Using this in-field test will mean that the processors themselves can assess the quality of the sour starch they produce and estimate a fair selling price. Compared to previous methods used for determining sour starch expansion, the main advantage of this method is the use of only sour starch and water, without the use of other ingredients, such as cheese and fat. This eliminates interference from these other raw materials and reduces the cost of the assessment. The method is being currently used by

COAPRACAUCA, a cooperative joining cassava producers and processors, as a means for product quality certification and a strategic commercial incentive for better selling price to the processors.

A participatory investigation was carried out with farmers and sour starch processors in order to evaluate the influence of the raw material on end product quality and to select promising genetic materials. Comparative trials were conducted in three areas (low, medium and high altitude), cassava cultivars were selected by the producers and planted in the three areas. After harvesting, roots were processed into sour starch in different plants (rallanderías) located in the three study-areas. Both agronomic features (growth and harvest) and technological characteristics (starch extraction) of the selected cassava cultivars were evaluated by producers and processors. Statistical analysis showed that the sour starch quality was strongly influenced by cassava cultivar, harvest date and cropping ecosystem and not at all by processing conditions. Recommendations were provided to cassava producers in terms of the optimal suitability of the cultivars to the cropping ecosystem and harvest period. The study was presented in a seminar on participatory research (Quito, Ecuador). A scientific paper is to be prepared for publication.

All the literature existing on sour starch processing in Latin American countries has been compiled and referenced (85 documents) using the EndNote software, for easier consultation and availability to the project partners. This literature was synthesized, published in the form of a manual and distributed among the local organizations and associations working with cassava producers and sour starch processors in the Cauca Department, Colombia. A review paper on sour cassava starch quality is also to be submitted by the end of 1999 for publication.

Formulation of a project on sour cassava starch-based snackfoods. A proposal on the elaboration of sour cassava starch-based expanded snackfoods by rural families in the Cauca department (Colombia) was formulated and presented to the IDRC for funding through the Small Grant Funds Programme. The rural processors of sour starch are currently buying at high cost the snackfoods elaborated with this ingredient by the urban industries. The proposal aims at generating incomes for rural sour starch processors and their families, especially for women, through adding value to this ingredient in the rural production zone itself and marketing the snackfoods either in the local rural markets of the Cauca department (Colombia) or in the fair trade in Europe.

Clean production of sour cassava starch. As the production of sour cassava starch in the Cauca Department (Colombia) is a source of contamination for rivers, the need for a "clean production" approach is becoming essential for this agroindustry. A recent decree from the Colombian Ministry of Environment stated that within three years, the cassava starch processors will have to pay a tax according to the contamination level they are generating. All the sour cassava starch processors, some of whom are organized within the COAPRACAUCA cooperative, signed an agreement with the CRC (Corporación Regional del Cauca) which commits them to collaborate with the regional institutions for the adaptation and adoption of alternatives for waste water and residue treatment.

Facing this increasing demand for "cleaner" production of sour cassava starch, an interinstitutional group was constituted, involving UNIVALLE (university), CETEC (NGO), COAPRACAUCA (cooperative of cassava producers and processors), CIRAD and CIAT. Meetings have been held to identify the priorities and lines of intervention for solving the problem. Contacts were made with regional experts in the area of waste treatment for eventual further consultancy.

The priorities and main topics which need further research for achieving "cleaner" production of sour cassava starch were identified as follows :

- treatment of waste waters coming from the sour cassava starch production. Different existing options and alternatives (e.g. anaerobic filters, methanogenic bioreactors, oxidation tank, use of the waste waters for the irrigation of some crops and forages, etc) need to be evaluated for their response to the different scales of operation in the Cauca Department (Colombia) ;
- reduction of water consumption during the extraction of cassava starch, which will help in the dry season when river water is scarce and for reducing the waste water volumes to be treated ;
- improvement of the sour starch quality through an adequate treatment of the water used for its extraction and processing ;
- adding value to solid cassava wastes, i.e. outer peel, inner fiber (locally named "afrecho") and the protein impurity layer (locally named "mancha").

Project proposals on these topics are being elaborated for presentation to the CRC which is the responsible entity before the Colombian Ministry of Environment for proposal submission and fund management.

It is to be noted that the same demand and needs were identified in Asia. The SN-1 project could play an important role for catalyzing interactions, information exchange and technology transfers between Asia and Latin America. A project proposal involving countries and partners from the two continents might be elaborated and presented for funding (to the European Union for instance).

Lemongrass drying. CETEC, a Colombian NGO, has identified a potential niche for dried lemongrass in the fair trade in Germany, which might generate incomes for small farmers and women groups in the Cauca Department (Colombia). Responding to CETEC's request, the SN-1 project brought support and assistance through a technology diagnosis for the implementation of lemongrass drying agroindustry in the region. Preliminary experiments were conducted for evaluating the behavior of lemongrass at different drying conditions (air temperature, relative humidity and velocity). Drying rates were determined and the microbiological and organoleptic quality of the resulting dried lemongrass was assessed. Samples were sent to a NGO in Germany for prospection of fair trade opportunities. Technical specifications were set for the implementation of an appropriate drying plant in the rural zone of the Cauca department (Colombia).

Cajamarca Department (Perú)

In the framework of a CIRAD-funded project on local agrifood systems (CIRAD, 1998. *Sistemas Agroalimenticios Localizados y Construcción de Territorios, Acción Temática Programada*), in which CIAT and PRODAR are participating, two case studies were selected as an input for validating the methodology which is under elaboration. These studies deal with the traditional processing of "rallado de arracacha" (project led by CIP-CONDESAN) and cheese (project led by ITDG) in the Cajamarca Department (Perú).

Arracacha processing. The "rallado de arracacha" is a sweet product obtained by the combination of grated arracacha (an Andean root) and sugar cane "honey". The arracacha grating was identified by the processors as a critical technological step, due to the low productivity and high sanitary risks of the present grating practices. The SN-1 project helped in the design and the participatory implementation of a pedal-operated mechanical grater which was well accepted and adopted by the processors. In order to increase their productivity and reduce the effort required to grate the arracacha, the producers are presently undergoing an organization process which will enable them to purchase an electric motor for the grater. Market studies are under way (by CIP-CONDESAN) in Lima and other small cities of the Cajamarca Department for better identification of the consumer demands and distribution channels. The next identified activities (in which CIAT-CIRAD can bring support) will deal with the improvement of the quality and packaging of the "rallado de arracha", the quality of sugar cane "honey", the mixing of the grated arracacha with the "honey" and energy saving during heating.

Cheese processing. A similar process is followed for adding value to the rural cheese processing in the Cajamarca Department (Perú). Studies are underway for identifying the market niches, consumer demands and distribution channels. PRODAR and ITDG have just finished a diagnosis on milk production and distribution, the relation between the small farmers and transnational groups such as Nestlé, the characterization of the cheese and quality requirements. The SN-1 project has been requested to collaborate in the analysis of the data collected and the elaboration of a strategy for further activities.

Puerto López District (Colombian savannas)

Pig feeding with local cassava-based rations. Within the framework of a project funded by the Colombian Ministry of Agriculture and Rural Development on the design of a decision support tool for the implementation of rural agroenterprises (see activity 4.3), the CIAT projects SN-1 and PE-4 collaborated in identifying a need and opportunity for the elaboration of cassava-based rations destined to pig feeding, in the district of Puerto López (Colombian savannas). Cassava is a common crop of the zone but is facing marketing problems due to narrow local markets and a lack of marketing strategies and information. On the other hand, the producers are buying expensive concentrates for pig feeding. The local cassava production

could serve as a main ingredient for feeding ration but there is a need for elaborating the recipe and training the producers on the appropriate technology to perform. By the end of 1999, some feeding recipes will be provided by SN-1 to PE-4 for participatory evaluation with the farmers and eventual further implementation.

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Activity 2.3 Generation of basic knowledge and adaptation of cutting-edge technology for adding value to selected products with a novel market potential

This activity seeks to identify promising products in the reference sites with a novel potential market such as the nutraceuticals, health-enhancing foods, biologically active components, exotic aromas, etc. and to collect the available information on these products. The identification of knowledge gaps helps in prioritizing the needed research and technological interventions to promote and add value to the selected promising products.

1999 milestones:

2.3.1 Constitution of an interinstitutional working group and information collected on selected Andean and Amazonian promising products

Due to the increasing demand for health-enhancing products and bio-active components and aromatic ingredients, either by consumers or food and non-food industries, many exotic natural resources and agricultural products represent a great potential for these new market niches. Some of these products represent a great opportunity for generating incomes to the small farmers and rural communities living in their native ecosystem. Under the auspices of CIRAD and in collaboration with CIAT and PRODAR, a partnership was built with institutions from the Andean countries (Colombia, Ecuador, Perú and Bolivia) to identify, promote and add value to the promising products of this ecoregion. Five categories were selected: the exotic fruits "camu camu" and "arazá", the medicinal plants "uña de gato" and "sangre de grado", as well as some native aromatic species (eucalyptus for instance).

Information on the selected promising products is currently being collected and synthesized in order to identify the lacks of information and point out the main research priorities for adding value to these products. The aim is to compile data and develop in the future an information system for these promising products, with further placement on website and wide diffusion, following the same model elaborated for cassava and mora and lulo. Research needs are being prioritized for the planning of future activities. One of these is the chemical characterization of the promising products for a better knowledge of their bio-active and/or aromatic components (vitamin C range in the camu camu fruit for instance). This characterization will help in promoting the use of these ingredients by industries, identifying the potential market niches, volumes and quality requirements. Then, techniques are to be identified and adapted for the active component separation and/or elaboration of marketable end-products. The Andean institutions involved in the working group on promising products committed themselves for undertaking local research, in each country, on the marketing, characterization and technology of these crops. They are also engaged in elaborating a joint strategy for the domestication and environmentally sustainable production of these promising products, as well as for proposing concrete linkages between the native communities whose income is mainly generated by the promising products extractivism and the emerging markets.

2.3.2 Membrane filtration technique adapted to the clarification of passion fruit juice

The passionfruit juice aroma is famous and highly demanded by food industries. However, it is very fragile and sensitive to pasteurization heat treatments. The membrane filtration technique, presently applied in the processing of dairy products and concentrated sugar syrups seems valuable for performing, in the same time, a "cold"-type pasteurization which preserves the aroma and the clarification of passion fruit juice which opens the way to new industrial market niches such as the use of the clarified juice in the elaboration of

alcoholic beverages, ice-creams, confectionery dressings, etc. The study carried out showed that the membrane technique was adequate for clarifying the passiflora juice, as the organoleptic features (aroma, flavor, fresh note) of the juice were preserved after treatment and the sanitary quality was excellent without heat pasteurization. Reflexion is underway on the possible adoption level of this technique by small rural processors and the way in which it could link them to the increasing industrial demand from national and international markets.

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Output 3: Information, options and recommendations for the design of efficient and effective organizational schemes for small-scale rural agroenterprises and their support services

The purpose of Output 3 is to provide options and recommendations for the design of efficient and effective organizational schemes for small-scale rural agroenterprises and their support services. Three levels of intervention are contemplated. Activity 3.1 considers schemes for the internal organization and operation of existing and new rural agroenterprises, as a means of determining options and best practices. Activity 3.2 looks at the integration of individual agroenterprises, seeking to define options for achieving successful linkages to expanding markets and for organization of raw material supply. Finally, Activity 3.3 concentrates on the forms of organization and modes for the delivery of support services to rural agroenterprises. These services include savings and loans, technical assistance, market information and commercialization, and agroenterprise management. Cross-case and cross-country analysis, and interaction with partners in the reference sites, will provide useful information on lessons learned, best practices and different options for the delivery of these services.

Highlights

- Draft review of literature on enterprise organization completed, and future research needs defined.
- The Post Harvest Technology Institute (Hanoi, Vietnam) IFPRI and CIAT completed a study of the root crop starch sector in Vietnam. In addition to policy recommendations for enhancing the role of rural industry in income generation, the study also provided information on enterprise organization in this sector, especially as regards enterprise scale. Following completion of the study, a concept note for a second phase proposal was prepared, which includes organizational innovations to enhance the role of the sector in providing sustainable livelihoods.
- Agroenterprise case studies completed or in progress in Central America, Colombia and Philippines, based on or adapting the methodology developed in the case studies reported in 1998.

Activity 3.1 Design of options and recommendations for the internal organization and operation of existing and new rural agroenterprises

1999 milestones:

3.1.1 Draft review of information on small agroenterprise organization completed

A draft paper has been completed which reviews literature (combined with CIAT experiences) on enterprise organization. This document is being finalized for publication during the final months of 1999, and will be presented at a CIAT seminar in November 1999. This paper also identifies key research issues for the CIAT Agroenterprise project and its partners.

Some of the major topics covered in this review, and the conclusions reached, are:

- Production vs. Marketing orientation. Enterprises need a marketing orientation in order to identify and realize commercially viable opportunities. Traditionally, rural enterprises have had a production orientation, as has agriculture, on which they are based, and many of the services to which they have access. There is a need to reorient small enterprises, and their support services, towards a market approach. This requires a culture change. Methodologies and tools to accomplish this do not yet exist (See Output 1).
- Price leadership vs. Differentiation. The dominant competitive strategy of the agricultural sector is price based, i.e. to out-compete other producers based on price leadership due to high yields and/or low production costs. This translates into large scale production in search of economies of scale. For the smaller agroenterprises reviewed, a differentiation strategy has paid off. Rather than competing on price, these enterprises compete on the basis of producing for market niches due to product quality characteristics, location of production, segment of market, etc. A market-oriented focus on product

differentiation has enabled smaller enterprises to escape from the treadmill of increasing cost competition, and the trend of decreasing commodity prices. Identification of these niches becomes a key element in the strategy (See Output 1).

- Technology. Access to information on technology options, and the ability to select the most appropriate technology, was key to business success in several cases. There is a tendency to invest in equipment that might be more sophisticated than necessary. For example, in Vietnam, return on investment from small-scale starch processing equipment was much higher, and contributed significantly to poverty alleviation, than investment in large-scale starch processing plants (see report below). Information systems that facilitate technology selection are a real need.
- Raw material supply. Although small enterprises are frequently close (physically and socially) to producers of raw material they require, they have problems in sourcing a continuous supply of raw material of a consistent quality. Organizational options for linking enterprises and their suppliers can help improve this situation (See Output 3.2)
- Business structure. Enterprises can be formal or informal, for- or not-for-profit oriented (e.g. cooperatives and associations), small or large in scale. Latin American countries have different legal systems, with different legally recognized enterprise alternatives. During a workshop with IICA in Ecuador on small agroenterprise projects, no consensus was reached on the best legal option for small enterprises. A detailed analysis of the pro's and cons of different alternatives is needed. This would necessarily be somewhat country-specific, due to differences in the legal code. One possible output could be the recommendation of a new legal option for small rural enterprises. This study will be pursued with IICA and PRODAR in Ecuador.
- Business skills. Substantial effort by many organizations has attempted to raise the level of business skills in small enterprises, although much of this has had an urban bias. This has been criticized as being supply lead. When given the opportunity to choose training courses based on vouchers and partial payment of fees, small business owners in Paraguay showed most interest in short, highly focused training that provided practical skills with a fast pay-off. Thus, a fee-based, demand-driven approach to business skills provision in a general sense may be difficult to provide, even when necessary.
- Sustainable enterprise. Much attention has been placed on the development of more sustainable enterprises in OECD countries, ie those where economic success does not come at the expense of the environment nor at social cost. Methodologies and tools such as life-cycle analysis, ecological footprint studies and concepts such as clean production and industrial ecology have been developed as a result. The literature reveals that this trend is focused almost exclusively on large-scale firms in the developed world. There has been minimal attention placed on smaller scale enterprises, or on the developing world. Small-scale enterprises in the developing world are almost entirely absent from this debate.

3.1.2 Research needs and partners identified

From the above review, several potential research areas and products were identified, which are important to the topic of internal enterprise organization, and where the CIAT Agroenterprise project, in collaboration with partners, is well placed to make a contribution.

Identify best practices:

- Raw material supply schemes for small enterprises
- Product differentiation for small enterprises
- Establishment and strengthening of commercially successful non-profit enterprises
- Incorporation of environmental objectives and criteria into enterprise decision making and operations

Develop decision support tools for selection of options:

- Enterprise legal and organizational structure
- Enterprise scale

Develop methods (and manuals, guides or other tools):

- Strengthening market orientation of small enterprises and rural communities (including strategies for risk management, negotiation skills, information search etc.)
- Development of business plans appropriate for small rural enterprises
- Development of marketing plans and strategies appropriate for small rural enterprises (see Output 1.3)

Organized information:

- Alternative trade contacts (see output 1.2)
- Database of enterprise case studies, reports etc., for consultation

Research questions:

- Has an enterprise focus on alternative markets been effective in achieving environmental and social impact at micro-regional level?
- Will a competitive strategy based on product differentiation (segmentation, niche marketing) be more suited to small rural enterprises than one based on price leadership (production efficiency, generic commodity production)?
- What circumstances or situations give advantages to small-over large-scale rural enterprises (crops, products, markets, locations, social situations, external environment, etc)?
- Is lack of legal status (i.e. informality) a barrier to agroenterprise establishment, expansion and success?
- What forms of small rural enterprise internal organization enhance the prospect for sustainable development (i.e. where economic success is compatible with equity and environmental sustainability).

The case study approach has proved useful in identifying many of the topics/products listed above. While several case studies have been carried out during the last three years, a more comprehensive review of cases is needed to extract the lessons learned and best practices. While some project proposals have been presented, with partners, that will help to address this in Latin America, it is essential that a greater and more systematic effort is made to gather existing case studies and to execute new case studies.

In Latin America, PRODAR is a key partner in this research, along with the national networks of institutions in each Latin American country. A demand has been observed among the international NGOs to document and systematize their experiences in rural agroenterprise organization and development. This could help meet the need for a more comprehensive approach to case studies outlined above. A partnership is developing with IICA-Ecuador, based on future plans for rural enterprise development in Ecuador, and the existence of a database of small enterprise activities funded by a FODECO credit scheme, which could serve as the basis for deeper analysis of enterprise organizational issues. In Asia, the UPWARD network is a key collaborator, with case studies now under way in the Philippines. Potential partners have been identified in Central America, if project funding materializes during 2000.

3.1.3 Individual enterprise case studies in Latin America and Asia completed

During 1998 an analysis of eight agroenterprises in the Andean region of Latin America, oriented towards export markets, was completed. In 1999, a paper based on this study by Lasso and Ostertag was presented and discussed during an electronic conference of INFOANDINA (on rural agroindustry development in Latin America).

In Asia, a series of enterprise case studies was initiated in collaboration with UPWARD, a network for users-perspective research, associated with CIP. Cases included represent differing degrees of institutional involvement with the enterprise development process, ranging from heavy project involvement (involving support to a cassava drying and chipping enterprise in Leyte) to cases where external support has been

negligible (eg snack food production near Los Baños). These studies will be completed in 2000. The study is jointly financed by CIAT and UPWARD, and will result in a MS thesis in association with the University of Philippines at Los Baños (UPLB).

Based on the case studies of export-oriented agroenterprise reported above, case studies of three agroenterprises oriented towards national markets were conducted, two in Honduras and one in Costa Rica. Cases were sought that were associated with alternative or ethical markets, that were feasible for data collection and that, in one case, it involved the initiative of women.

The three cases in Central America were:

- COHORSIL: Honduras. Marketing of agricultural inputs, coffee and vegetables. Processing (drying) of coffee.
- Jugar del Valle, S.A., Costa Rica. Organic (certified), selected and packaged vegetables, and organic fertilizer. Also supplies training services.
- CICAL, Honduras. Processed fruits and vegetables: pickles, preserves, jams, etc.

Based on the previous study, the analysis considered the following elements:

- Context in which the enterprise was founded, and the support conditions present.
- Organizational structure, leadership and decision making mechanisms
- Products, raw material and process
- Marketing: contacts, segmentation, strategy, orientation
- Business orientation, financial management, growth strategy

Compared with the previous study, greater emphasis was placed on the availability and use of financial information by the managers of these enterprises in their decision-making process.

The major key success factors identified in these cases were:

- Enterprise creation was due to the initiative of the founders, not of outsiders.
- Identification of one very profitable activity that can support development of others.
- Motivation due to realization of the need for enterprise development in order to improve welfare, especially for the women's group in CICAL.
- Leadership from within the founding group
- Decision taking following group participation
- Products with good demand, high quality, attractively presented and safe (with necessary licenses)
- Good organization of raw material supply
- Use of technology appropriate for the scale of the enterprise
- Participation in trade fairs
- Specialization (overtime) in certain market segments, e.g. supermarkets, restaurants.
- Consumer education on product attributes through labeling, to differentiate from competition.
- Simple administrative structure (manager and accountant), but capable of growing with the enterprise to take on new functions (e.g. marketing).
- Use of financial information to take management decisions, develop strategic vision and in negotiations with clients and creditors.
- Growth strategy with vision of vertical integration, especially for raw material supply to ensure continuity over time.

The results of this study are contained in a report "Analysis of key success factors in rural Agroenterprises – case studies on enterprises oriented towards national markets" by Mireille Totobesola, September 1999 (in Spanish).

3.1.4 Vietnam cassava starch industry project completed

The study of the Vietnamese root crop starch sector, with IFPRI and PHTI, Hanoi that was mentioned in the 1998 Annual report was completed in November 1998. Summary results are reported here, and also by IFPRI.

The study examined the entire root crop starch sector of Vietnam, involving a national survey of starch processors, traders and end users, as well as with community leaders in key processing regions. From the survey results, a model was developed which permitted an evaluation of possible policy changes on the sector, and on the rural population. The results of this study are partly reported here, and partly in Output 3.2, where linkages between processors, traders and users are discussed. A full report was presented to the donor (Post-Production Small Grants Fund, financed by IDRC, see Output 5).

Results at level of individual enterprises:

Starch processors: It is notable that the number of starch-processing enterprises has grown greatly in Vietnam since the economic opening commenced in 1986. Most of these are very small scale, however. Of the 339 starch processing enterprises surveyed, only 10% produced more than 10 tons of wet starch per day, with 49% producing less than 1 ton per day. These are household enterprises, often with other sources of income from crops and livestock. At this scale, starch processing represents an income and livelihood diversification strategy (except in some specialized households in major processing villages in north Vietnam, where starch is the dominant income source). Household scale enterprises often own little equipment themselves. Cassava graters, milling and sifting equipment, etc is hired from individuals who thus provide a fee-based technology access service to households who are too poor to purchase their own equipment. Small-scale enterprises operate more days per year than larger factories (169 days peak and off-peak production vs. 128 days). Many of these small scale enterprises cannot access adequate credit through the formal banking system: 90% of processors said that the reason for this was related to lack of collateral, or administrative problems at the bank, while only 8% mentioned high interest rates as a disincentive. Small-scale processors cited waste-water pollution as their major problem (22% of the total sample, but rising to 40% in the Red River Delta near Hanoi, where processing villages are concentrated sources of pollution). Starch processing is thus a dynamic sector (especially in the Red River Delta and NE South regions), strongly linked to rural development (providing more than 55% of income of surveyed households) and, more recently to export markets (21,000 ton starch exported in 1998). The per capita income of households engaged in starch processing (\$358) is more than double that of the average rural household (\$170). Constraints identified are:

- Low level of technology in small scale enterprises, resulting in poor quality starch product with low efficiency of production.
- Limited access to credit
- High raw material costs, due to low productivity of cassava
- Pollution from waste water

Some interesting findings relating to enterprise scale emerge from this study (Table 3.1). Although the large factories have higher profit margins, the smaller enterprises do show some areas of comparative advantage: notably, they have much higher capital-output ratios, operate for more days per year, and obtain cheaper cassava root raw material. The higher output: capital ratio is due to the reliance of smaller enterprises on manual labor rather than on capital equipment, and the fact that many of them rent equipment as needed. The proximity of small-scale processing operations to cassava producers, often in the same village or family, gives them an advantage in sourcing the raw material over large factories, which need complex supply networks, especially considering the highly perishable nature of the raw material and the poor road infrastructure. Thus, smaller scale enterprises are able to work more days per year and obtain raw material at a lower cost than larger factories. Indeed, the director of the largest factory (VEDAN) reported that it was more advantageous for his firm to purchase wet starch from small processors, than to transport fresh roots to his factory. VEDAN is thus focusing on added-value starch products, not in the manufacture of the basic product.

Table 3.1. Key information on starch processing enterprises, by scale of operation

	Micro	Small	Medium	Large
% of enterprises surveyed (n = 339)	49	26	14	10
Starch production/day (ton)	<1	1-5	5-10	>10
Operational days/yr (peak + off-peak)	169	168	122	118
Equipment assets (US\$)	60	104	1,365	363,000
Output-capital ratio	9.3	-	-	0.6
Profit margins (%)	16	17	12	23
Cassava raw material price (dong/kg)	285	300	332	391
Raw material cost as % of total production cost	94	-	-	86

Source: Report: starch industry development as a strategy for agro-food based rural industrialization. IFPRI-CIAT-PHTI 1999

End users: the survey also covered 235 enterprises that use starch as a raw material for production of added value food and non-food products. In Vietnam, this comprises two distinct industry typologies (table 3.2):

- household enterprises (83% of the sample surveyed) that use starch to manufacture a wide range of traditional food products, often of poor and variable quality;
- larger commercial firms (private and state enterprises, joint ventures, etc) in a wide range of industry sectors, making products in which starch may be either a major or minor raw material.

Table 3.2. Enterprise types and their legal registration

Enterprise type	% of sample	Legally registered	Not registered
Household	83.4	14	182
Vietnamese owned	8.5	20	0
Foreign owned	0.4	1	0
VN state owned	5.5	13	0
Joint venture with state	1.3	3	0
Cooperative	0.9	2	0
Total	100	53	182

Only 7% of the household enterprises were legally registered, but 100% of all other enterprise types were registered. Household enterprises were mostly dedicated to the production of noodles, maltose and other traditional food products. These three business areas accounted for all but four of the 196 household enterprises surveyed. On the other hand, the larger scale enterprises were found in a wide range of sectors, including pharmaceuticals, textiles, adhesives, plywood, packaging paper, paper, glucose and starch fermentation products (including MSG). Only 5 of the 39 larger scale enterprises operated in the same business areas as the household enterprises. It is important to note that the household enterprises are using starch as major raw material, whereas for some of the larger scale business areas, starch is a minor raw material (eg. Pharmaceuticals, textiles).

Trends in procurement of starch were investigated, to determine which of the business areas were most dynamic, and how the traditional household enterprises compared with the larger, more modern and more diverse firms. Table 3.3 shows that household level enterprises do produce products for dynamic markets, especially maltose, and that some products of larger scale enterprises do not appear to offer growth opportunities for starch as a raw material (eg. textiles and paper). However, most household enterprises are engaged in noodle manufacture, which shows relatively restrained growth to 2000. In maltose, the smaller scale enterprises face competition from a few larger enterprises that are now appearing, with higher grade products. If household enterprises wish to expand their operations, they will need to deal with product quality issues and with the lack of legal registration, which could be a barrier to growth in the future.

Table 3.3. Trends in average procurement (ton per enterprise) of different starch types for each business area, for 1996 and 1997 with projections to 2000.

Business area	Starch type	1996	1997	2000	% increase 1996-2000
Traditional household enterprises					
Maltose	Wet	372	434	503	35.2
Maltose	Dry, 1 st class	70	49	173	147.1
Noodles	Wet	6.5	7.1	8.1	24.6
Other food	Wet	13.4	13.6	14.5	8.2
Larger scale enterprises					
Pharmaceutical	Dry, 1 st class	591	731	897	51.8
Adhesive	Dry, 2 nd class	8	10	15	87.5
Packaging paper	Dry, 1 st class	28	30	106	278.6
Paper	Dry, 1 st class	396	414	452	14.1
Glucose	Dry, 1 st class	1250	1500	3500	180.0
Textiles	Dry, 1 st class	273	288	300	9.9

Further findings of this study, related to linkages between starch processors, traders and end users, are reported under Output 3.2.

Documentation:

IFPRI, CIAT and PHTI. 1998. Starch industry development as a strategy for Agrofood based rural Industrialization in Vietnam: final project report. (Summary report and 2 volumes of Annexes).

Francesco Goletti (IFPRI), K. Rich (International Trade Commission), and C. Wheatley (CIAT), "The development of the starch industry in Vietnam as a strategy for rural income growth and poverty alleviation" paper presented at the American Association of Agricultural Economists, August 1999.

3.1.5 Project proposals prepared

- (1) A concept note was prepared for a larger, second phase project, entitled "*Improving rural livelihoods through sustainable development of the cassava starch sector in Vietnam*" involving CIAT, IFPRI, PHTI, IAS and the Department of Agricultural Policy and Rural Development of the Ministry of Agriculture and Rural Development, Vietnam. The outputs proposed for this project are:
 - Specific policy recommendations for promotion of an equitable, environmentally sustainable and commercially successful root crop starch sector in Vietnam.
 - Networks of innovative small agro-enterprises in the starch value chain, linked to growth markets, in two selected areas of Vietnam, together with a sustainable enterprise support system
 - Sub-sector enterprises and support system linked to international sources of expertise and information networks.

The concept note is being presented to potential donors, and a full project will be developed if interest is found.

(2) A proposal was submitted to FONTAGRO for financing in May 1999, in a project lead by CEGA (Centro de Estudios Ganaderos y Agrícolas), and involving CIAT and RIMISP (Red Internacional de Metodología de investigación de Sistemas de Producción), Chile. The proposal is *Determinantes del desempeño exitoso de organizaciones económicas rurales en América Latina*. This envisages a series of cases entitled "studies of small farmer economic organizations"; ie rural associations, cooperatives or other group organizations with economic objectives. The status of this proposal is still pending.

(3) A small proposal was submitted to the Chorlavi Fund in September 1999, in partnership with CORFOCIAL. If funded, this will allow CORFOCIAL to undertake a systematization of the experiences of those CIALs in Cauca, Colombia, that have started microenterprise activities based on seed multiplication

or produce marketing. The Agroenterprise project will work with the Participatory Research project in supporting CORFOCIAL in this project. The project will also assist these CIALs in visioning and planning the future development of their enterprises. The proposal is entitled *"Realizando sueños empresariales en el campo: auto-sistematización de las experiencias empresariales existentes de los CIAL del Cauca, Colombia como herramienta de apoyo a la construcción de sus visiones futuras"*.

(4) In August 1999 the Swiss Cooperation Agency in Nicaragua asked for tenders for a project to support, at meso (institutional) level, agricultural marketing and transformation in Nicaragua, Honduras and El Salvador. In partnership with local and national institutions in these countries, with CIAT's Central American team and with PRODAR, the Agroenterprise Project tendered for this project. The initial tender was for a four-month period, to prepare a proposal for a 3 year Phase 1. During this initial four-month period, the CIAT bid envisages a concerted effort in the three countries to inventory cases of agroenterprise success (including support services as well as the enterprises themselves), and undertaking select case studies based on this inventory.

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Output 3.2 Designs of options and recommendations for enterprise linkages in the agribusiness chain

1999 milestones:

3.2.1 Draft review of information completed

The relationships between enterprises in the Agri-food sector can be viewed from two perspectives:

- That of a chain, proceeding from agricultural production through storage and processing, to food manufacturers, or marketing of fresh produce, to retailers and consumers. This is a linear view, commonly summarized in the concept of a "food chain".
- Alternatively, enterprises can be viewed as components of systems, in which a web of complex inter-relationships and linkages between enterprises in the same sub-sector (e.g. milk products, or root crops) are found. In this view, ancillary and support businesses (eg equipment supply and repair, provision of market information) are also included within the system. Terms used to describe this perspective are "enterprise clusters, networks and industrial districts". In addition, this perspective is compatible with the growing interest in "industrial ecology", where, for example, the wastes of one enterprise become the raw material for another.

The linear view encourages the separation, in the development process, of the enterprises directly engaged in transforming or marketing agrifood products, from those enterprises that provide support services to them (and which do not form part of the chain). The systems view sees the two as inter-linked and part of the same system. This has important conceptual and practical implications at development level, and implications for research.

The food chain perspective: channel integration:

The agrifood sector of the global economy, in parallel with many others, is undergoing relatively rapid concentration at all levels. In the developed world, a handful of supermarket chains dominate each national market, and a few branded foods (and retailers own-label products) dominate most product categories. Major commodities are traded by very few firms, and scale increases in agriculture, and concentration in input suppliers (eg seed firms) is proceeding apace. In addition, the agrifood sector is increasingly vertically integrated, and this is developing faster than in most other sectors of the economy. The drivers for this channel integration are:

- The dominant power of the multiple retailers, due to their ownership of information on consumer purchase habits at point of sale.

- The growing importance of quality and food safety in purchase decision-making by manufacturers and retailers. The spot market, and price alone, are no longer sufficient. Longer-term relationships between firms in the chain, and the trust and confidence this engenders, can give a competitive advantage in sourcing quality products and ingredients.
- Product differentiation as a competitive strategy: retailers find advantages in assisting product development of manufacturers and even growers/farmers, in the search for products with a difference (e.g. schemes in which retailers assist growers to make the transition to organic agriculture in Europe).

With globalization, food chains are increasingly international in scope. Retailers in Europe source products from the developing world, and expect the same standards of food quality and safety, and of continuity of supply that they obtain from suppliers in the home market. Thus, vertical integration, or at least the development of longer-term trading relationships based on trust and confidence, in the developing world are being driven by these same private sector forces. Urbanized societies in the developing world (e.g. Latin America) will increasingly follow the same trend in their national markets, especially as the multiple retailers increase their total share of the food market.

One visible result of these changes is the increase in the use of contracts between growers, food manufacturers and retailers in Latin America. Typically, price, volume and quality specifications will be agreed well in advance of harvest (often at time of planting). The contract may also include provision of inputs or credit for the grower by the other party, both to ensure adequate supply/quality and to tie the producer to the other party through the interlocking of these input and credit markets with that of the product itself. The success of these arrangements is mixed, especially where lack of adequate monitoring and enforcement regimes may encourage one party to sell on the open market at higher prices. The successful use of contracts requires both a well functioning enforcement regime, and the realization that the benefits of long-term relationships outweigh any short-term advantage from breaking the contract. The construction of trust between parties in the contract is critical. This may be a long-term endeavor when the parties are culturally and economically very different (eg between an urban supermarket chain and a group of small indigenous peasant produce-growers).

Systems view

The enterprise development literature over the last decade displays a fascination with enterprise clusters, networks and industrial districts. From the concentration of small, innovative and highly successful textile and clothing sector enterprises in northern Italy, to the effervescence of high-tech start-up firms in Silicon Valley, California, the potential of a dense network of inter-relationships (formal and informal) between enterprises in a related sector in one geographical area to be highly innovative, has been observed and studied. Similar concentrations of enterprises are found in the developing world, but not always with the same relationship to innovation and success. In Asia, it is common to find rural villages specializing in production of a specific snack food (or handicraft). In Vietnam, small-scale, cassava-starch processing has been concentrated in small villages near Hanoi for many years (see below), while similar clusters are found in China for sweet potato starch enterprises.

Two important features of these enterprise systems are geographical proximity and cooperation between enterprises (formal or informal), and a terminology based on this has been developed.

	Cooperation between enterprises	
	Yes	No
Geographic concentration	Industrial district	Cluster
Not concentrated	Network	-

The enterprise systems in Northern Italy and Silicon Valley are, under this definition, industrial districts, while the starch processing villages of Vietnam are clusters, since cooperation between enterprises is mostly lacking. Networks, where cooperation occurs in situations of dispersed enterprises, are facilitated through recent communication development (e.g. the Internet). More recent studies in Indonesia have identified both stagnant and dynamic clusters in rural Java. Dynamic clusters are those linked to growth markets (e.g. batik textiles for tourists) where enterprise cooperation around innovative design is a major feature of success. Traditional snack foods represent an example of stagnant clusters, in Java. R and D support to stagnant clusters may be wasted unless linkages to growth markets, that drive innovation

forward, can be made. An approach has been developed based on these findings, termed “collective efficiency” and which focuses on enterprise development through innovation based on:

- A market or customer orientation
- A collective or *meso* level approach (interventions at support system, not individual enterprise levels)
- Encouraging a cumulative or sustainable capacity to upgrade and improve (ie no long-term dependency on external projects).

3.2.2 Research needs and partners identified

These results lead to several potential areas of future research for the Agroenterprise project and partners.

Identify best practices:

- For contracts suited to rural agroenterprises (as both purchaser of raw material and supplier of intermediate or final products)
- For developing viable rural small enterprise linkages around the concept of “agroindustrial ecology”, where efficient resource utilization, turning wastes into products, clean production etc result in an ecology of inter-linked, sustainable enterprises.

Develop decision support tools:

- For designing effective and equitable linkages between small, rural agroenterprises and larger commercial enterprises in the food industry (e.g. for small enterprises to collaborate in supplying a large market opportunity)
- For optimizing location of new agroenterprises in existing or expanded agri-food systems at micro-regional level (integrating GIS and models with agroenterprise information) (See Output 4.3).

Develop methods, (and manuals, guides or other tools):

- For enhancing innovation in rural agroenterprise clusters/districts/networks

Organized information:

- Database of cases of rural agroenterprise system linkages
- Database of rural enterprise clusters, networks, districts and ecologies, and of innovations and interventions associated with them

Research Questions:

- What are the types and magnitude of the transaction costs faced by small rural enterprises in developing countries? How do these affect the nature of inter-enterprise linkages that are formed? How can these costs be reduced?
- How fast, and at what levels, is vertical integration proceeding in developing country agri-food industry (for both national and international markets)?
- Is the concept of the agri-food system (rather than an agri-food chain distinct from its support services), that integrates commercial actors and their service providers in a web of material, information and monetary flows, useful in the design of rural agroenterprise interventions at micro-regional level?.
- Does the combination of enterprise cooperation and rivalry increase the rate of innovation in rural agroenterprise networks/clusters/districts (i.e. is the “collective efficiency” approach relevant to rural situations?).
- Is it a waste of time and resources to address technology and business skills issues in dormant enterprise clusters, which need first to be revitalized via links to growth markets?

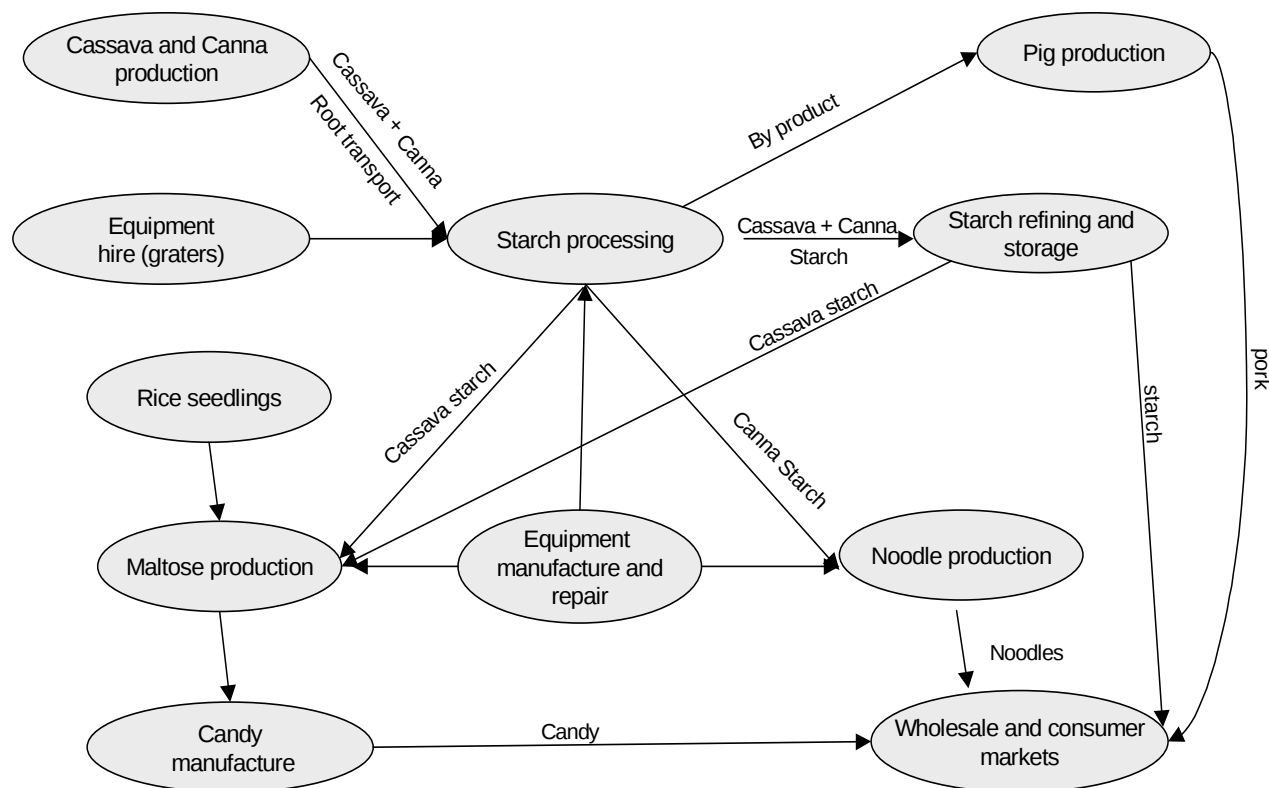
Research on enterprise clusters is starting in collaboration with CIRAD, through an initiative related to Local Agrifood Systems, including those of milk products in Perú (Cajamarca) and cassava starch in Cauca, Colombia. In Asia, the project proposed for cassava starch in Vietnam, with IFPRI and national institutions, adapts the collective efficiency approach to agroenterprise development. Collaboration with the urban agriculture initiative lead by CIP could be relevant.

3.2.3 Vietnam cassava starch industry study completed

Aspects of this joint IFPRI-CIAT-PHTI study (reported in 3.1 above) are relevant to the topic of organizational linkages between enterprises, and are presented here.

In North Vietnam, cassava processing is mainly a household enterprise activity, but a wide range of household enterprises can be identified operating in one area, and exchanging raw materials, end and by-products with each other. This can best be described by a diagram (Figure 3.1). This clearly shows a complex system of diverse components and a web of linkages between them. Some of the system components that might not be captured by a linear food chain analysis are:

- Local equipment manufacturers, who also undertake repair and maintenance. Substantial employment is generated in repair of graters, for example.
- Entrepreneurs who hire out root graters to those processors who have insufficient capital to purchase this equipment.
- Rice seedling producers. Dried rice seedlings are the source of amylase enzyme used in the maltose manufacture process. Production of these seedlings is a specialized activity in some households.
- Livestock (pig) production from the by-products of starch processing.
- Starch storage and refining. Storage of both wet and dry starch extends the processing season beyond that of the cassava and canna fresh root harvests, but requires large amounts of working capital, and is not an option for many processors. Specialized households undertake starch storage as an income generating business. These, and other, households also dry and refine starch for sale to higher value markets (e.g. Pharmaceutical firms).
- Other system component enterprises (fresh root and starch traders, credit providers) are not shown in this Figure.



Adapted from Prain, Wheatley & Duc 1996

Figure 3.1 Cassava and canna starch system in North Vietnam processing enterprise villages.

The results of the starch sector survey reported in 3.1 clearly show that this processing activity is dynamic, with the number and capacity of enterprises growing sharply through the 1990s, although less so in the last few years. In this case, traditional markets are not stagnant (maltose demand is projected to increase strongly, for example), and some links with new markets have been made. For example, traders are now exporting wet starch from these processing villages in north Vietnam to the large scale starch factories in the south. This linkage to a dynamic new market, and the strong demand this engenders, could have profound implications for the system as a whole (including cassava production). Similarly, the recent establishment of a few medium-scale maltose enterprises which use imported amylase enzyme (rather than locally produced rice seedlings) to produce a higher product of more uniform quality, could have great implications for the small-scale maltose sector and, especially, for those households that obtain livelihoods from rice-seedling production.

Documentation; see output 3.1.

3.2.4 Colombia: case study completed

Versalles, Colombia.

One case study was conducted which addressed some of the organizational issues raised above. This is the case of export of *ají Tabasco* (Tabasco chili peppers) from Versalles, Colombia. A firm in Cali which specializes in the export of chili peppers to the USA, was interested in expanding its production base in this region of Colombia. The firm usually contracts production with large-scale growers, but after some negative experiences with loss of significant volumes due to disease and floods, decided that diversification of the production base was advisable. At the same time, a community development NGO in Versalles, also in Valle department, Colombia, was searching for income-generating and enterprise activities for local farmers. The community development NGO also entered into the agreement, acting as an intermediary between the farmers and the exporter. The advantages of this were:

- Reduction in transaction costs for the exporter (who deals with one organization not 20 small farmers)
- Facilitates channeling of technical support and input supplies to small farmers
- Resolves problem of lack of trust between exporters and farmers (NGO seen as trustworthy by both parties)

In the model used, contracts were agreed between the NGO (CORPOVERSALLES) and the exporter, and between NGO and farmers. The exporter provided technical support to the NGO. (both for chili production and for the initial processing step, which adds value locally to the product), which in turn provided technical support to individual farmers. The costs of this support were covered by the difference between the price paid to the NGO and the price paid by NGO to farmers. Thus, the NGO in effect entered the “food chain” as an actor, as well as a service provider. The margin obtained from the difference in price between the two contracts, financed support services which helped ensure quality products, and enabled production to expand.

This example of a case which has operated successfully for more than two years, illustrates the difficulty in separating conceptually a support system from the commercial productive process. Indeed, in this case, their very integration made the support system financially sustainable.

Documentation:

M. Lundy, C.A. Magana and C. Wheatley (1999) *Ayudate que yo te ayudare: una alianza entre productores, ONG y la empresa privada* (Help yourself, and I'll help you: an alliance between producers, NGO and the private sector). Presented at the electronic conference hosted by RIMISP, entitled “Facing globalization: peasant economic organizations in Latin America and the Caribbean”.

3.2.5 Project proposals prepared

The Vietnam Phase II proposal on cassava starch (see 3.1 above) takes a collective-efficiency approach to enterprise development, and proposes to focus on building cooperation between enterprises in existing small enterprise clusters, as a means to foster innovation. Dynamizing market linkages, and facilitating the design and application of appropriate policies, also feature in this proposal. A specific issue to be tackled

is the problem of waste water pollution, where collaboration between enterprises is an essential part of the solution, but which is still lacking.

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Activity 3.3 Synthesis of information, options and recommendations for the organization and delivery of support services for rural agroenterprises (savings and loans, technical assistance, market information and commercialization, and agroenterprise management).

1999 milestones

3.3.1 Draft review of information on agroenterprise support services completed

Support services for agroenterprises can be divided into financial and non-financial services. These latter are often termed business development services. Both types of service were covered in the review undertaken. A major development objective is to ensure that support services are sustainable, i.e. that they will continue to function, innovate and develop long after the end of any project or program that gave birth to them.

Financial service

There is general agreement that significant progress has been made in the provision of financial services to the rural poor during the last decade. Experience throughout the developing world with a variety of microcredit schemes and institutions has resulted in a wide acceptance that such services can be provided. This is based on the realization that the barriers preventing the poor from accessing credit through the formal banking system are not so much due to the level of interest rates, but to the administrative and cultural barriers that such institutions erect. In the absence of access to commercial credit, the poor make use of the informal sector, which charges higher interest rates. Microcredit schemes have therefore positioned themselves with financial products that have interest rates intermediate between those of the formal and informal sectors, and that do not require formal collateral or have other administrative barriers. Instead, group solidarity lending, where peer pressure encourages prompt repayment, is used. The interest rates charged permit such schemes to cover the costs inherent in servicing a portfolio of small loans with a dispersed client base. Some of the more successful schemes have since developed into formal banks (eg BancoSol, Bolivia). A further institutional innovation has been the creation of community or village banks, which are locally owned, and provide savings as well as credit functions.

Some initial reactions to the perceived success of microcredit suggested that this could be the development panacea: in such a minimalist approach, only credit needs to be provided through external interventions. The use to which it is put is not important. Other services will be provided by the market as needed. Under this view, other non-financial services are inefficient, supply-lead and produce little impact. However, recent analyses show that a minimalist intervention strategy is not effective in fostering sustained income and employment growth (as opposed to survival strategies, which it can support).

As far as financial services for agro-enterprises are concerned, the following points can be made:

- Micro-credit can be a useful solution for household enterprises (see Vietnam project report, below), especially if combined with local savings.
- For larger enterprises, where capital investment or working capital needs are likely to exceed the upper limits of micro-credit financial products, a gap in the financial products market often still exists.
- In some Latin American countries, there is a large margin taken by the banks for financial intermediation. This raises the cost of money to small businesses, often above the interest rate at which investment projects are viable. Thus demand for credit may be low.

Family enterprises often face problems in accessing loans from the formal sector. A useful service in this regard is one that assists such enterprises to complete the paperwork involved in accessing formal credit. This may involve several trips to the bank, and incur significant opportunity and transport costs. Services which lower these transaction costs for rural enterprises could be viable.

Non-financial (business development services)

These comprise such services as technology access, technical assistance, training, marketing and market information, and business and accounting skills and services. Typically in the past, many of these were provided by the public sector, free of cost but poor in quality and deficient in coverage. Under the then prevailing production orientation, provision of many of these services was supply led. Following the relative success of microcredit in providing financial services in a sustainable manner, business development institutions are under pressure to devise similarly sustainable ways of service provision, in a demand-led, businesslike manner that will be sustainable beyond the lifespan of any given project. Indeed, it seems only logical that services proposing to improve the business skills of enterprises should be provided in a businesslike way. An important recent Latin American study has analyzed the financial viability of business-development service provision to small enterprises, to identify which type of services are most commercially viable and which will still require subsidy or other (partial) means of support, within a demand-driven framework. This study² concludes that the cost recovery potential of different services varies greatly:

- Marketing services: >100% possible, based on covering costs+ in marketing margin or as a commission on sales
- Technology access >100% (e.g. fees for machine use)
- Accounting and legal services: >100% (fees for services)
- Training >50%, on fees basis, > 100% if built into marketing margin
- Technical assistance: 0-20%
- Information provision: 25-32%

This analysis agrees with two cases presented in this report:

- in Versailles (case study. Output 3.2), full cost recovery of marketing and technical services was possible through the margin that CORPOVERSALLES obtained on the marketing of Ají Tabasco.
- In Vietnam, entrepreneurs provide, as a small business, the technology access service of rental of cassava grating machines to starch processing households too poor to purchase such equipment.
- Thus, the most viable services are, in effect, small businesses themselves.

Many NGOs in Latin America that are involved in supporting small enterprises in rural areas are uncomfortable with the idea that they should get directly involved in product marketing, or technology access services. There is a sense that the support services need to remain separate from the commercial agrifood activities themselves. Other NGOs are already involved in commercial activities, with no regrets. Case studies of such organizations, to identify the lessons learned in managing commercial and non-commercial activities in one organizational setting, are needed. The above points need to be considered carefully in the design and implementation of local support systems that include financial and non-financial services (Output 4).

A range of methods for financing services is possible. It is probable that any single organization will need to develop a combination of these:

- Via a marketing margin or sales commission
- From fees
- Donor support (to address market failures)
- Para-fiscal funds (from taxes at wholesale level, to support R and D of specific agricultural sectors, now operational in Colombia)

Finally, many services are provided informally. For example, traders may supply agricultural inputs or credit. It is important to understand the nature of current service provision in the informal sector (as well as formally) before attempting to provide “new” services.

² Source: Goldmark L (1999) Small enterprise development 10 (2) 4-16

Role of social capital.

Social capital is the capital invested by people in their relationships with others and comprises the trust, confidence and shared values and norms found in a well-functioning society. Trust is obviously an important element in enterprise success, since exchange transactions between economic agents are dependent on this. Several studies have found a direct relationship between high levels of social capital and both economic development and enterprise success in the developed world. Societies with a wide radius of trust will have an advantage in commercial transactions involving economic agents from outside the immediate rural community. Thus the organization of the wider community, and the nature of its links with the wider world, affect the performance and development of a rural enterprise. The level and nature of social capital has also been proposed as a key factor influencing enterprise scale. Enhancing social capital in communities would be of value to agroenterprise development, as well as for many other reasons. Services provided to the wider community that enhance the social capital and the functioning of civil society will also be important for the creation and strengthening of agroenterprises.

Documentation:

Draft review paper, (See Output 3.1)

3.3.2 Research needs and partners identified

Based on above information the following research needs have been identified:

Identify best practices

- To develop sustainable support services through complementing existing service providers in the rural agri-food system.
- For sustainable, demand-driven financing of the range of services required by small rural agroenterprises.
- For making effective use of new information technologies in service provision.

Develop decision-support tools

- To determine organizational structure most appropriate for sustainable service delivery and cost recovery

Develop methods (and manuals, guides, or other tools)

- For understanding existing formal and informal ways in which services are provided to rural agroenterprises at micro-regional level
- For re-engineering service providers towards a demand-driven, market orientation.
- For developing business plans, and marketing plans and strategies for non-financial service providers
- To identify and satisfy effective demand for agroenterprise services (implies activities at enterprise as well as service provision level)
- For describing (or measuring) social capital at micro-regional level, as relevant to enterprise establishment, growth and sustainability.

Organized information

- Database of cases of sustainable service provision

Research Questions

- Which services for small rural agroenterprises are viable business propositions, and which will require some provision of public sector or other support to address market failure to provide these services?
- Should non-profit service providers (with social objectives) engage in for-profit activities (i.e. as actors in the production-processing-marketing process)?
- Are R and D interventions most effective and efficient at *meso* level (i.e. through service providers) rather than at the level of individual agroenterprises?

- Are high levels of social capital causally related to the development, expansion and success of rural agroenterprises, and does social capital influence enterprise scale in rural agroenterprises?

Members of PRODAR are key service providers to agroenterprises in many countries, and are both partners in research and clients for the results. Members of reference site consortia are partners in this research, also as service providers. International NGOs involved in agroenterprise support programs and projects are also potential partners, especially for case studies of service provision, to identify best practices.

3.3.3 Supply and demand study of support services in the Andean region completed and disseminated

Products of the Andean regional study of supply and demand for support services ready to be placed in the Project website and document presented in electronic conference.

During 1997 a study was designed with the objective of “identifying and characterizing the supply of and demand for support services by institutions that design and implement rural agroenterprise development projects in the Andean region of Latin America”. In 1998 the study and analysis was completed, and in 1999 the three products of the study were placed in the project’s website that will soon be released. These three products are:

- A directory of institutions that offer support services for rural agroenterprise development, including contact information, mission, the supply of support services by theme and area, products in which the institution has expertise, and training courses offered.
- The final report of the project, which presents the methodology used and a critical analysis of it, an analysis of the services offered and those requested (i.e. service demand) by the institutions, the identification of the gaps where additional services to the institutions could be developed, and main conclusions.
- A searchable database of institutions, which was already distributed by demand to Intermediate Technology Development Group, ITDG, in Perú and Fundación Polar in Venezuela. Fundación Polar was interested in applying the survey to a larger number of institutions in Venezuela who was poorly represented in the study.

Additionally, a paper was presented at the Electronic Conference “Retos de la Agroindustria Rural en el Contexto de la Globalización”, organized by CONDESAN and PRODAR on July 1999.

Riveros, H. and Gottret, M.V. 1999. “Los Servicios de Apoyo no Financieros a la Agroindustria Rural en los Países Andinos de América Latina”. Paper presented at the Electronic Conference “Retos de la Agroindustria Rural en el Contexto de la Globalización, July 1999.

3.3.4 Colombia: Case study completed

COAPRACAUCA, Colombia

As one component of an integrated cassava research and development project in Cauca Department (See Output 4.2) a case study was conducted by a consultant (Zulma Roa Díaz) in November and December 1998 on the cooperative of starch processors (*rallanderos*). This organization, which was founded in 1981 with 12 members (and received legal status in 1984) has had problems in maintaining membership, and in marketing a significant volume of starch produced in the region. In 1998, the cooperative had 30 members, while the total number of starch processors in the Cauca area was 140. This study was designed to identify the reasons for the relatively poor performance of the cooperative to date, and to suggest ways to improve existing services and to assess demand for other services from the membership and wider community. A total of 21 people were surveyed, using a semi-structured interview guide with 18 starch processors (comprising 5 cooperative members of long standing, 5 ex-members, 2 new members and 6 non-members), plus 2 intermediaries and 1 equipment provider.

In spite of being the result of the initiative of the starch processors themselves, this cooperative has not succeeded in becoming a representative of the sector. Despite the general agreement of all processors in

the need (in theory) to organize and cooperate, in practice a marked individualism and distrust has prevented this from occurring. Two groups of processors were identified with different objectives:

- Large and medium enterprises, with profit maximization and growth objectives
- Small enterprises, with the objective of survival of the household unit over time (reproduction)

Small enterprises seek to minimize risk and need fast results, while larger enterprises can afford to take risk and can manage longer time horizons for investments to bear fruit. These different objectives have led to divisions within the cooperative in the past.

From its inception, the cooperative has faced problems of insufficient working capital to enter the starch market as a major intermediary and this also resulted in delays in paying processors for starch sold through the cooperative. Recently, finance was obtained through a local fund (Fondo Emprender) that should have helped to resolve this problem. However, according to existing and past members, the cooperative remains a minor player in the starch market. Additional complicating factors identified in this study were a rigid and centralized administrative structure combined with a low and passive level of member participation and sense of ownership. Faced with these problems, the cooperative has failed to compete effectively with existing starch traders. This has generated a climate of disbelief among members with respect to this, or other, services that the cooperative may offer.

Based on the results of this survey, the following elements of a strategy to energize the cooperative to meet the needs of members (and potential new members) were proposed:

- Increasing the level of participation from members and non-members
- Reduce operating costs
- Expand starch-marketing activities
- Search for additional financial resources

The existing services offered by the cooperative are:

- starch marketing (as marketing intermediary, taking a margin on sales)
- assistance with obtaining credit, including help with paperwork involved

Additional services requested by members during the course of this survey were:

- Price information (for cassava roots and starch)
- Contribute to solution of waste water pollution problem (technical and lobby/representative roles)
- Organization of raw material (fresh cassava root) supplies.
- Cassava starch quality control (laboratory financed by fees)
- Support to local equipment workshops for training, and generation of technological innovations, and improved communication with research institutions.
- Technical assistance and training by other institutions, facilitated through the cooperative, especially in the areas of starch quality and cassava varieties.
- Input provision (for cassava production and starch processing)
- Improved services for obtaining credit

In addition:

- Local starch intermediaries expressed interest in services related to information and commercial contacts for major national urban markets, and for export, and assistance with export procedures.
- Equipment suppliers requested training for their workers in equipment manufacture and maintenance (this is wider than the starch sector), and credit to finance equipment design.

Non-members also requested access to services of the cooperative. Thus, demand for additional, specific services exists among both members and non-members. Mechanisms that can provide these services on a sustainable basis need to be addressed by the cooperative.

Other components of this project have involved some of the actions mentioned in this study. CETEC, one of the NGO institutions supporting COAPRACAUCA, has been active in re-engineering the legal and organizational structure of the cooperative during 1999, to meet some of the needs outlined above. In addition, increased financial resources are being generated, and a new service (organization of raw material supply) is shortly to be offered. The cooperative has taken a leading role in representing the starch processors in forums where the regulation of wastewater discharges by the industry is discussed. Such discharges are shortly to be taxed. This is providing a strong incentive for starch processors to cooperate. The cooperative has been successful in taking up a lobbying role for the sector, as well as being a leading player in the search for, and future evaluation of, technical solutions to waste water pollution.

Documentation:

Roa Diaz, Z. (1999) Organization and cooperatives: a case study of the cassava starch cooperative in Cauca, Colombia, COAPRACAUCA. Internal project report, CIAT (Spanish).

3.3.5 Project proposals prepared

- The proposal for supporting marketing and transformation of agricultural produce in Central America, detailed in Output 3.1, is focused on actions at *meso* level, i.e. at the level of organizations that support and provide services to agroenterprises. The proposal includes, as part of the project preparation phase, case studies of successful service providers in the region.
- The proposals prepared for submission to USAID and IAF (see Output 4.2) for the development of local agroenterprise support systems in Versalles y Cauca, Colombia, drew on inputs from the experiences reviewed in Output 3.3.

Contributors: Christopher Wheatley, Verónica Gottret, Mark Lundy (CIAT), Hernando Riveros (PRODAR), Zulma Roa (Consultant)

Collaborators: Ricardo Ruiz (CETEC), José Manuel Trujillo (COAPRACAUCA), William Cifuentes (CORPOTUNIA)

Output 4: Institutional models and policy options for the establishment and strengthening of rural agroenterprises and their support systems at the micro-regional level

The objective of Output 4 is to generate appropriate models, instruments and policies to facilitate the process of establishing a sustainable agroindustrial system at the microregional level. These systems are composed of dynamic, market-oriented agroenterprises and businesses and appropriate local support services, both of which build upon local leadership and external support. In the process of building the local agroindustrial system, it is important to maintain an updated business portfolio and to design and execute the corresponding research and pre-investment projects. Activity 4.1 focuses on studying methods for organizing and integrating, around a given product or commodity, the production, post-harvest processing and marketing functions with an appropriate organizational structure and institutional support. Activity 4.2 centers on the design and strengthening of an appropriate support system for the development of rural agroindustry within a given region. This support system includes local support services (see Output 3), including support for new business ideas, and a local mechanism for identifying, setting priorities and developing market opportunities by means of the execution of research and development projects. Activity 4.3 moves from the microregional level to consider aspects related to replication, scale-up and extrapolation of the results obtained in Activities 4.1 and 4.2. Of particular importance are the implications for regional or national interventions (policy, provision of services, technology development, human resource development etc.) in support of sustainable development of enterprises at the local level.

Highlights

- A conceptual framework and a methodology for the design of integrated agroenterprise development projects (IAPs) was further developed through the preparation of a draft which has been used as the basis for discussion with partners, and to initiate the implementation of the methodology at the microregional, regional and national levels.
- Guidelines for the design of local support systems for rural entrepreneurial development, and the conceptualization of an operational scheme for the provision of support services, were well advanced this year. A draft document, outlining the conceptual framework and guidelines for putting a local support system into place, was developed, discussed and modified in collaboration with a range of our partners. Projects have been prepared to test, adjust and validate the proposed schemes, and the process has been started at two of CIAT's reference sites with the holding of workshops.
- The Community Watershed Management, Sustainable Smallholder Systems, Land Use and Rural Agroenterprise Development projects obtained strategic research funds to integrate their efforts in the development and application of user-friendly methodologies for incorporating GIS and economic models for the identification of locations for sustainable agroenterprises in CIAT's ecosystems.

Activity 4.1 Design of conceptual frameworks and methodological options for organizing and integrating production, processing, and marketing functions for the establishment and/or strengthening of rural agroenterprises

1999 milestones:

4.1.1 Methodology for the design and development of integrated agroenterprise development projects (IAPs) further developed

The process of methodology development started in January with internal meetings of the project team in order to make a preliminary outline of the steps for participatory diagnosis and design of Integrated Agroenterprise Development Projects (IAPs). Based on this outline, a methodological workshop was organized and held at CIAT on February 3-4 1999 with the participation of project partners from a diverse range of institutions. Participating institutions included the local consortiums from CIAT's reference sites (CIPASLA, CLODEST, and CODESU-DEPAM), local development Corporations (Corpotunía and Corpoversalles), national research institutions (CEGA, Corpoica), national and international programs, projects or corporations for rural entrepreneurial development (PRODAR, PADEMER, Corpomixta), universities, local governmental institutions and NGOs. CIAT outposted staff working on rural

agroenterprise development in the reference sites also participated in the workshop, as well as staff from other CIAT projects (PE-3, PE-5, SN-3) working in those sites.

The Methodological Workshop

Background

Through dialogue with partner institutions in the area of rural development, and the result of impact studies conducted by CIAT, the importance of rural agroenterprises as a mechanism to contribute to poverty alleviation in rural areas has become evident. However, there is an absence of clarity and consensus about how rural development should be approached given the changed circumstances with respect to development models. In particular, there is a lack of systematization of previous experiences and of an agreed methodology to promote the strengthening or establishment of rural enterprises. Clear methods, tools and institutional models are needed to design and execute successful rural agroenterprise projects that truly achieve an integration of market opportunities and postharvest technologies with environmentally sound production and processing practices.

Objectives

The overall objective of this workshop was to take a first step in the design of methodologies for rural agroenterprise development, by building on the experience of various institutions that have been working in this field over the past years. The workshop was focused on two areas, which were identified as critical for the achievement of a sustainable development of the rural agroenterprise sector:

- Integrated Agroenterprise Development Projects (IAPs)
- Support Systems for Rural Agroenterprise Development

The specific objectives of the workshop were:

- To provide an opportunity for the exchange of ideas and experiences on the theme of rural agroenterprise development, among a group of people from different institutions, and working in different countries of Latin America, and
- To define through consensus a methodology for the participatory diagnosis and design of Integrated Agroenterprise Development Projects (IAPs) and Support Systems for rural agroenterprise development at the (micro) regional level.

Presentations

The workshop started with five presentations:

- Introduction and presentation of CIAT's Rural Agroenterprise Development Project by Rupert Best, CIAT
- A vision of the Rural Agroenterprise Development in Latin America by Carlos Ostertag, CIAT
- Experiences and vision of Corpotunia on Rural Agroenterprise Development by William Cifuentes, Corpotunia
- Experiences and vision of Corpoversalles on Rural Agroenterprise Development, by Mark Lundy and Carlos Hernández, Corpoversalles
- Elements for rural agroenterprise development: Integrated Agroenterprise Development Projects (IAPs) and Support Systems (a methodological approximation) by Veronica Gottret and Carlos Ostertag, CIAT.

The first 4 presentations are summarized in the report on the workshop. An outline of the methodological approach to rural agroenterprise development, the last presentation, is included here.

Elements for rural agroenterprise development: Integrated Agroenterprise Development Projects and Support Systems

A methodology is proposed for rural entrepreneurial development based on the establishment of local support systems that offer financial and non-financial services (marketing, technical assistance, management skills development, legal advice, access to information and communication, organization strengthening, etc.). Within the system, financial and non-financial services would be provided by different institutions that operate in coordinated manner. A possible structure for the coordination of both services is suggested. The users of these local support systems would be the rural population, independently of their activity (agricultural or non-agricultural), but with the objective to target and benefit small farmers.

A key function of the local support system would be the identification of market opportunities for both traditional and non-traditional products through a continuous process of market intelligence. For those products that market opportunities are identified, integrated agroenterprise development projects (IAPs) could be developed, following a process of participatory prioritization of the most attractive options. The methodology for the participatory design and execution of IAPs includes market research, sub-sector characterization and analysis, participatory diagnosis of limitations and opportunities, evaluation of past experiences, feedback, consensus among sub-sector organizations and individuals, design of the project, resource mobilization and execution.

Workshop discussion

Three themes were broadly discussed during the workshop: (1) a vision for “rural entrepreneurial development”, (2) integrated agroenterprise development projects (IAPs), and (3) support systems for rural entrepreneurial development. The major conclusions of these discussions are summarized as follows:

- *A vision of rural entrepreneurial development*

First, elements of the context within which “rural entrepreneurial development” needs to be promoted were discussed. This context includes policies, globalization and free trade, rural poverty, natural resource degradation, and cultural heterogeneity. There was recognition that there are five types of capital that have to be taken into consideration: financial capital, technological capital (know-how), human capital, social capital, and natural resources. It was agreed that the construction and/or strengthening of human and social capital (construction of society) is a key element and must be considered explicitly in rural entrepreneurial development projects. This led to the suggestion that the term “rural entrepreneurial development” is too narrow and should be changed to “rural development with an entrepreneurial orientation”. This, however, does not imply that CIAT’s Rural Agroenterprise Development project, or CIAT in general need to take on this wider responsibility. It means that the concept of rural agroenterprise development, adopted by CIAT, is in line with the perception that there is a need for the incorporation of a greater ‘market’ and ‘business’ orientation to rural development in general.

Second, macroeconomic policies and state support for rural entrepreneurial development were considered. It is clear that the new institutional model reduces the level of state intervention, and therefore, direct government support to rural development has been reduced significantly all over the developing world. It becomes essential, then, to propose new mechanisms of support that are economically and financially sustainable in the long run, with the creation of financial systems that can eventually base themselves on the local capacity for saving. Competitive governmental and non-governmental organizations need to be promoted that can develop cooperative agreements among themselves and with the private sector to provide the services demanded of them by their clients. In this model, the role of the government becomes one of facilitator at the macro level, as a promoter of consensus at the meso level, and as a possible co-executor at the micro level. The last requires a process of decentralization and popular participation at the local level, with a strong emphasis on the construction and/or strengthening of human and social capital. In many instances there exists a gap between the role of the public and private sectors and it is not clear who is responsible for what. Therein lies the importance of achieving closer ties among these two sectors, based on a mutual recognition of each other’s comparative advantages, possible differences in ethical principles, distinctive objectives and responsibilities, but underpinned by their common goal, and vested interest, of contributing to the overall development process.

Third, although enterprise projects and added value are essential for rural development, it is not always necessary to think about complex levels of post harvest processing. There exists large potential for post harvest activities that can be implemented with low-cost appropriate technology, which add value to agricultural products, and generate extra income and employment opportunities for the rural population. It was also stressed that, while integrated enterprise projects require consensus among different actors, it becomes essential to go beyond the diagnosis and design of projects to their actual execution. To pass from design to action, it is necessary to create confidence among the institutions and the community at the local level. Therefore, it may be more effective to support small projects, that show tangible results in the short run, than mega projects that require huge resources and die at the design phase. As one participant noted “big changes are a result of many small well-executed projects”.

- *Integrated agroenterprise development projects (IAPs)*

Two issues were discussed under this theme: the conceptualization of IAPs and the methodology for the design of IAPs.

- *Conceptualization of IAPs*

The definition of IAPs should take into account issues of scale, context and integration. The definition should also explicitly acknowledge that IAPs include both research and development components. With respect to scale and context, the concept of IAPs should be broad and multi scale. IAPs can be developed at three different scales: mega projects that correspond to national programs or plans, regional projects, and local projects. The scales will depend on the real possibilities to execute the project, and therefore, the most concrete scale for IAPs is likely to be the local one, and it is at this level that they should be emphasized. However, since the ‘production to consumption’ or ‘agroindustrial chain’ concept surpasses the spatial context of a microregion, it is recognized that regional and national actions outside the defined territory will be necessary.

In terms of integration, this is looked upon as integration within a given commodity agroindustrial chain, and not among chains of different commodities. Therefore, it is better to define specific product(s) destined for identified markets, rather than the more generic or loose definition of commodity sub-sectors. While the design of IAPs should take into account an analysis of the complete agroindustrial chain (from production, post harvest handling and processing, marketing, and entrepreneurial organization), it is not always necessary to work on all four components. The integrality is not the sum of all the components, but the process of integration, which takes into account the relation among the components, and tries to understand how changes in one component are likely to affect the others. Moreover, integration goes beyond the simple integration of all the components, and includes social organizational issues, such as institutions, local and community organizations, and individual actors.

- *Methodology for the design of IAPs*

There are three aspects that need to be considered in the design of IAPs and require a careful evaluation and analysis. The first is the participation of the different actors in the process. This requires making decisions on the type of organizations that should participate, their criteria for decision making, and the ways that they will be involved in the process including their roles and responsibilities.

The second is the consensus-building process that needs to create space for negotiation, look for win-win situations, have clarity on the interests of each actor, and define comparative advantages, radius of action, responsibilities and commitments. In this process, the roles of institutions need to be well defined. The selection of an institution to take the coordination and leadership role is critical. Questions such as ‘Should institutions take a facilitating and guiding role because they are perceived as neutral? Or ‘How should local organizations be strengthened to enable them to participate more effectively in this process?’ need to be asked and require careful discussion and future reflection.

The third is the process of market opportunity identification, a critical step in which the involvement of producers needs to be incorporated from the beginning. The role of experts and producers in this process needs to be well defined. Factors that are likely to make one product more competitive than another should also be further analyzed, so as to limit the probability of failure.

- *Support systems for rural entrepreneurial development*

Four topics were discussed with respect to the proposed methodology for the participatory diagnosis and design of support systems for rural entrepreneurial development:

1. Definition,
2. Methodological steps for diagnosis and design,
3. Mechanisms for the provision of non-financial services, and
4. Provision of financial services in rural areas.

– *The definition of support systems for rural entrepreneurial development*

It was suggested that the definition should be broadened. A new definition was suggested as:

“the willingness of all the different local actors that are involved in and/or influence the rural development process (state, special interest groups, universities, research institutions, NGOs, civil society, private entrepreneurs, etc.) to develop a common vision and mission to support rural development, with an entrepreneurial approach and an efficient use of human, technical and financial resources.”

This implies that support systems should emanate from a broader process in which if possible all the existing social actors in a (micro) region should participate. This process requires going beyond specific products and committed actors at the personal and institutional level. If this can be achieved, the “local enterprise support units” can be considered simply as a tool to support this process (see section 4.2.1).

– *Methodological steps for the diagnosis and design of local support systems*

The guiding principle in the whole process should be that all the methodological steps are specially designed to motivate an active participation of all the actors, users and clients. This will achieve a high level of commitment among actors and foster the growth of social capital in the region. The following methodological steps were proposed:

1. Search of a consensus among all local actors and institutions
2. Participatory and integrated institutional diagnosis
3. Inventory, characterization, and segmentation of economic activities in the (micro) region
4. Inventory and characterization of existing support services for rural entrepreneurial development (formal and informal)
5. Identification of support services needed with users and/or clients by productive sub-sectors
6. Feedback of the process to all the local actors and institutions
7. Prioritization, consensus and definition of areas where support is to be provided
8. Participatory design of a dynamic, entrepreneurial local support system for rural development

– *Mechanism for the provision of non-financial services*

The starting point for strengthening the provision of non-financial services is an analysis of the existing supply of support services and an identification of client needs for support. In the first instance, articulation and coordination of the existing support services, and looking to how local institutions might strengthen each other should be considered. When local capacity is not capable of supplying a specific service demand, then this capacity will need to be identified and made available to the community. An important component of the support system will therefore be an information system that includes directories of individuals and/or institutions that can provide services and expertise. Two other aspects of local support systems were also discussed: (1) the proposed mechanism for the development of investment projects, and (2) different mechanisms and/or alternatives for financing this support system that would make them sustainable and therefore less dependent on donor funds.

– *Financial services provision in rural areas*

Given the actual situation of a limited or non-existing supply of financial services in the rural areas, a broad range of possible alternatives was discussed. One of the most important conclusions reached in the discussion was that financial resources should be managed at the local level. The local management of credit has the following advantages: (1) it reduces financial costs through less intermediation, (2) a certain level of social control is possible which reduces the amount of loans that are not paid, and (3) local savings can be attracted for local investments.

Main conclusions of the workshop

- Two important elements were recognized for the development of rural agroenterprise: (1) that the market should orient the production process, and (2) that there is the need to foster and strengthen community and producer organizations.
- The orientation of institutions like CIAT is on research, support, reflection and systematization of experiences. Each reality has its own characteristics, each institution its own focus and approach, each community its own cultural identity, and each person his/her own ideas. Therefore, proposals should not be unique but should offer alternatives for different conditions.
- The challenge faced for the promotion, development and success of rural enterprise is complex, and therefore, requires cooperation mechanisms (partnerships, consortiums, agreements, etc.) among institutions, among producers and entrepreneurs, and between these two groups.
- Support systems that articulate and coordinate efforts of state organizations and civil society, and seek to strengthen and develop local capacities on organization, savings and capital (financial, human, social, technological, natural resources), are basic and important components for the development and consolidation of rural enterprises

Feedback on the role of CIAT in this area

- There is an important demand for CIAT's Rural Agroenterprise Development products, and an interest by partners to work in a collaborative manner offering their knowledge, experience, methodologies, capacity and human resources, in an integral, permanent and horizontal way.
- The priority areas for research include: markets, promissory products, entrepreneurial organization, technology supply and financial systems.
- These products can be offered as case studies, tools and methodologies to use not as a recipe, but as a guide that can be applied with the criteria and judgement of users.

Document and Presentation on Integrated Agroenterprise Development Projects prepared for further discussion with partners

Based on the paper presented by the project, discussions with partners and the conclusions of the workshop, a paper has been prepared for use in the reference sites and other sites where the project has a presence. This year workshops were conducted with CIPASLA and Corpotunia in Cauca, Corpoversalles in Versalles (Colombia), the Carchi Consortium in the province of Carchi (Ecuador), and CLODEST in Yorito, Honduras. The basic elements of this document are presented below.

Definition of IAPs

IAPs are defined as "a set of activities planned and executed with the objective of achieving improved organization and integration of production, post-harvest management/processing, marketing and enterprise organization within a sub-sector, for which concrete market opportunities have been identified". IAPs use an agroindustrial chain (production to consumption) approach and seek to link small producers (land owners or landless) with growth markets. The development of IAPs is only justified if there is a market opportunity that can be developed to benefit small producers as the main beneficiaries. Therefore, IAPs are market oriented and respond to demands.

Cycle for the diagnosis, design and implementation of IAPs

The IAP cycle (see Figure 4.1) starts with the process of identification of problems and opportunities. This process requires four elements of analysis to help in the decision-making process: (1) A characterization of the agroindustrial chain, (2) a market study, (3) a participatory diagnosis of limitations and opportunities, and (4) the evaluation of previous experiences. The next step consists on the feedback of results to all the actors and interest groups who should reach consensus and prioritize areas for support. These actors and interest groups should then assign their representatives to start the IAP design process. The process of IAP design requires the confrontation between the needs and demands for the development of the IAP and the actual supply of services. This process also requires a methodological proposal for the provision of support services that should not only articulate with the existing supply, but also search and channel those services that are not being offered locally.

Based on the previous process, IAPs may need to enter a research process, a pre-investment or pilot phase where the technology, organization, and market have to be developed and adjusted with final users, or go directly to an investment project which requires mainly development and diffusion activities.

Additionally, a monitoring and evaluation system should be designed from the beginning, based on the IAP logical framework. Intermediate indicators should be defined and collected to make periodic evaluations of the project that determine to which extent the objectives are being achieved and suggest needed adjustments to increase the probability of success. Finally, the development impact indicators should be defined that will be used for ex-post impact assessment.

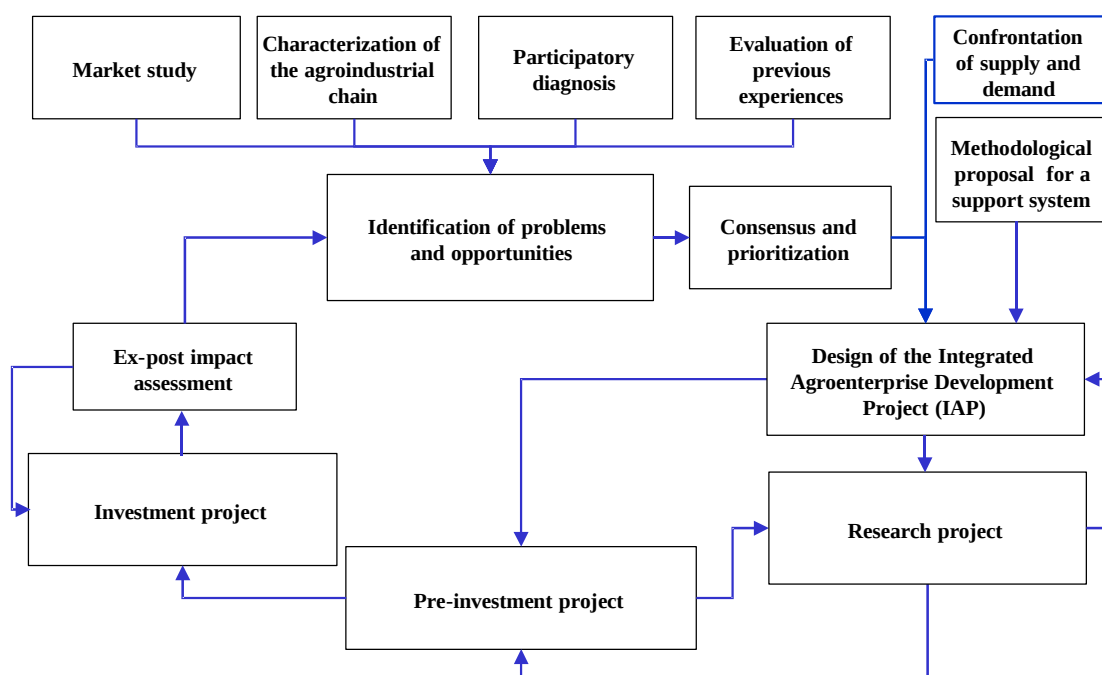


Figure 4.1. Cycle for the diagnosis, design, and execution of Integrated Agroenterprise Development Projects (IAPs).

4.1.2 Empirical experiences on the design and development of IAPs started this year

In order to test, adjust and validate the proposed methodology for IAP design and development, the project participated and facilitated the diagnosis and design of several IAPs with partners. This included four regional IAPs for mora or blackberry, (*Rubus glaucus*), tree tomato (*Cyphomandra crassifolia*), “lulo or naranjilla” (*Solanum quitoense*), and “granadilla” (*Passiflora ligularis*) with Corpoversalles; national-level IAP for *Panela* with Corpoica and Fedepanela; and a micro regional IAP for products with CIPASLA.

Fruits IAP with Corpoversalles

As part of the activities of the support system of Corpoversalles which seeks to improve the quality of life of the community of Versalles, the possibility to develop the fruit sector of the municipality was identified. This sector was identified because a market opportunity was identified for four fruits granadilla" (*Passiflora ligularis* Juss), "lulo" (*Solanum quitoense* Lam), blackberry (*Rubus glaucus* Benth) and tree tomato (*Cyphomandra betacea* Sendt)) that had been produced in the municipio for many years. Also, the region presents a comparative advantage because of its proximity to an important fruit-processing region, La Unión, the northern part of the Valle del Cauca department, and to the coffee area.

To develop this market opportunity, Corpoversalles with the support of CIAT's Rural Agroenterprise Development project, conducted a study to analyze the agroindustrial chain, which included the following activities:

- Characterization of the agroindustrial chain in order to identify the different actors involved in all the activities from production to final consumption, their functions and costs.
- Participatory diagnosis of the actual situation with producers and intermediaries, and the institutions supporting the development of the fruit sector in the municipality of Versalles.
- A market study which analyzed the demand for these fruits for fresh consumption, and for processing in the North area of the Valle del Cauca department and the coffee area of Risaralda and Quindio.

Characterization and diagnosis of the agroindustrial chain:

Granadilla and lulo are major crops in the Versalles area, while tree tomato was important in the 1980's but then declined due to disease, but is now increasing in area once more. Blackberry production is also increasing, from a small base.

The first actor of the agroindustrial chain is the small farmer who has the following functions: (1) planning of production areas and timing, (2) seed selection, (3) planting and crop management activities, and (4) harvesting and packing. The major problems encountered by the producers were:

- Restricted access to technology
- High cost of inputs
- Climatic changes
- Inadequate access to roads and markets
- There are not a special transportation facilities for fruits
- Products go through a number of intermediaries
- There is no value added to primary production
- Lack of market information

After primary production and packing, the product is bought by intermediaries who commercialize the production and have the following functions, (1) collection of the production in the farm, (2) transportation, (3) selection, (4) re-packing, and (5) provides services to the producers such as informal credit and inputs. Intermediaries are responsible for conserving the quality of the product during transportation, secure a constant and regular supply to supermarkets, pay in cash and on time to producers, and transmit price and market information. This last function of intermediaries, price transmission, is not a transparent process, and therefore, creates distrust between producers and intermediaries. The major problems faced by intermediaries are:

- Low quality of the fruit
- Fluctuation of production volume

Intermediaries sell the fruits either to wholesalers (mainly in El Dovio or La Unión), supermarkets, or processing industries. Wholesalers buy large quantities of fruits and provide the following functions to the agroindustrial chain: (1) supply a diversity of products, (2) provide storage facilities for the products, (3) manage large volumes of fruits and other products, and (4) provide market contacts between sellers and buyers. The major problems of wholesalers are:

- Inappropriate handling of the product
- Lack of adequate storage facilities
- Instability of supply.

Supermarkets stores exhibit and sell the fresh product, and their responsibilities are: (1) to offer different qualities of fruits (extra, first and second quality), which implies selection and (2) guarantee a constant fruit supply to consumers with excellent hygiene and quality. For supermarkets, the most important characteristic is the quality of the product in terms of size, presentation and absence of phytosanitary problems that affects the conservation of the product. Therefore supermarkets offer better prices for the product, and when a supplier provides the required quality and a constant supply, a relation of trust is created between them. The major problems that affect supermarkets are:

- Fluctuations in supply, especially in terms of quality and price variations.
- Social problems that affect the transportation and supply of the products

Fruit-processing industries were founded to promote diversification and to add value locally. Processing industries provide the following functions to the agroindustry:

- Conserve and transform the product through physical and chemical treatments to maintain quality and improve its taste
- Control the storage conditions of the product
- Adjust post harvest technologies to their conditions, and conduct research on packing, post harvest processes, transportation, and marketing
- Advise farmers and/or intermediaries on their requirements for buying the fruits
- Promote fruit consumption

One of the major problems of processing industries is securing a supply of the fruit with the required characteristics for processing, especially at a price that makes the business profitable. The advantages of selling the product to these industries for the producer are that they guarantee the volumes and the price in advance through contracts, provide technical assistance, and stabilize prices.

Market study

The market study was oriented towards two sectors: fresh fruits for retail sale through supermarkets, and to processors who produce juices, yoghurt, ice cream, etc. The objectives of the study were to (1) determine the demand and supply situation for these fruits, (2) obtain information on current prices and market channels, (3) identify the most promising options for adding value through processing, and (4) determine the possibility of establishing contracts and cooperation agreements with buyers. The study involved detailed interviews with 15 fruit growers, to assess supply, and 9 supermarkets and 9 fruit processing enterprises to assess demand. Additionally, two fruit wholesalers who supply to a range of supermarket chains were interviewed. This survey covered Cali (as the major urban center) and other urban communities in the Valle Department and coffee region of the country. This study formed part of the thesis research of two students from the University of Gran Colombia, Armenia.

The results show that currently Versalles produces more “granadilla” and “lulo” than other fruits, but that, in the fresh market, “lulo” and tree tomato have the greatest demand are most in demand. In Versalles, the intermediaries who purchase fruit pay in cash, and pay the same price for all fruit. For industrial markets, blackberry is used to make a wider variety of products (juices, pulp, ice cream etc) than the other fruits. The fruit processors are characterized by offering lower but more stable prices than buyers in the fresh market. Processed markets require some specific quality standards (e.g. acidity, degree of Brix) but are less sensitive to visual appearance than the fresh market. Supermarkets offer higher prices for fruits that are well presented and branded. 21% of the supermarket and industrial purchasers of fruit in Cali, and 45% in the Coffee zone, reported problems in supply of fruit, demonstrating an opportunity for Versalles. The supermarkets reported strong consumer demand for selected, well presented fruit of high quality and for frozen fruit products. There is a tendency to consume more natural products. Reduced use of chemical preservatives is important.

This study contributed to the development of a focused market study for specific options that will be developed into IAPs. This methodology is being further refined in Cauca and other reference sites.

Participatory diagnosis and consensus and development of the IAP

Based on these results, a workshop was conducted with the different actors identified in the agroindustrial chain with the following objectives:

- Provide a forum for interaction among producers, intermediaries, wholesalers, and the different buyers to analyze and share their needs and opportunities for the development of the fruit agroindustry.
- Provide feedback on the results of the characterization, diagnosis and market studies to the different groups of interest.
- Design an IAP for the fruit sector of the municipality of Versalles.

Based on a matrix of problems defined by the different actors, which was one of the outputs of the previous study, a participatory diagnosis was conducted with all the interest groups. Based on this analysis, a consensus was reached that the principal and central problem is *the “integral formation of the human resource”*.

The causes of this problem were defined and ranked as follows:

- Low or lack of consensus and articulation among the different actors and interest groups
- Low levels of co-participation on decision-making and technology development and adjustment leading to low adoption rates of technology.
- Lack of institutional commitment because the presence was limited; when present, it has not been effective, and thus has led to a loss of credibility of the institutions.
- Lack of human resource and personal commitment, which lead to unclear objectives, and therefore, a lack of motivation for both producers and institutions.
- Information flow problems, resulting in the lack of information feedback to users and clients.

The consequences of this situation were also defined and priorities set:

- Low production and productivity levels, which reduces the profitability and the possibilities of competition of the agroindustry.
- Low product quality which is mainly due to a lack of knowledge on post harvest handling
- Lack of entrepreneurial organizations and management because of a lack of understanding between producers and institutional personnel.
- Non-existence of a producers organization for fruit commercialization in Versalles
- Problems with the commercialization of fruits due to a lack of information, commercial contacts, producers' organization, and poor bargaining power.
- Credit management problems caused by poor management of financial resources, low access, lack of credit advice and monitoring, and the risk involved.
- Low quality of life that causes migration to urban areas, family decomposition, and instability of the economy.

Design of the IAP

The previous diagnosis and consensus process lead to the design of an IAP to strengthen the fruit sector in Versalles. The design started with a brainstorming of possible solutions and interventions that included:

- Exchange visits among producers and processing industries and other buyers of fruits
- Start with a pilot entrepreneurial organization with a small group of producers
- Motivate producers by creating a trusting and transparent environment
- Map actual and possible production areas and farms to determine the volumes that can be supplied over time and plan the production.
- Determine production costs and prices at which the agroindustry is feasible
- Analyze the possibility to add value to fresh fruits in the region
- Identify buyers that would be willing to participate in cooperation agreements and contract future production.
- Define the role of support institutions and organizations clearly

- Offer training on business management, marketing, production, and post harvest handling and processing.
- Consolidate a farmers' organization based on a transparent management and clear definition of quality parameters.

Based on these ideas, it was decided to develop a short-term IAP focused on the development of an entrepreneurial organization that could be developed with existing resources. The logical framework of the project is presented in Table 4.1.

Milk Products IAP with CIPASLA, Cauca

With the approval of the project presented to IDRC (see Output 5, activity 5.3), the CIPASLA rural agroindustry committee was re-activated and has since been working in a dynamic manner. One of the main responsibilities of the committee is to conduct the participatory formulation, resource mobilization and execution of integrated agroenterprise projects (IAPs) focused on the market opportunities selected within the IDRC-funded FoodLinks project (see previous annual reports). These opportunities include sour starch, blackberry, lulo, "uchuva" (*Physalis Peruviana*) and milk products. The process of IAPs formulation has already been undertaken for sour starch, and this is being partially executed with the resources available from the participating institutions and the Colombian Ministry of Agriculture and Rural Development (see outputs 2 and 3). For the other products, more detailed market studies are being conducted. For the case of blackberry and "lulo", the study conducted for Versalles (see above) is being used. With respect to milk products, some activities have already been initiated, and these are reported below.

The process was initiated with the realization of a workshop whose purpose was to (1) characterize the agroindustrial chain for milk products; (2) conduct a participatory diagnosis of the actual situation of the milk sector in the Cabuyal reference site with producers, processors, intermediaries, consumers and the CIPASLA rural agroindustry committee members; and (3) evaluate previous support activities.

Characterization of the agroindustrial chain

The characterization of the agroindustrial chain was done using a participatory mapping methodology with producers, processors and the technicians. The resulting map is presented in Figure 4.2. This map still requires more information in terms of functions of each actor in the agroindustrial chain, production costs and price margins. However, it shows how the necessary information for the formulation of IAPs can be collected at low cost and rapidly using participatory methodologies.

Evaluation of previous experiences

Since this agroindustry has already received support from institutions, it was considered important to analyze their previous experience with this support, and the lessons learned to (re) focus institutional activities to improve their effectiveness. With this purpose, workshop participants generated the matrix presented in Table 4.2. Although more discussion is still needed about the experience, the use of this participatory methodology has permitted a fast and low-cost evaluation of previous institutional support.

Table 4.1. Logical framework of the integrated agroenterprise development project for the fruit sector of Versalles, Colombia.

Narrative Summary	Measurable Indicators
Goal <i>Contribute to the improvement of the quality of life and well being of the community of Versalles.</i>	
Purpose <i>Establish an entrepreneurial organization that articulates fruit producers to the market in an effective, participatory and transparent manner, and with the capacity for continuous improvement</i>	Entrepreneurial organization established
Outputs 1. 100 producers of Versalles motivated to establish an entrepreneurial organization for fruit commercialization and value added in three months. 2. 40 producers of Versalles trained on entrepreneurial development and management in nine months. 3. An entrepreneurial organization established in one year.	1. % of motivated producers of Versalles 2. % of producers trained 3. Entrepreneurial organization established
Activities 1.1 Define the responsibilities of Corpoversalles promoters. 1.2 Define motivation contents 1.3 Define working areas based on production soils, water availability, and access mapping, 1.4 Define the logistics for the motivation campaign 1.5 Conduct motivation and promotion workshops 1.6 Sign of a compromise agreement develop with the participation of producers. 2.1 Define training contents that should include entrepreneurial vision, cost and price analysis, ethics, advantages of future market contracts, team work, legal advice, other experiences, credit management, etc. 2.2 Training materials preparation 2.3 Logistic organization of training activities 2.4 Producers training activities including workshops, individual on-farm advising, and information sharing. 2.5 Negotiation with identified clients and evaluation of market opportunities. 2.6 Evaluation of the process and decision-making 3.1 Legal advice for the conformation of the entrepreneurial organization. 3.2 Selection of the most adequate legal form of organization. 3.3 Development of the vision and mission of the organization. 3.4 Preparation of the organization statutes. 3.5 Legal conformation of the organization 3.6 Development of a strategic business plan for the agroenterprise.	

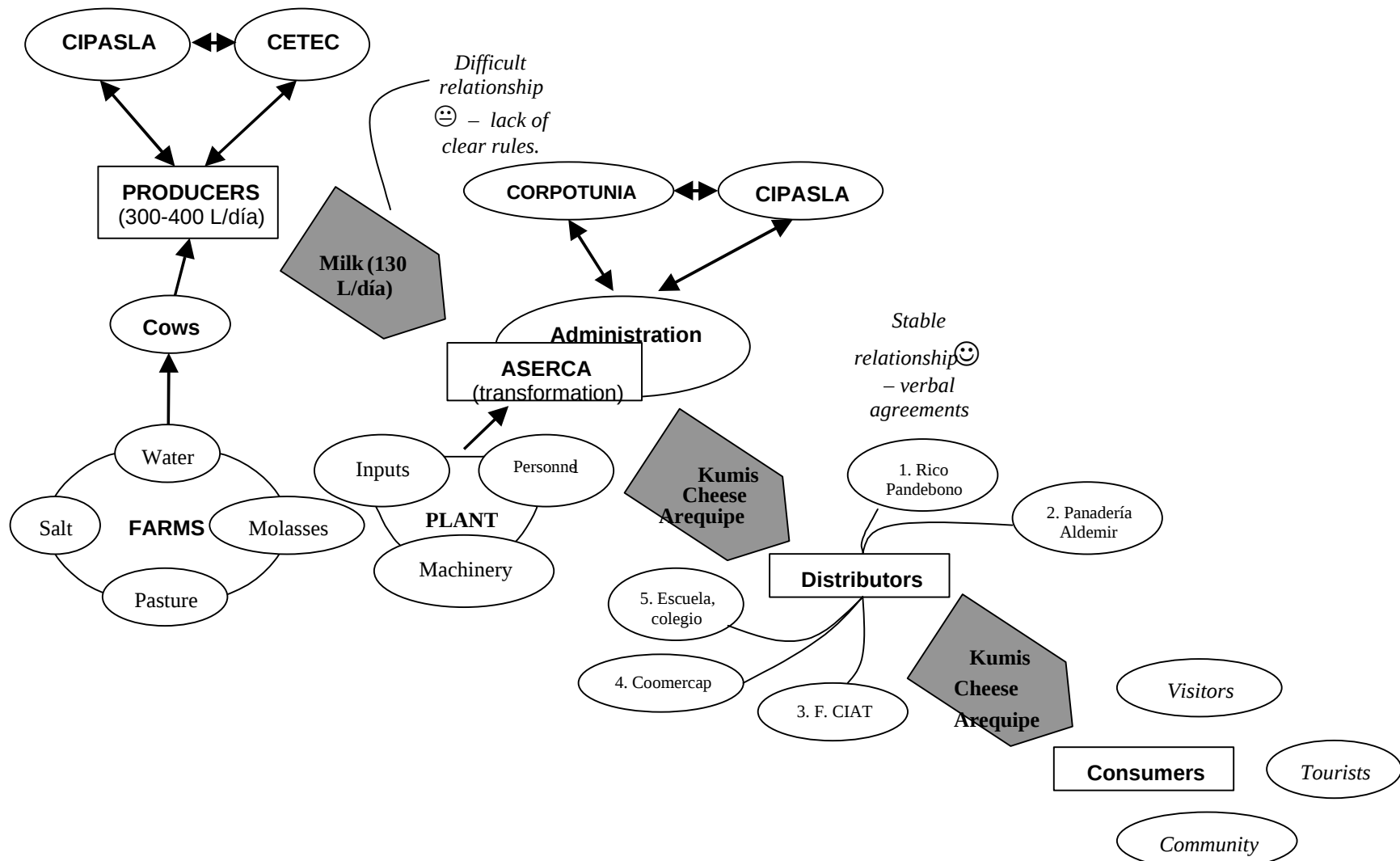


Figure 4.2 Characterization of the agroindustrial chain for milk products in the Cabuyal watershed, Cauca Colombia

Participatory diagnosis and prioritization

By using a brainstorming technique, the principal problems faced by the sector were identified by the different actors of the agroindustrial chain. Afterwards, the problems were prioritized using a double-entrance matrix. Table 4.3 presents the results of this exercise by group of interest. This diagnosis still needs a more in-depth analysis of central problems, causes and effects, as well as a process that permits reaching a consensus on the problems that require immediate attention to design the IAP.

This process for the design of an IAP for milk products for the Cabuyal reference site will continue with upcoming workshops and the feedback of information on the results of the on-going detailed market study that is being conducted.

Table 4.2. Matrix generated in the evaluation of previous experiences with institutional support for the development of the milk sector in the Cabuyal reference site.

Year	Event	Who participated	Who supported us	Evaluation		
				The good	The bad	The lessons learned
94	Congreso Internacional de Leche – Medellín	2 milk producers	CIAT, CIPASLA	The idea of getting organized		
94	Presentation of the idea, producers survey	CIPASLA	CIPASLA	Collect production data and options		
94	Field visit to La Arboleda (a demonstration site)	Producers	FIDAR			Organizational process of the group for the operation of a milk-processing plant.
95	Training on milk processing	Producers	FIDAR, CIPASLA			All related with the processing of milk.
95	Organization of the group and equipment acquisition.	Producers	FIDAR, FES			Importance of being organized and processing practices.
96	Land acquisition, plant construction, and enterprise organization	Producers	CIPASLA, PRODAR, DRI, Econorca, CETEC		No consensus was reached with public health authorities	How to manage resources, and that by being organized it is possible to reach objectives.
97	Inauguration of the plant	Members of the organization	SENA, FIDAR, CIPASLA	The plant		The objective was achieved.
97-99	Own management of the plant	Members and board	Advisor paid by the organization, CIPASLA – AIR	Knowing that we can do it by ourselves (empowerment)	Lack of sense of ownership by members and the low profile of the Board	Despite the difficulties, we were able to progress because we put effort to it.
99	More detailed market study and paperwork for public health legal approval.		CIPASLA – AIR			

Table 4.3. Prioritized problems faced by the milk processing agroindustry in the Cabuyal reference site.

Problems	Producers	Processors	Support system
Training and technical assistance on milk production	1	-	6
Marketing	2	1	3
Pasture improvement (low yields)	3	-	8
Access to working capital and credit	4	-	4
Cattle improvement (low yields)	5	-	8
Input costs	6	-	-
Training and technical assistance on milk processing	-	2	9
Milk-processing organization	-	3	1
Construction of needed processing plant infrastructure	-	4	-
Processing sub-products management	-	5	-
Additional equipment and machinery required	-	6	-
Entrepreneurial capacity	-	-	2
Legal limitations	-	-	5
Quality control	-	-	7

Panela IAP with CORPOICA and Fedepanela

The two previous experiences on the formulation of IAPs for products and/or sectors with identified market opportunities had in common their (micro) regional approach. This third experience of the CIAT's agroenterprise development project aims to formulate an IAP with a national coverage. The design of this IAP was based on the results of a previous study on the adoption and impact of a research and development project developed by CORPOICA for the panela agroindustry in the Hoya del río Suárez region, which was then transferred to Cundinamarca. This study was undertaken by CORPOICA and CIAT's Rural Agroenterprise Development project and finalized this year (see Output 5.2). The conclusions and lessons learned from this study permitted the development of a national plan for the panela agroindustry.

The development of the national plan started with a workshop with the participation of Fedepanela, CORPOICA, CIAT and the different actors of the agroindustrial chain (sugar cane producers, panela processors, wholesalers, and equipment manufacturers). Representatives from NGOs and GOs that work at the regional level, and other producers' organizations such as the Comité de Cafeteros, also participated in the workshop. This process has been important for the following reasons. First, it improved the information flow among research institutions such as CORPOICA and CIAT, Fedepanela, NGOs, and local governmental institutions, as well as among producers and wholesalers. Second, the prioritization of problems was important for decision-making relative to allocation of "parafiscal" funds (a fund generated by a percentage of the revenue from sales of panela) for the development of the sector. It became apparent that these funds should be mainly allocated to product promotion and a generic publicity campaign that differentiates panela from sugar. Also, resources should be allocated to foster cooperation agreements among producers, and among the different actors of the agroindustrial chain. Third, for Fedepanela the IAP designed for panela is proving useful as a strategic document that helps them to lobby support within the Colombian government.

Based on the methodological principles and the concrete experiences described above, a presentation is being prepared for presentation at the PRODAR Jornada Técnica “Agroindustria Rural y Globalización Frente al Próximo Milenio” to be held in Quito, Ecuador, November 8-11, 1999.

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Activity 4.2 Development of guidelines for the design of local support systems for promoting agroenterprises that contribute to the sustainable development a the microregional level

1999 Milestones:

4.2.1 Guidelines for the design of local support systems for rural entrepreneurial development and a conceptualization of an operational scheme for the provision of support services further advanced

The methodology development process started in January this year with an internal meeting of project team members to establish guidelines for the design of local support systems for rural entrepreneurial development and the conceptualization of an operational scheme for their provision. Based on these guidelines, a presentation was prepared for the methodological workshop described in Activity 4.1 above.

Document and presentation on Local Agribusiness Support Systems (LASS) for rural entrepreneurial development prepared for discussion with partners

Based on the paper presented by the project at the methodological workshop and the discussions with partners as well as the conclusions of the workshop, a paper was prepared, presented and discussed with partners in the reference sites and other sites where the project has presence. This year workshops were conducted with CIPASLA and Corpotunia in Cauca, Corpoversalles in Versalles (Colombia) the Carchi Consortium in the province of Carchi (Ecuador), and CLODEST in Yorito, Honduras.

Justification

The current peripheral position of the rural economy in developing countries is a consequence of at least the following four factors:

- The absence of integrated support policies for the rural sector, in which the state facilitates local rural development processes.
- Methodological, human resource and financial weaknesses of local support institutions, so limiting their ability to establish effective support systems with wide coverage.
- Difficulties for the small rural entrepreneurs to access the formal financial system.
- Poor linkages with growth markets.

Given this situation, it becomes important to develop alternative intervention models for the economic development of rural areas that are effective and efficient in the use of economic, human and social resources. This document presents an alternative model for the provision of financial and non-financial services for the strengthening of the rural economy, through the development of rural agroenterprises in a (micro) region.

The proposal for the establishment of LASS is to start from a broad process that starts with an inventory of all the existing institutions, organizations and associations that offer services for the promotion and strengthening of rural agroenterprise. Once all these actors (state, special interest groups, universities, research institutions, NGOs, civil society, private entrepreneurs, etc.) are identified, then a process to articulate and coordinate the provision of this services should be implemented. This process starts with the development of a common vision and mission to support rural development with an entrepreneurial approach that makes an efficient use of human, technical and financial resources.

A proposed operational scheme for the provision of these support services is the Local Business Support Units (LBSU), which create an enabling environment for small business development. A LBSU can be

defined as a “non-financial support system for regional rural business development, offered by local institutions, individuals or private enterprises, which provides services for rural microenterprises at different stages of business development. An outline of the operational scheme is now described.

Proposed operational scheme for the LBSUs

The system will cover, at local level, non-financial business development services; arrangements will be made with institutions offering financial services so that these can be offered in a co-ordinated and parallel fashion: one of the services offered will be assistance with credit provision. Services will be offered to rural people, regardless of whether their enterprises are formal or informal.

It is intended that the LBSUs will develop a few selected Integrated Agroenterprise Projects based on the identification of market opportunities and the competitive advantage of the (micro) region. These projects could be developed both for traditional and novel sub-sectors in each region. While it is intended that the Local Business Support Units will specialize in the prioritized sub-sectors, they will still support other entrepreneurial activities in the region.

The LBSUs will progressively develop a sustainable business outlook, based on income derived partially from client fees, which will increase over time, and according to the size of the business, and also from other mechanisms such as retained earnings, other commercial sources of revenues, and private sector alliances (seeking win-win situations).

The LBSUs will co-ordinate with local financial institutions the provision of credit for the development of business and market plans, so business development services will be offered in parallel with financial services. This co-ordination will be implemented through the following business-plan development scheme. The scheme is graphically represented in Figure 4.3 and has the following components:

- Project Evaluation Committee, which includes representatives from the different interest groups of the community. This committee should include at least one representative from the community, the LBSU coordinator, the microenterprise advisor assigned to the client, and a member of the financial service institution.
- Business Development Services, which refers to the LBSU that provides advice and consultancy services to the clients for investment project development, and other non-financial services demanded by the clients.
- Financial Service Institution with which the LBSU will negotiate in order to have a co-ordination mechanism. From the clients' perspective, these two services will be physically and operationally separate. The LBSU will not participate in credit management.

Under this scheme, the Committee will receive the business ideas, which could be a re-conversion or improvement of an existing microenterprise or a totally new business idea. The Committee will evaluate the idea in terms of its market potential, and income and employment generation possibilities. Once a business idea is approved, the LBSU will provide the micro entrepreneur with the necessary services to prepare a business profile. The Committee will again evaluate this profile, and if the business appears economically viable, environmentally friendly and contributes to the overall community development, then it will be approved. Once the business profile is approved, the LBSU will again support the micro entrepreneur to develop a detailed business plan. Finally, the detailed business plan will be reviewed by the financial service institution, which will make the credit disbursement. The LBSU will then provide all the necessary follow-up services to implement the business plan. This scheme provides also an on-hands training experience for the micro entrepreneur, and builds a mutual trust relationship between the client, and the LBSU and financial service provider.

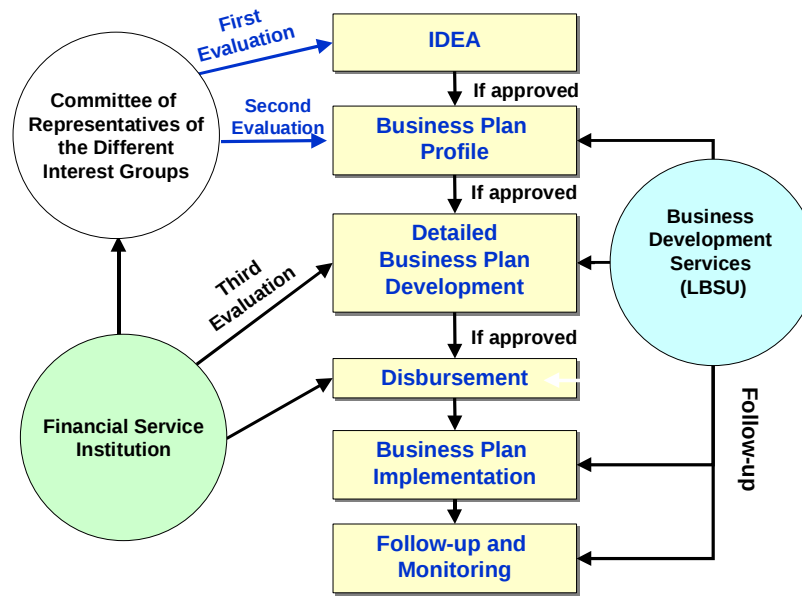


Figure 4.3. Mechanism for investment-project development, and for the co-ordination with financial service institutions.

Given client dispersion in rural areas and the access, transportation and communication problems of these areas, most of the services provided by the LBSUs will need to be mobile, portable, and in a sense virtual. Therefore, microenterprise advisors will provide services in a decentralized manner at the client's microenterprise facilities.

The support system will require multidisciplinary teams and advisors with different expertise according to client needs and demands. For this reason, a basic and minimum unit comprised by microenterprise advisors who have a good knowledge of the region and its people will form the LBSUs human resource. Demands that cannot be met through in-house expertise will be channelled to a network of consultants. Therefore, advisors should have the capacity to get the necessary timely support from experts according to the specific demands of clients during their business development cycle. The clients will be able to select the most appropriate consultant according to their needs and demand a service of excellent quality.

Support services:

The services offered by LBSUs will depend on client demand, and could comprise:

- Marketing (market intelligence, development of markets plans and strategies, commercial advise – including for export, advertising and graphic design, identification of market contacts).
- Production/processing (technical assistance, new product development, raw material/input procurement schemes, product presentation and packaging).
- Enterprise skill development (development of business plans, feasibility studies, and investment projects, business/entrepreneur development, business start-ups, book-keeping skills, facilitation of horizontal and vertical co-operation).
- Meeting legal, regulatory and tax requirements (legal, tax advice, help with paperwork associated with obtaining licenses and permissions related to health, food safety and the environment)
- Access to communications and information (hire of personal computers, communication, information searches, and internet).
- Producers organization and strengthening of social capital

The action-development process

The current proposed local support system has been conceptualized by the project with inputs from different local and national partners. However, the proposed system needs to be adjusted and validated to field conditions, which will be achieved through an action-development process. This process requires a monitoring and evaluation system that permits a periodic evaluation of the system in terms of its outreach, efficiency, effectiveness and sustainability. This monitoring and evaluation system should provide the necessary information for periodic adjustments of the system and the subsequent systematization of the experience. This action-development process will result in a demand-driven effective, efficient and sustainable support system, which is adjusted and validated according to client conditions and that can be replicated.

4.2.2 Proposals for the testing, adjustment, validation and systematization of the proposed scheme for local business support systems prepared and submitted

Proposal presented to USAID for project “Local Support Systems for Rural Enterprise Development” in collaboration with the Carvajal Foundation, Corpotunía and Corpoversalles

Based on the previous activities, CIAT's Rural Agroenterprise Development Project team participated in the preparation a project proposal for the establishment of local rural business support systems for Versalles and Tunía (two municipalities in the departments of Valle del Cauca and Cauca in Colombia). This proposal, “Local Support Systems for Rural Enterprise Development” was presented to the United States Agency for International Development (USAID) for financing in conjunction with Corpoversalles, Corpotunía and Fundación Carvajal. The expected outputs of this project are:

1. Local Business Support Units (LBSU) established, resulting in strengthened, effective, sustainable, demand-driven provision of local support services for rural business development over two project areas.
2. Mechanisms for horizontal cooperation established between the local organizations that offer services, namely Corpoversalles and Corpotunía, and their respective LBSUs.
3. Contributions made to the formulation of support policies for rural microenterprises, through the development and validation of an effective, replicable methodology suited to the needs of rural clients.

After review of the proposal, USAID declined to finance the initiative.

Adjusted proposal presented to IAF for a local support system for Corpoversalles

The effort invested in the presentation of the first proposal allowed the rapid elaboration of a second proposal, which was presented by Corpoversalles to the Inter-American Foundation for financing in September of 1999. The second proposal, titled “Local Support System”, proposes the establishment of a local support system consisting of three service areas: (1) market intelligence and information; (2) demand-driven support activities (technical assistance, building and strengthening of social capital and capacities and applied participatory investigation), and; (3) access to financial resources. In this proposal, CIAT's Rural Agroenterprise Development Project, Fundación CIPAV, and Fundación Carvajal accompany Corpoversalles.

Support to Corpotunía in the preparation and execution of a project for PADEMÉR to execute a Local Support System

Between March 1998 and February 1999, Corpotunía implemented the project “Basic Training and Advising to Determine the Feasibility of Establishing Rural Microenterprises in the Department of Cauca, Colombia.” This project was funded by the “Proyecto de Apoyo al Desarrollo de la Microempresa Rural”, PADEMÉR, that operates with funds from the Republic of Colombia (Ministry of Agriculture and Rural Development and Ministry of Economic Development), the International Fund for Agricultural Development, IFAD, and the Corporación Andina de Fomento, CAF. Based on the interactions of CIAT's Rural Agroenterprise Project with Corpotunía in all the previous activities, and especially on the preparation of the proposal for AID, Corpotunía asked for CIAT's support in the preparation and implementation of the second phase of the project. Therefore, CIAT supported Corpotunía in the preparation of the proposal for PADEMÉR “Proyecto de Apoyo para el Desarrollo de Microempresas Rurales”. This project was approved and CIAT's role in the

project will be to support the implementation of a LBSU for the area of influence of Corpotunía in the Department of Cauca. This opportunity is seen by the project as an opportunity to test and adjust the proposed scheme for the provision of local support services for rural entrepreneurial development. As part of the support system, CIAT will also support specific activities in the areas of:

- Market opportunities identification and evaluation
- Development of marketing plans and strategies for small rural enterprises
- Design of IAPs to develop the market opportunities identified
- Design and implement a participatory methodology for post harvest research
- Monitoring and evaluation for the systematization of the experience

All the above activities are strategic for the development of CIAT's Rural Agroenterprise Development project outputs 1, 2, and 4.

4.2.3 Activities for the development of Rural Agroindustrial Committees in CIAT's reference sites initiated

The project presented to IDRC in September 1998 to promote the establishment of a rural agroindustry support system for Cauca, Colombia; Yorito and Sulaco, Honduras; and Pucallpa, Perú was approved this year (see Output 5, activity 5.3). This project will be of great importance for CIAT's Rural Agroenterprise Development Project because it will permit the process of establishment of LBSUs in the three reference sites. This experience should be an opportunity to test, adjust and validate the proposed methodology of the project, and afterwards, systematize the experience for scaling-up.

Rural Agroindustry Committee, Cauca

The proposed methodology for the establishment of LBSUs was presented and discussed in a workshop with CIPASLA. This served, together with the approval of the Umbrella Project that provides seed money for LBSU strengthening, to motivate the reactivation CIPASLA's Rural Agroindustrial Committee (RAI). Committee membership was expanded to include greater community representation.

In the Committee meeting that followed the workshop, the general objective of the Committee was discussed and redefined as to *“Develop and implement, using participatory approaches, a support system for rural entrepreneurial initiatives with emphasis on adding value to primary production in the Cabuyal river watershed of the Cauca Department”*. The specific objectives of the Committee are to:

1. Permanently identify and evaluate a portfolio of market opportunities for the region
2. Design IAPs for the market opportunities identified, mobilize resources for the development of these projects, and support the implementation of these projects
3. Design and implement a sustainable LBSU for the region to provide services for productive activities and the rural entrepreneurial development
4. Develop and systematize a local support system for rural entrepreneurial development that can be replicated in other regions.

On this basis, the Committee has put into motion the following activities:

- The portfolio of market opportunities identified through the IDRC-funded FoodLinks projects has to be revised and updated. For this purpose, a rapid market study is being executed using the market opportunity identification methodology. The market study includes products of interest to existing small rural agroenterprises in the zone, such as dairy products and country chickens. In addition, small farmers were consulted relative to their products of interest to include these also in the market survey. A representative group of small farmers will participate in a tour to visit potential clients such as markets and supermarkets.
- The RAI committee has initiated a program of visits to rural agroenterprises in the zone, to identify important constraints and needs.
- The committee rapidly identified the key constraints of the local dairy product plant and has promised financial support amounting US\$1500.

- The RAI committee also prepared terms of reference for a national market study on cassava starch, to include intermediaries, retailers, processors and consumers. Four consultants have sent their research proposals with an average budget of US\$6.500. The RAI committee is contributing US\$1.500 but funding sources are being identified for the rest of research cost.
- IAPs for market opportunities identified through the project will be developed. This process has already started with the design of an IAP for milk products (see activity 4.1).

Commissions for Commercialization and Rural Agroenterprise Development, Yoro and Sulaco

CLODEST has had a commercialization unit since its foundation, but it has been relatively inactive. A workshop was conducted in Yorito on October 5, 1999 with the following objectives:

1. To identify the existing supply of and demand for support services for rural entrepreneurial development in Yorito and Sulaco.
2. To make a preliminary approximation of support-service demand by producers and rural entrepreneurs in the region.
3. To provide feedback to institutions, local organizations and producers on the results of the market opportunity identification study for Yorito-Sulaco, discuss the results, and evaluate the methodology used for the study.
4. Discuss the most appropriate mechanism and approach for the development of rural agroenterprises in the region, including the conformation of a Commission, the provision of support services, and the development of IAPs.

The result of the workshop was the conformation of two Commissions for Commercialization and Rural Agroenterprise Development: one for Yorito as part of CLODEST, and another for Sulaco attached to CIDES. Meetings of these two Commissions were set up to define the objectives and functions of them. Also, the mechanisms for the development of IAP proposals will be discussed and defined in these upcoming meetings.

Although attendance of the Commission's membership to the first meeting was quite low, the Commission proceeded to define its objectives, functions and workplan. The interest on working around the market opportunities identified was also confirmed. Interest was expressed for two other market options (organic fertilizer and potatoes). The Commission will facilitate the process of choosing the final IAPs.

Committee for Rural Entrepreneurial Development, Pucallpa, Perú

This Committee was founded in April 1999, under the leadership of the rural enterprise development (RED) specialist attached to the DEPAM structure. Membership includes the Consejo Transitorio de Administración de la región Ucayali (CTARU), Ministerio de Agricultura Ucayali, Dirección Regional Agraria de Ucayali (DRAU), Cámara de Comercio e Industria de Pucallpa (CICTU), Instituto Internacional de Investigación en Agroforestería (ICRAF), Asociación de Mujeres Campesinas de Ucayali (AMUCAU) and Productores de Campo Verde.

Three meetings have been held to date. In the October 1999 meeting, the committee decided to formulate an IAP around cocona, the overall winner in the participatory evaluation of exotic market options. Another winner, cat's claw, was proposed for a second IAP. A four-member task force was established to execute CIAT's IAP participatory design methodology; a timetable was developed and the final report will be ready beginning 2000.

The RED specialist has coordinated several activities and studies during 1999, in collaboration with the committee and with the support of CODESU and DEPAM. These tasks, listed below, are performed by the enterprise specialist himself, by thesis students and by consultants.

- Three short documents have been prepared with inventories on (a) past and current rural business development projects that have been executed in the region, (b) processing technologies in the region, and (c) most important products and crops in the region (both exotic and non-exotic). The latter document was more than an inventory and tried to establish priorities for the non-exotic product market study (See Output 1)

- A qualitative evaluation of farmer organizations is being conducted to establish which are really solid and operational. This work responds to the fact that many farmer organizations in Ucayali are non-operational, and were founded solely to capture social government funds. The variables to be analyzed have been determined, such as level of participation, number of projects executed and verifiable achievements. An interview guide has been prepared, which is being tested in collaboration with DRAU.
- Terms of reference for a study of the agroindustrial chain in Pucallpa were prepared for a consultancy. This study will (a) identify the actors and their functions, (b) propose categories for stratification of these actors, and (c) detect important bottlenecks in the farmer-to-market continuum for agricultural, forestry, and animal products. This study will help develop a strategy to improve the small rural producer's position in the marketing chain, to improve income and negotiation capacity.

Carchi Support System

One of the CONDESAN (Consortium for the Sustainable Development of the Andean Ecoregion) reference sites is the watershed of the River Angel, in the province of Carchi, Ecuador. A local consortium of research, development and community organizations, and local government, which has the objective of promoting the sustainable management of the watershed, is supported by an IDRC-funded project (MANRECUR II), coordinated by the Ecuadorian NGO FUNDAGRO.

The MANRECUR project has two objectives:

1. Facilitate the development of the El Carchi consortium of institutions that are active in the watershed, as an "espacio de concertación" or forum for the development of collaboration and consensus between organizations.
2. Undertake specific research and development activities that will contribute to the better management of natural resources in the watershed.

The watershed ranges from high páramo (3,500 masl) to dry valleys (1,600 masl). Three climatic/agricultural/altitude zones can be distinguished:

- cold (pastures/potatoes)
- temperate (maize, beans)
- tropical (irrigated horticultural crops, tropical fruits)

In general, water is the major limiting resource, with shortages (and decreased quality) becoming more severe at lower altitudes, especially during the dry season. Conflicts over water between communities at low (*afro-Ecuadorian*) and higher (*mestizo-indígena*) elevations are increasingly common. Water is distributed over the valley sides by a network of 17 canals (*acequias*) which used to empty into rivers lower in the valley, but now run dry before reaching this level.

One of the components of this project concerns supporting/promoting small rural enterprises as a means to improve local livelihoods. The emphasis is on enterprises that offer benefits for natural resource management as well as economic viability. The target is to create or strengthen 6 agroenterprises over the next 2 years. The agroenterprises existing in the project area include small-scale cheese, cream and butter production, a forestry nursery and communal mills for barley and other grains (for production of *arroz de cebada*). Possible new pilot enterprises include mora comercialization (a local CIAL is evaluating mora varieties) and organic horticultural crops (experiments are being undertaken in several locations). CIAT's Agroenterprise project was invited, at the end of 1998, to visit this project site, and to identify research and development topics of mutual interest.

An initial visit to the watershed area was made in March 1999, when participation in a consortium-planning meeting was complemented by field visits to micro-enterprises located in the three distinct climate/altitude zones.

At the consortium meeting, a working group of organizations interested in IAPs was formed. It was clear that the consortium lacked an overall strategy for this component of the project, especially with regard to the priorities for creation of new agroenterprises, and that methodological input into the design and

implementation of the IAPs was also needed. On the positive side, the consortium had already conducted research in several areas necessary for product/market opportunity prioritization, including local market surveys (*circuitos locales*), and much of the information for micro-regional characterization was available, although not in one integrated document.

Thus, the input from the CIAT agroenterprise project during 1999 was agreed, in the form of participation in the IAP working group, and the organization of a workshop to present and discuss the concept and method of market opportunity identification, and IAP and local support system design. This was conducted in September 1999. Future activities of the consortium IAP working group, which will follow on from this, into 2000, are:

1. Carry out a market opportunity study for each climate/altitude zone in the watershed. It was proposed to follow the four basic steps of the market opportunity methodology developed at CIAT, but adapt this to involve the community at all stages, to increase local understanding of the process, enhance local involvement in the analysis of options, and hence increase community commitment to the final results.
2. Design and organize two IAPs in each climate/altitude zone (i.e. 6 in total) using the information from the market opportunity analysis.

The CIAT Agroenterprise project has agreed to accompany the implementation and evaluation of this process, based on the interest in the methodological adaptations that will be generated. The linkages of MANRECUR and CIAT Agroenterprise project with CONDESAN and IDRC's Minga program will facilitate this collaboration.

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Activity 4.3 Development of guidelines for the design of policy options for national support systems whose objective is the promotion of rural agroenterprises that contribute to sustainable development at the regional level

1999 milestones:

4.3.1 IICA-Ecuador collaboration consolidated

Through the strategic alliance between CIAT's Agroenterprise project and PRODAR, CIAT was invited to make a methodological contribution to a national small rural agroindustry Program (PRONADER), managed by IICA-Ecuador. This program has for several years provided small loans (called FODECOs) for IAPs based on small farmer organizations. 690 loans (maximum of US\$3,000 per enterprise) have been provided under this program to date. The program is now trying to support the growth of those small enterprises that have proved successful, into larger concerns. This year, therefore, larger loans were available (up to US\$100,000), and the program needed methodological support in identifying and selecting the best project ideas for this new credit line.

CIAT, with support from PRODAR, was asked to develop a guide for the preliminary evaluation of enterprise ideas for this new credit line. Based on the study of key enterprise success factors (Output 3.1, 1998 Annual report) this covered the following enterprise areas that are critical to success:

- Marketing
- Business skills
- Comparative advantage
- Environment
- Social factors

From this, a range of indicators was developed. Some indicators applied to more than one critical area. Typical indicator categories are:

- Market growth rate
- Enterprise credit history
- Production costs
- Product differentiation
- Rural value added
- Technology used
- Employment generated

From this matrix of critical areas and indicators, a list of key information needed for the initial evaluation of each project idea was developed. This was discussed with IICA-PRONADER and PRODAR in January 1999. The enterprise development component of this project also involved the Small Enterprise Development Center of a local University (Pontificia Universidad Católica de Ecuador - Sede Ambato), which also contributed to the development of this guide for idea evaluation. This guide formed the basis for the initial development of project ideas in each of the 12 regions where PRONADER operates in Ecuador.

At the same time, a visit was made (with PRODAR) to one of the PRONADER regions to visit project staff, functioning FODECO enterprises, and to discuss preliminary ideas for new projects with local people involved in the current FODECOs and with project staff. Besides providing an overview of the range of enterprises covered under this scheme, it also permitted a rapid appreciation of the sometimes patchy level of community participation in the development of these project ideas.

A workshop in March 1999, held at the University in Ambato, provided the opportunity for regional project staff to present outline investment project ideas for consideration. These were critiqued using the criteria in the guide developed previously. At the same time, the methodologies developed by the CIAT agroenterprise project (namely market opportunity identification, IAPs and local support systems), were presented in outline to PRONADER, University and IICA staff.

Following this workshop, three additional activities were proposed to CIAT by IICA. These also involve participation of PRODAR-Andean region:

- Visit to Colombia by IICA-Ecuador staff to visit collaborating projects and institutions (e.g. CORPOVERSALLES and Fundacion Carvajal), and to discuss longer term collaboration with CIAT in Agroenterprise development (see Output 5, Activity 5.3).
- A workshop on the CIAT market opportunity identification methodology, to be held in Ecuador
- CIAT participation in a new rural agroenterprise project in Ecuador, based on support to bottom-up local community processes (PROLOCAL).

To facilitate development of a longer term alliance between IICA-Ecuador and CIAT, a letter of understanding is under preparation.

4.3.2 A cross project initiative on the development and application of methodologies incorporating GIS and models for the identification of locations for sustainable agroenterprises in target ecosystems of Latin America proposed, financed and put into motion

This set of outputs and activities was not included in the original 1999 workplan, but has developed as the result of a felt need combined with the funding opportunity. The initiative has made possible the integration of some existing activities, and their complementation with specific additional activities, and associated outputs. Many of these are reported under other CIAT projects as well, since they are collaborative in nature.

Develop concept for integration of GIS, models and agroenterprise methodologies, define outputs, obtain funding and initiate activities at reference site and strategic levels

Introduction and justification

The integration of GIS and economic models with agroenterprise development methodologies offers the prospect of:

- a better definition of agroenterprise priorities
- improved design and implementation of specific agroenterprise projects in reference sites
- the development of a methodology for wider application.

Integrating these components into rural agroenterprise development activities will enhance the ability of our projects to target poverty, and to provide enterprise options that are environmentally beneficial. The incorporation of GIS tools will permit mapping of the biophysical, market, socio-economic, infrastructure and sustainability/environmental variables, that need to be considered in the identification of locations in the micro-region where (a) the prioritized crops can be produced in a sustainable manner, and (b) where any enterprise activity - e.g. storage, grading, processing, packing and be located to maximize economic, social and environmental feasibility and impact. This will greatly assist in the design and implementation of the Integrated Agroenterprise Projects.

Better consideration of key variables associated with sustainable crop production and utilization has so far been attempted only in the case of Hillsides (Cauca) through use of an LP model that incorporates soil erosion, as a final stage in the evaluation of options. More attention needs to be paid to which variables are most related to sustainability in each ecoregion (erosion is not so relevant to Forest Margins, for example), in order to understand the nature of any trade-offs between sustainability and income/commercial feasibility. This implies greater attention to the enterprise-related aspects of sustainability in the development of models in each ecosystem (including post-harvest processes that can generate water pollution, for example). This analysis should include the trade-offs due to risk, both from crop/livestock production and market/price uncertainties, especially as related to non-traditional crops and markets for which both risk and income potential may be higher.

During 1999, a proposal was made to, and approved by, CIAT's Strategic Research Initiative Fund to develop methodologies for the integration of GIS and models with Agroenterprise development. The products/outputs of this initiative will be:

1. Conceptual/methodological publication, detailing the nature of the common approach and the integration of GIS and model-based decision support tools for evaluating and prioritizing locations for agroenterprises and their associated crop/livestock production areas and markets (year 2000).
2. Training materials, based on the approach used, suitable for the target audience at national/local level(s) (year 2000).
3. Economically, socially and environmentally viable agroenterprises initiated or strengthened in target reference sites, with potential for future impact (year 2001).
4. Priority crops/products/markets identified for the three target reference sites, Yoro, Honduras; Cauca, Colombia and Pucallpa, Perú (year 1999).

Note: achieving outputs 3 and 4 will require action at the level of individual projects as well as through this cross project initiative.

Concept and strategy

Quarterly meetings have been held at CIAT with scientific staff from all NRM projects, including staff based in Honduras and Pucallpa. During these meetings, the strategy of the Agroenterprise project, at micro-regional level, was presented. Briefly, this consists of the identification and selection of market opportunities, followed by the design and implementation of integrated agroenterprise projects and local agroenterprise support systems. Areas where both GIS and models can contribute to more efficient and effective development impact through this methodology were identified. Based on this, several activities

have been initiated at reference site level (see below). The diversity of approaches taken at each reference site reflects both the needs of the micro-region and the professional expertise available in the region.

At strategic level, the intention is to systematize the experiences in the reference sites, to assist the development, from the diverse set of activities, of a common approach. This should ensure the compatibility and integration (where relevant) of the different project methodologies used, (e.g. SN-1 market opportunity identification and Projecto SOL), and to clearly identify when and how GIS tools, and models that incorporate sustainability variables, can contribute to improving the methodology. This analysis should also determine any ecoregionally specific modifications that may be needed. One additional strategic concern is to ensure that sufficient attention is paid to the identification and measurement of key social variables (e.g. poverty, community organization, and levels of social capital) in this methodology.

A proposal for a Ph.D. scholarship was made to NRI/University of Greenwich, UK in June 1999 to partially support this strategic-level research. This narrowly failed to secure funding. Other options are now under consideration.

Pucallpa, Perú: identification of optimal locations for the production of promising crops and enterprises for their transformation and/or commercialization

Following the identification of the promising products with market potential in Pucallpa, Perú (see Output 1.1) a study was undertaken to identify the optimal locations in the reference site area for each of the 8 crops/plant species. This was undertaken by Scott Cecchi, visiting researcher and candidate for MS in Land Use and Planning, Appalachian State University, USA, in collaboration with CIAT's Agroenterprise and Land Use Project and staff in Pucallpa, and CODESU.

The methodology used incorporated farmer preferences for the different crops, along with edapho-climatic (rainfall, elevation, soil quality, temperature etc) and market access variables, and land use information, to assess the relative suitability of each crop in each part of the reference site region. On the basis of this analysis, specific areas were identified where, according to these variables, the proposed crops have the best possibility of being successful in contributing to sustainable livelihoods of the local population through the rural agroenterprise initiative.

Eight study zones were identified, based on biophysical conditions, land use patterns, and socio-economic dynamics. National census data was used to analyze communities within these zones, and to select those where specific agroenterprise projects would be most likely to succeed. Community representatives participated in feedback surveys on their relative preferences and abilities to cultivate each crop. In the survey, respondents were asked to rate their liking of each crop and to indicate why they would (or would not) be interested in cultivating that crop. These results were used to select variables from the survey and the national census, to act as indicators for comparing strengths and weaknesses of different communities for cultivating each crop. The most important indicators identified through this process are:

- Market : % of farmers who grow crops based on high prices or secure a market. The project should focus on those farmers who are most market-oriented.
- Auto-con: low on-farm consumption (or high market orientation) is another indicator of market forces
- Index: indicator of the diversity of crops produced on each farm
- Sufficient: % of farmers whose agricultural production provides enough earnings to cover their costs
- Technical: % of farmers who have received technical assistance in the past
- Cert-imp: % of farmers using certified or improved varieties on their farms
- Total: overall probability of Agroenterprise projects being successful in specific communities or zones, using all of the above indicators.

Using the above indicators, the most practical location for the agroenterprise development of each of the eight promising crops was identified, based on spatial variation in farmer preferences, historical cultivation patterns, socio-economic, logistical and economic requirements (Table 4.4).

Table 4.4. Recommended zones/communities for each of the promising crop options identified in Pucallpa

Crop	Recommended production area
Cocona	San Alejandro, Von Humboldt, Campoverde
Camu-camu	River communities in San Alejandro, Curimaná
Uña de gato	Indigenous communities of Ucayali river
Palmito de Pijuayo	Von Humboldt, Curimaná, Nueva Requena
Aguaje	Campoverde, Bajo Ucayali
Copoazu	San Alejandro, Von Humboldt and Campoverde
Barbasco	Von Humboldt, San Alejandro
Castana	Von Humboldt, Campoverde

The four most popular crops were cocona, camu-camu, uña de gato and palmito. The three zones along the Lima-Pucallpa highway were found suitable for the greatest number of crops due to market access, and better ecological characteristics. Other zones with potential are those located along the Aguaytía river and which also have road access (Curimana and Nueva Requena). The zones along the Ucayali river received the least number of recommendations due to risks associated with flooding and poor market access: the indigenous communities there are suited to the uña de gato crop. Other crops that are based on their indigenous knowledge could also be developed.

Yoro, Honduras: Development of a methodology for determining the optimal location for agroenterprises, based on sector analysis (market, processing and raw material production) using GIS and mathematical programming models.

A methodology was proposed, with the following steps:

- A descriptive sector study, and collection of basic data
- Analysis of sector and its potential (identification and characterization of factors, their objectives and strategies; collect additional data needed e.g. production and transaction costs; identify inter-regional flows and create database with information collected
- Mapping of the sector with GIS for visualization of existing data and output from the optimization model (for optimizing location of agroenterprises taking resources and constraints into account). The data needed to map the sector are area, yield and the volumes produced, processed and marketed.
- Identification of the development potential of the sector, through use of the optimization model for agroenterprrese location, considering profitability in different locations, and with the simulation of different scenarios considering possible changes in key variables (e.g. production costs and volumes, demand, transaction and processing costs

The mathematical model uses networks to minimize sector costs, and select network nodes (e.g. sites of processing enterprises) and optimum flows. The limiting conditions are:

- Final consumer demand should be satisfied
- The capacities of production, transport and processing cannot be exceeded
- The condition of opening or not of an agroenterprise is characterized by a fixed cost expressed as a number 0 or 1.
- Mapping with GIS of the output from these model-generated scenarios.

This methodology is being tested with the milk and milk-products sector in Honduras. To date, basic information on the sector is being collected, and a map of the different production regions in Honduras prepared, based on the Honduras atlas published by CIAT in 1998 and the Honduras agricultural census. The experience will be fully documented as it develops.

Llanos, Colombia: Development of a support system to local land-use planning at municipal level based on GIS, incorporating a methodological guide for market studies for specific products, and to determine the products that are best adapted to the biophysical and socio-economic conditions of the region.

The following activities have been carried out during 1999:

- The market opportunity identification manual (see Output 1.1) was incorporated into the Mapmaker program used by GIS, to facilitate its systematic use, and dissemination to actors in the region.
- Collection of secondary information on the soil, climate, fertilization requirements of existing and promising future crops.
- A survey of decision-makers was conducted in Puerto López, Meta, in October 1998 concerning their vision for development in the region, problems that they face, and possible future crop/product and market options.
- Discussion with municipal authorities in Puerto López on their interest in working for and with the agricultural planning efforts of five community action committees at village level.
- Survey of 16 local community action groups (Juntas de Accion Comunal) in the municipality of Puerto López on the current situation of existing crops, and the future potential of these and other promising options.
- Community visits, to identify needs such as:
 - Marketing limitations
 - Land property rights and titling
 - Water supply
 - Diseases and post-harvest losses for fruits
 - Transport problems (for marketing)
 - Deficiencies of local agricultural support services (UMATA, the municipal extension agency)

Some specific demands for technological innovation from the local communities were encountered, for example:

- The need for swine feed rations based on locally produced raw materials, e.g. cassava.
- Improved post-harvest management of fruits to reduce losses and maintain quality.

Future plans: mapping of communities and crops, based on promising market options. The land units derived from GIS mapping will be subjected to an evaluation of land suitability, production costs and potential benefits for the different fruits and crops considered as well as the value added products derived from them.

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Output 5: Enhanced capacity to design and develop successful agroenterprise projects, within CIAT and other institutions

The purpose of Output 5 is to enhance the capacity to design and develop successful agroenterprise projects, both among our partner institutions and within CIAT itself. Activities are contemplated at three levels. Activity 5.1 corresponds to the training of technical personnel in client institutions and organizations that are active in planning, in research or in the promotion of rural agroenterprise development. This training is provided through formal courses offered by CIAT and its partners. Activity 5.2 is aimed at enhancing the awareness of the contribution that rural agroenterprise development can make to sustainable rural development. This is achieved by documenting the impact of the investment in research and development in this area, and providing efficient means for disseminating the results of the work among different stakeholder groups, and in particular among key government and private sector decision-makers. Finally, Activity 5.3 contemplates the consolidation and creation of strategic alliances that provide the basis for developing, in an integrated fashion, the products of the project and projecting them over a wider area.

Highlights

- The Manual on Market Opportunity Identification and Evaluation for Small Rural Producers has been validated and used in nine workshops and training events. Over 150 national personnel have been exposed to the methodology and more than 300 copies have been distributed to interested parties.
- A strategic alliance link with IICA-Ecuador has been established to provide technical support to the actions of IICA in Ecuador directed at the promotion and support of rural agroindustry and rural enterprises. IICA is the executing agency for Ecuador's National Rural Development Program and a series of other initiatives in support of local development.
- The Rural Agroenterprise Development project has made a bid for a project to design and implement a Support Program for the Marketing and Transformation of Agricultural Products in Nicaragua, Honduras and El Salvador. The program that will be financed by COSUDE is scheduled to run for 12 years with an investment of around US\$ 8 million.

Activity 5.1: Training of national personnel in the design and execution of rural enterprise development projects

1999 milestones :

5.1.1 Enhanced capacity in national institutions to identify and evaluate market opportunities for small holders

During 1999, the Community Watershed Management project (PE-3) has made a concerted effort to validate and subsequently use the set of 9 manuals developed as decision-making instruments for the management of natural resources in training courses in Central America and the Caribbean. As reported last year, manual number 7 in this series on the Identification and Evaluation of Market Opportunities for Small Rural Producers was developed by the Rural Agroenterprise Development project.

A total of seven events have been held. Three of these were used to validate the manuals and four were courses designed to 'train trainers'. The latter four courses were run in Colombia, with the watershed consortium, CIPASLA; in the Dominican Republic with an NGO, Sedaf; in Honduras with several government and NGOs, and in Nicaragua with the national agricultural university, UNA.

The market opportunity identification manual was also used as a principal component of a marketing course conducted in September in Quito for thirty professionals associated with Ecuador's rural agroindustry program, PRONADER, in conjunction with IICA and PRODAR. In addition, the market opportunity identification manual will be an important instrument in a rural marketing course, organized by several CGIAR centers, to be held in November in Africa (Nairobi).

The courses conducted with the aid of the aforementioned marketing manual are characterized by the interest and enthusiasm expressed by the trainees. The courses are very dynamic, including field visits and plenty of group exercises and presentations.

In total, over 150 national institution staff has been exposed now to the methodology. Useful feedback has been obtained that will be used to up-date and improve the manual.

5.1.2 Demands for training in agroenterprise development assessed and the design of a strategy initiated

In a process of informal consultation with some of our key partners and stakeholders, potential training needs in rural agroenterprise development have been identified. Among the most important are the following:

- A course in the Philippines with SEARCA and UPWARD on the incorporation of agroenterprise development in sustainable natural resource management development projects.
- A course in East Africa in conjunction with FoodNet, one of ASARECA's regional networks managed by IITA, on rural agroenterprise development.
- A course for Latin America, to be held in Cali, with support from the Organization of American States and the Colombian Ministry of Agriculture and Rural Development.

Further demands for training have been detected in Central America. Follow-up is required to determine the nature and content of these training needs.

Now that the extent of potential demand is better known, a training strategy for the project will be developed over the next few months.

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Collaborators: Ana Abejuela (SEARCA), Dindo Campilan (UPWARD), Shaun Ferris (IITA)

Activity 5.2 Enhancement of the awareness of the potential of rural agroenterprises to contribute to rural development

1999 milestones:

5.2.1 Adoption and impact study of an integrated R and D project for panela in Colombia completed and the results diffused to interest groups

In 1985 the governments of Colombia and Holland established a cooperation agreement for the development of the panela agroindustry in Colombia. The purpose of this agreement was to contribute to the improvement of the quality of life of families that make their livelihoods from panela-production and related activities, through the generation, adjustment and diffusion of appropriate technologies for the agroecological and socioeconomic conditions of panela producing regions of Colombia. This project started in the Hoya del río Suarez region, which was chosen as the pilot region based on a previous characterization and diagnosis of the agroindustry in Colombia. In 1993 a new cooperation agreement was signed to extend the technology to Cundinamarca.

Given the importance of the panela agroindustry and the activities developed through the cooperation agreement for technology development, CORPOICA and CIAT presented a proposal to the IDRC small grants fund that was approved. The objectives of the project were:

- Evaluate the adoption and impact (economic, social and environmental) of the technology developed by CIMPA-Corpoica for the panela agroindustry of Colombia.
- Develop a strategic plan for the strengthening and further modernization of the agroindustry, based on the evaluation of the past intervention experience, a participatory diagnosis with all the actors involved in the agroindustrial chain, and a process of consensus, prioritization and design of the strategy.

Below the most relevant results of the adoption and impact study are presented, while the results of the second objective of the study are presented in section 4.1.2.

Between 1983 and 1998 panela production in Hoya del río Suarez region increased at an annual rate of 4.5% mainly as a result of an increase in yields (5.8% per year) since the harvested area decreased during this period at an annual rate of 1.3%. In Cundinamarca, production also increased at an annual rate of 3.5% but as a result of an increase in harvested area (2.9% per year) since yields only increased at an annual rate of 0.6%. The rest of the panela producing regions of Colombia show an almost null growth in production, area and yields. This situation has resulted in a concentration of panela production in the Hoya del río Suarez and Cundinamarca.

The analysis of the adoption process shows that the work of CIMPA and CORPOICA has been reflected in a significant technological change in sugarcane production, panela processing and sub-products utilization. 76% of the production-processing units in the Hoya del río Suarez adopted at least one of the technologies developed and those units that adopted a technology affect 80% of panela production in the region. For the case of Cundinamarca where the work of CORPOICA started later, only 19% of processing units adopted at least one of the technologies developed and they affect 22% of panela production in the region.

The most broadly-adopted technologies are those that have a low capital requirement. Capital intensive technologies were adopted less frequently. Given that the project was not articulated with a credit scheme, only producers with higher economic capacity adopted the capital-intensive technologies. However, those producers that did adopt these technologies (24%) have a 40% participation of the total production of panela.

The economic impact of the technology at the production-processing unit level is reflected in a significant reduction in production costs and the generation of additional income through the utilization of processing by products such as the “melote”. Producers that reached a high technology level have reduced their production costs by 37% and have increased their total benefits 110% with respect to those that use the traditional technology level. The technology developed was biased towards a reduction in labor demand and an intensive use of capital, which responded to the increasing labor scarcity in the production regions.

In a broader analysis of the economic impact of the technology at the national level, a total economic surplus of US\$ 63 million was estimated for the 1985-1998 period, with an internal rate of return to investment of 76%. When the distribution of these benefits is analyzed, it is estimated that 45% of total benefits reached panela producers and the rest went to panela consumers. Also, the distribution of these benefits among the different panela-producing regions of Colombia shows that panela producers of the Hoya del río Suárez received 56% of the total economic surplus generated by the project, while producers of the occidental part of Cundinamarca received only 5.5% of these benefits. On the other hand, panela producers in other regions of the country that did not adopt the improved technology lost an estimated US\$ 9.8 million because they received a lower price for their product and had not reduced their production costs.

The analysis of the social impact of the project shows a high correlation between well-being and the level of technology. In general, the target population for the processing technology developed were the owners of panela-processing facilities, and therefore, the population with higher well-being. Hence, processing unit owners who adopted the improved technology generated enough economic resources to further invest in their production unit, diversify their production by the acquisition of cattle, and the overall improvement in the quality of life of their families. However, a more detailed analysis on the social impact on other actors with lower well-being, such as sugarcane producers without a processing facility, sharecroppers, and wage-day workers, showed that they also benefited from technological change. First, sugarcane producers and sharecroppers broadly adopted sugarcane production technology. Second, the “maquila” (shared facilities for panela making) type of social organization of processing activities permitted those actors to also benefit from improved processing units and reduce their processing costs and increase productivity. On the other hand, since wage-day laborers who work on panela-processing activities and some of sugarcane crop workers are paid by volumes produced, they increase their incomes considerably when they work on improved processing units or production plots where the improved technology is being applied. However, for the latter the workload was increased in some activities.

The evaluation of the environmental impact of the technology shows that the incorporation of improved furnaces in panela processing facilities have significantly reduced the emission of contaminating gases

such as carbon monoxide, nitrogen and solid particles. At the same time, the increase in energy-use efficiency in the improved furnace has reduced considerably, and in most cases eliminated, the use of wood fuel and tire rubber (when wood is not available), reducing the pressure on deforestation and the production of sulphuric gases from rubber combustion. Finally, liquid effluents were shown to have higher contamination levels in processing units that did not adopt the improved technology.

The following recommendations were made based on this study:

- To increase the impact of technology development, both in terms of adoption and outreach, and to target producers with lower levels of well-being, it is important to increase the level of participation of all the actors in the agroindustrial chain. A more participatory process should result in the generation of appropriate low-cost technology and the articulation of the technological development process to a financing arrangement that provides economic resources according to the needs and capacity of the sector.
- The technological development process should be articulated to a broader strategy for the development of the panela agroindustry, which should include the development of human and social capital, and of new products and markets.
- The design and implementation of a broader development strategy requires the coordination and articulation of the existing support services for the development of the agroindustry that results in a specialized support system for the sector. This support system should articulate and coordinate the different institutions, organizations and associations that offer services for the sector in such a way that they respond effectively to client demands and needs.
- It is recommended that a strategic plan for the agroindustry be designed at the national level, without leaving out the local characteristics of production, oriented to the modernization of the panela agroindustry to make it more competitive, and to the development of national and international markets.

5.2.2 Adoption and impact study of the integrated R and D project for cassava in the North Coast of Colombia was re-analyzed and updated, and the results diffused to interest groups

During the early 1980s, CIAT's former Cassava Program started to develop an innovative approach to research and development as a response to the low adoption rates of the technologies developed by the program during the 1970s. This new strategy called Integrated Cassava Research and Development was designed and implemented for the first time in the North Coast of Colombia during the 1980s. This study analyzed the impact of this first CIAT experience and its contribution to poverty alleviation. Also, the avenues by which the program brought these changes were identified.

In the early 1980s, the North Coast of Colombia was characterized by higher poverty levels than the national standards. The semi-arid conditions of the region made cassava an important crop for food security and cash income, because of its high tolerance to seasonal low rainfall, high temperature and intermediately fertile soils. Small farmers of the North Coast obtained 40% of their cropping income from cassava marketing. Cassava was also an important employment generator. It was estimated that cassava production created around 7.3-million wage-days per year.

During the 1970s, some farmers in the region received land through the land reform program. Also, in the late 1970s, the Integrated Rural Development Program (DRI-program) was established, which concentrated on credit provision. These programs had the effect of encouraging farmers to greatly intensify cassava production. By 1981 cassava production was extremely high and as a consequence cassava farmers faced depressed prices. Hence, problems of massive credit default appeared. Limited markets for cassava belied the DRI's basic premise that production increases would improve small farmers' income. Small-farm development clearly did not depend on production increases alone, but also on marketing. The DRI therefore began searching for alternative markets for cassava.

In the same period, CIAT was concerned that cassava farmers in Latin America, constrained by lack of markets, were not adopting improved production technologies developed during the 1970s. CIAT therefore studied alternative uses for cassava to identify markets with growth potential, the most promising of which was the use of dried cassava chips as an energy component in animal feed concentrates. Therefore, CIAT initiated an integrated approach to cassava research and development.

For the DRI, facing the challenge of finding alternative markets for cassava, CIAT was a natural partner, because it had already identified such possibilities. The Center had also begun developing appropriate cassava-processing technology, and conceptualizing the ICRD strategy. In 1981 the Integrated Cassava Research and Development Project started and was implemented through an integrated set of institutional, organizational, and technological interventions, designed to link small-scale cassava farmers to expanding markets.

The project was implemented through an interinstitutional approach where each institution assumed an agreed a set of responsibilities in accordance with their own mandates and capacity. The Project was coordinated and financed by the DRI-program. The Canadian International Development Agency funded the research activities through CIAT, which work in partnership with the Colombian National Agricultural Research Institute (ICA). These agricultural research activities were articulated to a broader rural development program, where decentralized public and private institutions provided a complete set of support services, including technical assistance, marketing, support to the organizations on business management and legal advice, and credit. Therefore, small cassava-farmer organizations received a broad range of support services for the development of the new agroindustry.

Since the project targeted small farmers working on farms of less than 20 ha, the new agroindustry was established through the organization of small cassava farmers in cooperatives with an average of 25-30 members, which built and operated small-scale processing enterprises. Therefore, a new alternative market was developed for fresh cassava roots, which was expected to establish a price floor for cassava roots, narrow price fluctuations, and enhance farmers' bargaining power. These changes in demand and prices would thus reduce the market risk faced by cassava farmers and create an incentive to increase cassava production, both through area and productivity increases.

The technology was brought from Asia, but was tested, adjusted and diffused with small farmers' participation. This low-cost appropriate technology consisted in chipping cassava roots, which were then taken to cement drying floors, spread and sun-dried.

The ICRD Project was executed in four phases. The experimental phase began with a group of 15 farmers. A pilot plant was built, the processing technology was evaluated and adapted, and an operational scheme was developed for local conditions. During the demonstration phase, farmers took full responsibility for managing the pilot plant. Data on the plant's operation and the consolidation of the market for the product prompted the DRI-program to create a special credit line for establishing cassava-drying plants. The pilot plant was then used as a demonstration and training site for farmer groups interested in building plants in their communities. Between 1983 and 1989, drying plants were replicated at other sites in the North Coast. In 1989, the ICRD Project, as a formal interinstitutional activity, ended. This phase was followed by a progressive reduction in institutional support and, afterwards, by a farmer management phase.

Therefore, cassava chipping and drying organizations emerged, mainly during the replication and institutional withdrawal phases. By 1993, 138 processing plants for drying cassava were operating. Small-farmer cooperatives managed 101 plants, while private individuals, who had adopted the processing technology but not the organizational model, built the remaining 37. Dried cassava production had reached 35,000 tons, valued at US\$6.2 million. 36% of small cassava farmers in the region were selling cassava roots to the agroindustry, and 15% of them were members of a cooperative.

The results of a dry-cassava organization emergence analysis, show that cassava chipping and drying organizations emerged in communities with higher potential for production surplus. Social and human capital also played an important role in the emergence of organizations, as captured by previous experience with community associations, institutional presence, and average education in the community. Human and social capital influenced the capacity that the community had to become organized and ask for institutional support to build a processing enterprise. This result was also validated through interviews with cooperative members, which show that most of them were already organized around some common interest: land or agricultural produce marketing, mainly. The Project's target of reaching small farmers was achieved because cooperatives emerged in communities where the average farm size was lower. Drying plants also emerged independently of land tenancy, indicating that the Project reached equally those communities composed mostly of landowners and those mostly of landless peasants.

The cassava-drying agroindustry started to provide a price floor and a secure market for cassava roots. Prices for fresh roots reacted and rose between 1983 and 1993 at an annual rate of 2.5%. Therefore, by

linking farmers to new expanding markets, the marketing situation of small farmers was improved. Over the short term, this new and more secure market alternative created an incentive to increase area planted to cassava. The area under cassava increased at an annual rate of 7% between 1983 and 1993. This intermediate short-run effect of the ICRD project was validated through interviews with farmers. A testimony of a cooperative member confirms this result in his own words: *"The construction of the drying plant has been one of the major achievements of this community, and the changes in the standard of living are obvious. The association has improved the market for cassava. Before farmers only planted a quarter or half of a hectare with cassava... mainly for home consumption. Now, farmers plant 2-3 hectares of cassava because they have a secure market. The drying plant pays members and non-members in cash; therefore, they increased their cassava cropping area, and this means a higher income."*

The long-term impact of the new agroindustry was expected to foster the adoption of improved production technology, such as new varieties to increase cassava yields. The results of the analysis on the factors that influence the adoption of new varieties show that the presence of a drying plant in the municipality did not influence directly the farmers' decision to adopt. However, the proximity from the farmer's field to the nearest drying plant had a positive impact on the adoption of improved varieties. This result captures two possible effects of the drying plant on technology adoption. The first is related to the new market alternative as discussed previously. The other effect of drying plants was to enhance technology diffusion in three ways: first, technological programs found cooperatives to be natural partners for technology diffusion, by allowing them to reach a larger number of farmers. Cassava farmer associations also foster farmer-to-farmer networking. Furthermore, a major constraint to adoption – availability of planting material -- was partially overcome by the establishment of seed multiplication plots by cooperatives. Improved variety adoption was also encouraged by the presence of technology development projects implemented by cassava research institutions in the communities. Finally, although land tenure had a positive effect on the adoption of improved varieties, these varieties tended to be adopted by smaller farmers.

An analysis on the changes in "unsatisfied basic needs" and in "poverty" show that the ICRD Project contributed to poverty reduction, not directly through the emergence of cassava-drying cooperatives, but through the provision of new production technology and its diffusion as captured by the adoption of production technology. For both poverty indicators, the higher the percentage of cassava area planted to improved varieties in a municipality, the greater the reduction in poverty.

An economic surplus model applied to the ICRD Project supports the above results. The study concluded that the direct benefits generated by the processing technology were only US\$1.6 million for the 1984-1991 period (8.5% of total benefits). However, it was the indirect impact of the agroindustry on the adoption of improved cassava production technology that generated most of the economic surplus, estimated at a total of US\$18.6 million.

Beyond what these results can explain, farmer interviews show that the ICRD project created employment and stabilized incomes. Cassava drying cooperatives empowered small cassava farmer communities and provided informal credit. The following testimonies validate the poverty linkage results presented previously.

"Before, we didn't eat three meals per day... if we had breakfast; we didn't have lunch. And now... I said that there was a change. When we got this land in 1971, we used to plant a quarter or half of a hectare... and now we even plant 5 hectares with cassava. Therefore, things have improved. If you walk around the village, you can see that almost all the houses are built of brick and cement. The village has an aqueduct and part of it has a sewage system, and all of this was acquired with the little we obtained. We don't live in adobe houses anymore, where you could see the beds from outside. The hammocks used to be made with jute, and now we have at least a more comfortable bed. Now we have money to send the children to school and to dress them, to buy the shoes and socks, and in sum, we have enough to eat three meals too." (Don Carlos, cassava farmer and member of COINPROSAN, Segovia, Sampués, Sucre, 1999)

"I was able to support my family, educate my children... Since these programs came, my life has changed from a poor peasant who didn't have anything to a peasant who has enough to eat... I have already told you that all my children are professionals... all of them because of the program. If it weren't for the land reform and the DRI-program, my children would be living in the city slums, and maybe would have become delinquents... they wouldn't have had another choice... they had other opportunities... they went to high

school, to the University, and now can contribute to society” (José Ortega, cassava farmer and member of COAPROBE, Montañita, Betulia, Sucre, 1999)

Although the previous results show that the project was successful in reducing poverty, it is also important to analyze the project's impact sustainability after project termination. However, in this case, the end of the institutional withdrawal phase in 1993 occurred at the same time that the Colombian Government moved toward a neoliberal system by opening up the economy to international competition. Even though cassava farmers faced these two major shocks, in 1999, 56 cassava-drying plants are still operating, representing 40% of the total number of plants built between 1981 and 1991. Of these 56 plants that still operate, 43 belong to small-farmers' cooperatives, although 15 rent their plant to individual entrepreneurs.

After 1993, prices of both dried cassava and fresh roots paid by the agroindustry decreased at annual rates of 5.5% and 4.3%, respectively. These steep decreases in prices were a result of Colombia importing grains for animal feed at lower prices, which were at that time particularly low, reducing to almost zero the profit margins received by cassava-drying organizations. During the same period, the collapse of institutional support eliminated the availability of credit at low-interest rates for use as working capital. These two shocks, combined with the lack of accumulation of working capital by most associations, forced 28% of the cassava drying plants to stop processing between 1992 and 1993. Hence, dried cassava production dropped from 35,000 tons in 1993 to only 7,000 tons in 1994.

Dry-cassava production is starting to increase again, as grain imports are becoming more expensive due to the recent devaluation of the Colombian peso. This illustrates that the sustainability of the project is highly dependent on the macroeconomic environment, which directly affects the viability of the developed marketing alternative.

The experience of the ICRD Project in the Colombian North Coast shows that agricultural research can contribute tangibly to poverty alleviation. However, it requires two important components. First, the integration of market and post-harvest research and development with the production technology research agenda. If, for example in Latin America, only about 7% of the final price paid by the consumer, represents the price received by the farmer, it is therefore important to look beyond the farm gate. At the same time, agricultural research should be articulated to a broader demand-led development process in order to achieve poverty alleviation goals. Second, the complexity of the challenge of reducing poverty and the scarcity of available resources makes the development of partnerships a must. Those partnerships should be promoted both among institutions, where each provides its own expertise, comparative advantage, and mandate to respond to the demands of community organizations and individuals, and between institutions and community organizations this fosters an intimate networking among institutions and local social organizations and individuals, building on existing local social and human capital.

5.2.3 Conceptual framework for assessing the adoption and impact of the CIAT Rural Agroenterprise Development Project under development

Since 1998, CIAT's Rural Agroenterprise Development Project team initiated an internal discussion on the methodology to assess the impact of the project. The process started with the revision and the introduction of modifications to the project's logical framework. The revision of the project's logical framework was a very useful first step for the development of an impact assessment methodology for the project. First, the team constructed a “problem tree” to illustrate the links between resource degradation, poverty and agroenterprise development. In this way, the role of the project in contributing to poverty alleviation and resource conservation was analyzed. Second, the products of the project were better defined and linked to the overreaching development objective, which is the base for good impact assessment.

Figure 5.1 shows the “problem tree” that was constructed by the project team, where the central problem was defined as rural poverty. The most cited effects of poverty on society are migration to urban centers, social conflict, the move to the production of illicit crops, and of course the over exploitation of natural resources.

The causes of rural poverty are numerous but among the most important are food insecurity, and the inadequate access to basic social services such as health and education. In turn, food insecurity in rural areas can be attributed to the inability of farm families to meet their own household food needs, but also to the low profitability of agricultural activities. Opportunities for them to complement their income with off-farm

employment are also limited. As we move down the “problem tree”, low income can be attributed to supply side problems that have to do with low production surpluses. However, low income is also a consequence of demand side problems that have to do with (a) unarticulated market channels, which have the effect of reducing the price paid to the farmer for his produce, and (b) the absence of higher-value production alternatives that could provide rural communities with higher earnings.

Looking first at the supply side of the equation, low farm production can be attributed to two causes, either to the unavailability of sufficient land and/or the low productivity of the land that the farmer does have at his or her disposition. Low productivity can be attributed to soil and water resource degradation, and inappropriate production technology. However, low productivity can also be attributed to the limited access that farmers have to infrastructure and support services.

In the demand side, low farm income can be attributed to unarticulated market channels, the absence of efficient value-adding post harvest handling and processing enterprises, and the absence of higher value production alternatives as a result of a lack of information on potential market opportunities. However, even with the desire to invest in post harvest processing and handling enterprises, these efforts are often limited by three further factors: 1) the accessibility to appropriate technology, 2) the difficulty in identifying and harnessing the entrepreneurial skills of the community, and, 3) the severe or even total absence of services to support these types of activities. Underlying these problems are a number of causes. Among the many that one might think of there are two that are related to CIAT’s work, which are a low degree of coordination among the institutions involved in rural development and the lack of organization among the members of the rural community. Below these problems we have what might be termed the root of our tree, which is the absence of coherent policies for land use, agricultural and rural development.

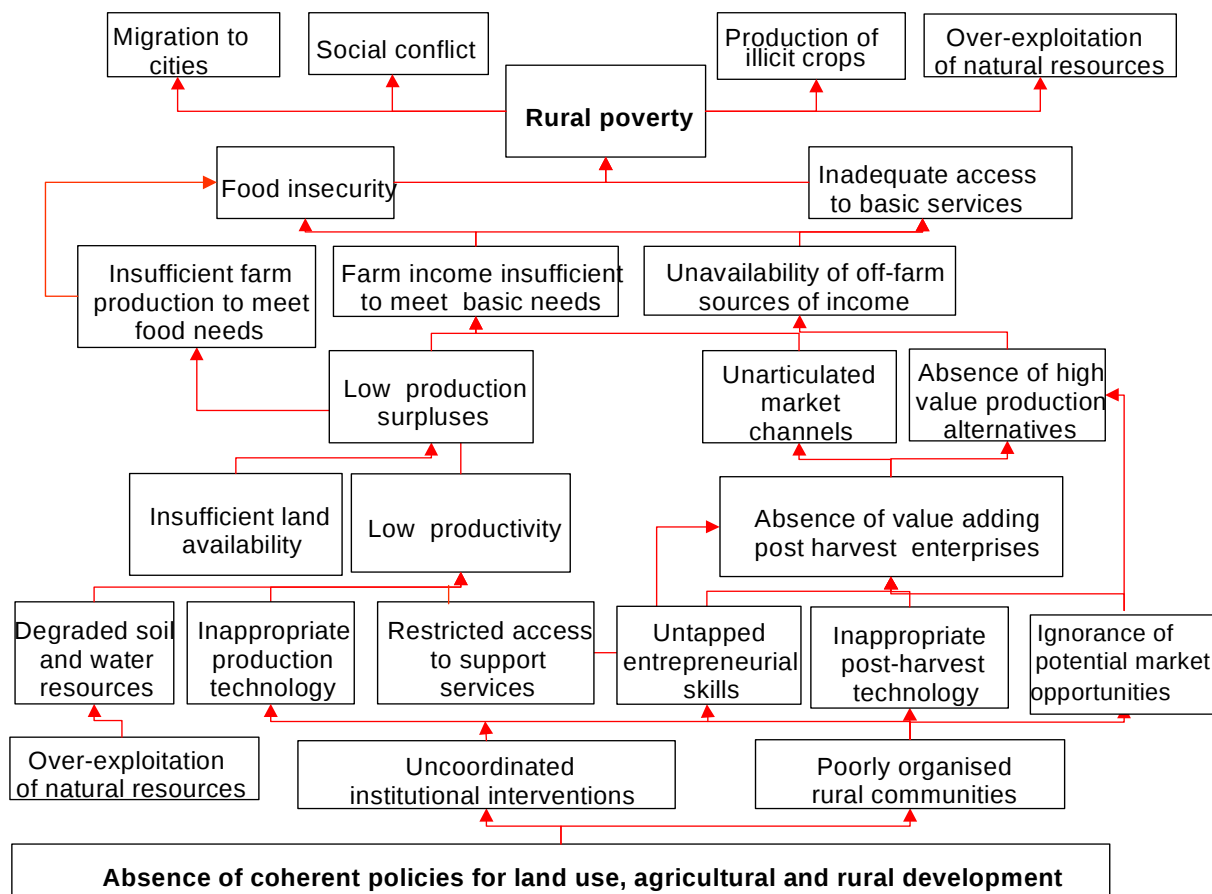


Figure 5.1 “Problem tree” to link SN-1 project outputs to final development impact on rural poverty and natural resource management.

The process of developing an impact assessment methodology for the project continued with the identification of the clients and the uptake path from project outputs, to intermediate effects, to final development impacts. Therefore, trying to link project outputs to development impact, we can see that the methods, tools, information and institutional models generated by CIAT's Rural Agroenterprise Development project are transferred through training, information and publications to personnel of national, regional and local institutions and organizations. This diffusion of project outputs is intended to improve the skills of personnel in developing rural agroenterprise development projects. The institutional indicator at this level is the degree to which the outputs are used and incorporated into project design and execution. In turn, the implementation of these projects, that incorporates SN-1 project outputs in its design and execution, reach directly the rural population. Hence, it is expected that these agroenterprise development projects achieve intermediate impact, which should be measurable through the number of new enterprises established, improvements in processing efficiency and product quality, a diversification in income generating activities, more functional support systems, and increases in the value added retained in the rural sector and in employment. This intermediate impact should then contribute to an improvement on rural incomes and overall quality of life of the rural population, which is the ultimate goal of CIAT.

In CIAT's reference sites, the project will have the opportunity to evaluate both intermediate and final development impacts. For this purpose, the SN-1 project economist has been participating this year in CIAT's Natural Resource Division Impact Assessment Taskforce. This taskforce has had two meetings, and a series of interactions, this year to further discuss an impact assessment methodology for all the projects in the hillsides reference sites (Cauca, Colombia; Yorito and Sulaco, Honduras; and San Dionisio, Nicaragua), as well as in the forest margins site in Pucallpa, Perú, and the Savannas site in Puerto López, Colombia. For each reference site, paths from project outputs to intermediate effects and final development impact are under construction. Advice will then be sought on a conceptual framework and an econometric model that permits the validation of the hypothesized links from outputs, to intermediate effects, and to final development impact. Following this, a database collection mechanism will be defined to assess the present "baseline" situation, and subsequently monitor impact through time, and to assess ex-post impact in the future.

5.2.4 Public awareness materials about the project developed and information disseminated to our partners and clients

Public awareness materials. A series of public awareness materials on the project have been elaborated for distribution to visitors, partners and other potential stakeholders, and for use in conferences and workshops. These include:

- a two-page flier about the project (in English and Spanish)
- a more detailed 8 page document that describes the project, its outputs, strategy and partners (in Spanish)
- A 25 page compendium that summarizes the achievements of the project and CIAT's previous work on agroenterprise development (in Spanish)
- A PowerPoint presentation of the project, available in Spanish, English and French
- A poster for use at workshops and conferences

Project website. Progress was made in developing a structure for a bilingual website, and in completing the basic text content, organized by project output. Some of the project products and services, including the searchable database of service providers in the Andean zone, are also completed while others are under construction. Several project publications are in the process of translation to a web format.

Staff changes and the need to train new personnel have recently slowed progress. It is expected that, with the support of the communications unit, the project website will be online by December 1999.

Staff resources must be dedicated to maintaining up to date content and in dealing with information requests that result from the launch of the website. The project will ensure its capacity to cope with this potential demand.

Information dissemination. A total of 77 information requests were received and answered by the project, most of them dealing with the cassava postharvest handling and processing, the rest concerned other roots

and tubers and some fruits. The material developed for the cassava information system has proved invaluable in being able to supply relevant information.

5.2.5 Third round of the Global Collaborative Post-Production Research Network's Small Grants Fund completed

The Small Grants Fund of the Global Collaborative Production Research Network (GCPPRN) is managed by CIAT for IDRC. The Fund aims to promote and support partnerships for research and development on value-added activities, and enterprise and market development in the key crops and ecosystems identified by the CGIAR. The resources of the Fund are destined for undertaking exploratory research or pre-feasibility studies on which to develop larger proposals. In its initial phase, which will terminate in March 2000, the Fund has had a capital of US\$ 130,000 for disbursement, with a maximum award of US\$ 13,000 per grant. At the end of the one-year period allowed for project execution, grantees must provide a final research report and a follow-up project profile.

In the period April 1997 to October 1998, two calls for proposals were made. 10 awards have been granted from a total of 167 proposals submitted. The proposals selected by an Expert Panel were:

Arracacha Processing – Perú, submitted by the International Potato Centre.

Marketing Opportunities for Root Crops Starch Processing in Uganda submitted by the International Institute of Tropical Agriculture.

Assessment of the Adoption and Impact of Improved Technology by the Panela Agroindustry and Prioritization of Future Research and Development Activities in Colombia, submitted by the Corporación Colombiana de Investigación Agropecuaria.

The Potential of the Starch Industry as a Strategy for Promoting Rural Industrialization and Income Growth – Vietnam, submitted by the International Food Policy Research Institute.

Opportunities of Sweetpotato Starch Production in the Philippines, submitted by the Philippine Root Crop Research and Training Centre.

Linking Postharvest Utilization with Soil Conservation: Sweetpotato in an Agroforestry System in Vietnam, submitted by the International Potato Center, Bogor, Indonesia.

Strengthening Marketability and Transfer of Technology for Sustained Food Processing at a Village Level in Vietnam submitted by SEAMEO Regional Center for Graduate Study and Research in Agriculture (SEARCA), Los Baños, Laguna, Philippines.

Lessons Derived from the Rise of Small-Scale Sorghum Milling in Botswana, submitted by Development Technology Centre, University of Zimbabwe, Mount Pleasant, Harare, Zimbabwe.

Sweetpotato Flour for Urban Markets in Uganda: Assessment of Market Potential for a New Product, submitted by the International Potato Center, Nairobi, Kenya.

A New Thresher-Cleaner for Irrigated Rice Farmers in Mali and Burkina Faso, submitted by the West Africa Rice Development Association (WARDA), St. Louis, Senegal.

The technical reports and follow-up project profiles of the first five of these projects were completed this year. The technical reports from the second round will become available in the first trimester of 2000. A second phase of the Fund initiated this year, made possible by a further grant from IDRC. A third call for proposals was therefore made in July this year. 120 proposals were submitted before the October 1 deadline. These are in the process of being evaluated by the Expert Panel.

An interim report on the Fund was prepared in January 1999, based on experience gained to date. The report raises issues that have had to be addressed during the current phase. It is evident that the Fund has generated considerable interest, as is illustrated by the number of grant submissions.

It is too early yet to make an assessment of the effectiveness of the Small Grants mechanism for:

- (a) Promoting partnerships among IARCs and NARS in the area of post production research, or
- (b) Increasing the investment in post-production research through the development of well-oriented project proposals based on exploratory or pre-feasibility studies of the type supported by the Small Grants Fund.

In the current phase, a mechanism for monitoring and evaluating the progress towards reaching these objectives needs to be established.

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Activity 5.3 Consolidation and establishment of collaborative links and strategic alliances

1999 milestones:

5.3.1 Links with international and national research and development institutions involved with postharvest and rural enterprise development consolidated

Intercenter Post Harvest Working Group on Roots, Tubers, Plantains and Cooking Bananas (RTCBP). This Working Group was established in 1996 following the creation of the Committee for Intercenter Root and Tuber Crops Research (CICRTR). The objective of the working group is to *capture the synergies of continued and enhanced collaboration between CGIAR centres and increase the effectiveness of the research on postharvest processing and marketing of RTCBPs.* The group was constituted and is currently made up of representatives of CIAT, CIP, IFPRI and IITA. The CIAT representative convenes the group.

This year it was hoped to have the vision and strategy document for post harvest research on RTCBPs completed, progress on which was reported last year. However, the group convenor is also a co-convenor of a Task Force, commissioned by the CICRTR, to develop an overall vision for root and tuber research in the CGIAR. This latter document has taken precedent and is now terminated.

Of particular significance, has been the role that the working group has played in promoting a fusion of efforts between what were the GASGA (*Group for Assistance on Systems relating to Grain After harvest*) institutions (ACIAR, GTZ, FAO, CIRAD and NRI) and five international agricultural research institutions (CIAT, CIP, IFPRI, IITA and IRRI). At a meeting held in Chatham, UK in June, *PhAction* was created as a forum for post harvest research and development. The role of the new forum will be to raise the profile of post-harvest research and development and accomplish greater impact in the post-harvest sector. This will be achieved through the development and delivery of innovative post-harvest systems in collaboration with a range of public and private-sector partners in developing countries. *PhAction* aims to contribute to enhancing rural livelihoods and securing access to safe food supplies for all, by fostering better links between farmers and markets.

The forum will seek to expand the level of representation by including major regional research bodies, key NGOs, agribusiness centers and entrepreneurs, to gain a more global membership and include partners with a range of skills that are required to meet the post-harvest challenges into the next millennium.

Three major activities have been initiated. The first is *PhAction*'s participation at International Centres' Week with the development of a rolling PowerPoint presentation on the role of biotechnology research in resolving post harvest constraints. This presentation will be displayed as part of the International Conference on "Ensuring Food Security, Protecting the Environment, and Reducing Poverty in Developing Countries: Can Biotechnology Help?" to be held 21-22 October 1999. The second is the organization of an International Meeting in June 2000 on "Linking Farmers to Markets" which will be held the GTZ Headquarters at Eschborn, Germany. Finally, the GASGA newsletter and IITA's post harvest newsletter have been fused into anew *PhAction* news.

The creation of *PhAction* is an important step towards raising the visibility of post harvest research and seeking greater coherence and complementarity among the different institutions active in this field.

Programa para el Desarrollo Agroindustrial Rural (PRODAR). PRODAR is a strategic partner of CIAT's Rural Agroenterprise project. In March 1999, members of PRODAR, including representatives of CIAT and key stakeholders, undertook a participatory strategic planning exercise to orient the activities over the next five years.

A number of important changes in the way PRODAR is managed and administered were proposed, and a new organizational structure recommended. With a view to longer-term sustainability, a change of status, such as a foundation, is also recommended. In addition, operationally the following actions were prioritized:

- The strengthening of the national networks and other organizations that want to join PRODAR
- The progressive, but decisive, linking into PRODAR of organized farmers' groups
- The stimulation of research towards local agrifood systems, including priority themes identified by farmers such as credit, business organization, etc.
- The strengthening of mechanisms for commercializing the products of rural agroindustry, especially marketing market information, making use of the region's comparative advantage in the marketing of promising products
- The activating, with greater determination and persistence, of the mechanisms of horizontal cooperation and technical assistance between networks and associated organizations
- The linking, in a more proactive way, to those instances responsible for policy and programs in support of rural agroindustry
- The reorientation of training programs in function of the needs and demands of farmers.

These types of exercise are of exceptional importance to CIAT's Rural Agroenterprise project since they provide a basis from which to analyze and introduce modifications into our own research agenda based on the needs and demands of our clients.

CIRAD. CIRAD has been a strategic partner of CIAT's in its work on small agroenterprise development since 1989, providing an important link to know-how on processing technologies and product quality. More recently, this alliance has extended to work on local agri-food systems. This year we have undertaken a series of discussions, both in Montpellier and CIAT, to define the scope and content of future collaboration. Based on the objectives of both institutions, and the needs identified over the past two years, the areas that have been tentatively prioritized are:

- The generation of basic knowledge and adaptation of cutting-edge technologies for adding value to products with novel market potential, with CIRAD-amis and CIRAD-flhor.
- The enhancement of technological and organizational innovation in local agri-food systems.

CLAYUCA. The Consortium for the Promotion of Cassava Research and Development in Latin America and the Caribbean (CLAYUCA in Spanish) was established in April this year. CLAYUCA is a novel mechanism that seeks to mobilize resources from both the public and private sectors for an international research agenda on cassava. Both CIAT and CIRAD are founding members. In defining the Consortium's priorities, a number of post harvest constraints were identified. Among them, CONGELAGRO, a private enterprise producing frozen cassava and cassava-based ready-to-fry products, member of the CLAYUCA consortium, has solicited technical assistance for improving its process efficiency and product quality. CIAT and CIRAD, being members of CLAYUCA, joined in offering this service, through support from the Rural Agroenterprise Development project. A preliminary diagnostic visit was made to CONGELAGRO and recommendations formulated on the steps to be undertaken to resolve the constraints identified.

The creation of CLAYUCA provides a further vehicle through which to disseminate the experiences and lessons learned from CIAT's involvement in the Integrated Cassava Projects, for which the Rural Agroenterprise Development and the Impact Assessment (BP-1) projects have analyzed the adoption and impact.

IICA ACT-Ecuador. Initial contacts made through PRODAR and the subsequent development of a memorandum of understanding for the development of a series of short term activities (see Output 4, activity 4.3) in support of Ecuador's National Rural Development Program (PRONADER in Spanish), have led to the establishment of a more formal strategic alliance with the office of IICA in Ecuador. Following a visit of two IICA staff to Cali in July, the objectives of the strategic alliance have been formulated as:

- a) to support the actions of IICA in Ecuador directed at the promotion and support of rural agroindustry and rural enterprises,
- b) to apply in Ecuador the methodologies, strategies, and mechanisms developed by CIAT's rural agroenterprise project, and
- c) to generate information that will permit an increase in the knowledge base on this theme that is possessed by CIAT and PRODAR.

A series of concrete short and medium-term activities have been defined. In the medium term, CIAT's support activities will be implemented within the framework of the Proyectos de Desarrollo Local (PROLOCAL in Spanish), a national program that will be funded through a loan from the World Bank over a five-year period.

5.3.2 IDRC-financed project on Promoting Sustainable Links for Improved Rural Livelihoods successfully initiated

Late in 1998, the 'umbrella' project submitted to IDRC for the management of the research activities of the former FoodLinks program was approved. The start up of this project has required the selection and hiring of a rural agroenterprise specialist to work with the project team, and the establishment of contracts with a number of existing and new partners. There were 41 applicants for the position of agroenterprise specialist. Three candidates were short-listed and following their interviews, Mark Lundy was selected for the position.

The 'umbrella project' has three outputs:

1. Principles and a set of methodological tools for selecting natural resource-based products with market and production potential in fragile ecosystems and for the subsequent market development of the most promising options.

The output is oriented toward building on the market opportunity identification studies developed in the three reference sites (see Output 1 of this report), and seed money has been made available to the local consortia, based on an agreed workplan, to design and develop agroenterprise projects. Planning meetings have been held in each reference site. By the end of the year, agreements will have been signed with all three consortia. Progress is reported in Output 4, activity 4.1. In addition, provision has been made to enter into a collaborative arrangement with EARTH College in Costa Rica, with a view to incorporating rural agroenterprise development activities into the community-development component of the student curriculum. EARTH College is an international university focusing on agricultural sciences and natural resources. Discussions are advanced and will also be concluded shortly. The agreement with EARTH represents an important means for further validation of the products of our research, improve them, and as a means of dissemination in Latin America.

2. Strategies for the design and implementation of support systems for promoting rural agroindustrial enterprises at the local and regional level.

This output will be worked at two levels: at the microregional level in the reference sites and at the Latin American and Caribbean level. At the microregional level in the reference sites, arrangements are similar as for the above output and progress is reported in Output 4, activity 4.2. At the regional level, means of consolidating the integration and cooperation among CIAT, PRODAR and CIP-CONDESAN, with a view to improving the regional provision of services (R&D, training, information, etc.). Included here is the strategic planning process that was undertaken this year within PRODAR and reported above.

3. Strengthened partnerships between International Agricultural Research Centres, IARCs, and National Agricultural R&D systems, NARS, for undertaking well focused post-production research and development projects.

This output refers to the continuation of the Small Grants Fund mechanism for a further round (see 5.2.5. above).

5.3.3 Project proposals formulated to support the work of the project and our partners

A number of project proposals have been prepared over the year. These can be divided into different categories. A full list of proposals prepared is listed at the end of this report.

Major projects to make progress towards achieving outputs, submitted by CIAT. In this category, two projects were developed:

- A project titled 'Sustainable Rural Livelihoods through Agroenterprise Development in Semiarid Southern Africa', presented to the DFID competitive grants facility. The purpose of the project is to develop and adapt, with local partners in Zimbabwe, methodologies, tools and organisational models for the strengthening and establishment of rural agroenterprises and their support services. We have recently been informed that this project has not been approved for funding.
- A project titled 'Support to the marketing and transformation of agricultural products in Nicaragua, Honduras and El Salvador', presented to COSUDE. This was also a competitive bidding process about which we have yet to learn the result.
- A project titled "Identification of market opportunities to promote sustainable production systems in the Río Calico microwatershed in Nicaragua", presented to IDRC in collaboration with PRODESSA and Redar Nicaragua. CIAT's reference site, San Dionisio, is located in the aforementioned watershed. This project was not approved and new donors will be identified.

Major projects presented by our partners, in which CIAT would provide a supporting role. Five projects were presented in this category, two to FONTAGRO and one to BMZ:

- 'Post harvest handling and marketing of two neo-tropical fruits: mora (*Rubus glaucus*) and lulo (*Solanum quitoense*)'. This was the resubmission by CORPOICA of the proposal approved last year, but due to insufficient availability of funds, FONTAGRO withdrew its support. It is an Andean regional project, under the auspices of PROCIANDINO, and was prepared by institutions from Venezuela, Colombia and Ecuador, and CIAT. If approved, CIAT will participate in the development of an information system, training in participatory technology development and the design of marketing studies.
- 'Factors in the successful performance of competitive rural economic organizations in Latin America', presented by the Centro de Estudios Ganaderos y Agrícolas, CEGA, with the participation of the Red Internacional de Metodología de Investigación de Sistemas de Producción Instituto de Desarrollo Agropecuario, RIMISP, Chile and CIRAD, France. CIAT together with CEGA are to take responsibility for developing the studies in Colombia.
- 'Integration of Agroindustrial and Environmental Demands in Agricultural Research for the 21st Century', submitted by ISNAR to BMZ. This is a second phase proposal whose goal is that the NARS contribute effectively to the process of technological innovation in a way that induces the equitable and environmentally sustainable socio-economic development of Latin American countries. In the first phase a set of six methodological studies that concentrated on the strategic, programmatic and operational dimensions of integrating environment or agroindustry-oriented research into the agendas of the NARS were prepared and developed as training materials. These management methods were tested, validated and disseminated through a series of workshops. In the second phase, the purpose is to ensure that the NARS have the management capacity and have at their disposition the tools for integrating environment and agroindustrial demands into their research agenda. CIAT, through projects BP-1, PE-1 and SN-1, will participate in the project by providing decision support-tools for resource management and rural agroenterprise development, technical support in training and implementation, thematic research and institutional impact assessment. The proposal was rejected for financing in 2000. There exists the possibility of resubmission for financing in 2001, and ISNAR is searching for other possible donors.
- 'Local Support Systems for Rural Enterprise Development', presented by the Fundación Carvajal to USAID. See Output 4, activity 4.2 for details.

- ‘Local Support System’, presented by Corpoversalles to Inter-American Foundation. See Output 4 activity 4.2 for details

Projects submitted to competitive small grant funds, principally in support of our partners’ work. 6 proposals have been submitted by partners to these types of funds. These are:

- Development of snack-type expanded foods that generate value added for the cassava sour starch agroindustry in the department of Cauca, submitted by COAPRACAUCA, Colombia .
- Improvement of the chancaca (crude sugar) rural agroindustry in the region of Saipina, Bolivia, presented by the Universidad Mayor San Simon, Cochabamba.
- Technical and economic feasibility of the production and marketing of uchuva (*Physalis peruviana* L) by small-scale farmers in the Andean region of Colombia, presented by FIDAR.
- Exploration of alternatives for the handling and processing of mora (*Rubus glaucus*) at the level of farmer groups in the department of Cundinamarca, presented by CORPOICA.
- Realizing enterprise dreams in the field: self-systematization of the enterprise experiences of the CIALs of Cauca, Colombia as a support tool for the construction of a future vision, presented by CORFOCIAL.
- Information system on markets for rural agroindustrial products, presented by El Taller, Perú

Project concept note prepared but not yet submitted for funding. The following project concept notes were prepared, either as lead institution or in collaboration with our partners:

- ‘Improving rural livelihoods through sustainable development of the cassava starch sector in Vietnam’. Prepared by CIAT, IFPRI, PHTRI (Hanoi, Vietnam), IAS (Vietnam), Dept. of Agric. Policy and Rural Devpt. (Hanoi, Vietnam).
- Diversifying income sources in small holder production systems through the development of market linkages, small agroenterprises and value-added post-harvest processes in developing countries. Prepared by CIAT, IITA and EMBRAPA for possible submission to IFAD. The concept was rejected.

Contributors: Rupert Best, Christopher Wheatley, Nadine Zakhia, Veronica Gottret, Carlos Ostertag, Mark Lundy, Mireille Totobesola.

Collaborators: See institutions named above.

Donors

Restricted core

The following donors provided restricted core funding for the Rural Agroenterprise Development Project during 1998:

Department of International Development, DFID, United Kingdom
Ministerio de Agricultura y Desarrollo Rural, MADR, Colombia

The Centre de Coopération Internationale en Recherche Agronomique pour le Développement, CIRAD, France provided support to the project through the secondment of a food technologist to CIAT.

Special project funding

The following donors provide special project funding for the Rural Agroenterprise Development Project during 1998:

International Development Research Centre, IDRC, Canada

Ministère des Affaires Etrangères, France

Ministerio de Agricultura y Desarrollo Rural, MADR, Colombia

Unrestricted are funding

In addition, to the above the project receives support from donors that provide unrestricted core funding to CIAT.

Collaborators

The following institutions collaborated with the Rural Agroenterprise Development Project during 1998.

Output 1.

AGROGENET, Honduras
CIAT's Community Watershed Management Project (PE-3)
CIAT's Sustainable Production Systems Project (PE-5)
CIAT's Participatory Research Project (SN-3)
Consorcio Interinstitucional para la Agricultura Sostenible en Laderas, CIPASLA, Colombia
Consorcio de Desarrollo Sostenible de Ucuyali, CODESU, Perú
Comité Local para el Desarrollo Sostenible de la Cuenca Tascalapa, CLODEST, Honduras
Instituto Interamericano para la Cooperación para la Agricultura, IICA ACT, Ecuador
Institute for Participatory Research in Central America, IPCA
PDA de Visión Mundial, Honduras
Programa Cooperativo de Desarrollo Agroindustrial Rural en America Latina y el Caribe, PRODAR

Output 2.

CIAT's Cassava Genetic Enhancement Project (IP-3)
CIAT's Participatory Research Project (SN-3)
Programa Cooperativo de Desarrollo Agroindustrial Rural en America Latina y el Caribe, PRODAR
Centre de Coopération Internationale en Recherche Agronomique pour le Développement – Département d'Amélioration des Méthodes pour l'Innovation Scientifique, CIRAD-amis, France
Corporación para Estudios Interdisciplinarios y Asesoría Técnica, CETEC, Colombia
Cooperativa Agraria de Productores de Yuca y Rallanderos del Cauca, COAPRACAUCA, Colombia
Fundación para la Investigación y el Desarrollo Agrícola, FIDAR, Colombia
Plan de Generación de Empleo - Plan de Modernización y Desarrollo, Ministerio de Agricultura y Desarrollo Rural, Colombia
Universidad del Valle, UNIVALLE, Colombia

Output 3.

Cámara de comercio e Industria, Perú
Centro de Estudios Ganaderos, CEGA, Colombia
Centro Internacional de la Papa, CIP, Asian Regional Office
Corporación para Estudios Interdisciplinarios y Asesoría Técnica, CETEC, Colombia
Fundación Carvajal, Colombia
Programa Cooperativo de Desarrollo Agroindustrial Rural en America Latina y el Caribe, PRODAR
Natural Resources Institute, NRI, United Kingdom
Post Harvest Technology Institute, PHTI, Vietnam
Internacional Food Policy Research Institute, IFPRI, USA

Output 4.

CIAT's Community Watershed Management Project (PE-3)
CIAT's Land Use Dynamics Project (PE-4)
CIAT's Sustainable Production Systems Project (PE-5)
Corporación para Estudios Interdisciplinarios y Asesoría Técnica, CETEC, Colombia
Comité Local para el Desarrollo Sostenible de la Cuenca Tascalapa, CLODEST, Honduras
Consorcio de Desarrollo Sostenible de Ucuyali, CODESU, Perú
Consorcio Interinstitucional para la Agricultura Sostenible en Laderas, CIPASLA, Colombia
Consorcio Carchi, Ecuador

Cooperativa Agraria de Productores de Yuca y Rallanderos del Cauca, COAPRACAUCA, Colombia
Corporación para el Desarrollo de Tunia, CORPOTUNIA, Colombia
Corporación para el Desarrollo de Versalles, CORPOVERSALLES, Colombia
Dirección Regional Agraria de Ucayali, DRAU, Perú
Fundación para la Investigación y el Desarrollo Agrícola, FIDAR, Colombia
Fundación Carvajal, Colombia
Servicios Técnicos para el Desarrollo Sostenido, Sertedeso, Honduras

Output 5.

Australian Centre for International Agricultural Research, ACIAR.
CIAT's Public and Private Linkages Project (SN-2)
CIAT's Impact Assessment Project (BP-1)
CIAT's Cassava Genetic Enhancement Project (IP-3)
CIAT's Integrated Pest Management Project (PE-1)
Centro Internacional de la Papa, CIP, Perú
Centro Nacional de Pesquisa de Mandioca e Fruticultura Tropical/Empresa Brasileira de Pesquisa Agropecuária, CNPMF/EMBRAPA, Brazil
Consortio Interinstitucional para la Agricultura Sostenible en Laderas, CIPASLA, Colombia
Comité Local para el Desarrollo Sostenible de la Cuenca Tascalapa, CLODEST, Honduras
Corporación Colombiana de Investigación Agropecuaria, CORPOICA, Colombia
Deutsche Gesellschaft für technische Zusammenarbeit, GTZ.
Empresa de Asistencia Técnica e Extensioa Rural do CEARE, EMATERCE
Food and Agriculture Organization of the United Nations, FAO
Fundación Carvajal, Colombia
Instituto Interamericano para la Cooperacion para la Agricultura, IICA ACT, Ecuador
International Institute of Tropical Agriculture, IITA, Nigeria
Internacional Food Policy Research Institute, IFPRI, USA
Natural Resources Institute, NRI, United Kingdom
Programa Cooperativo de Desarrollo Agroindustrial Rural en America Latina y el Caribe, PRODAR
Servicios para el Desarrollo Agropecuario y Forestall, Sedaf, Republica Dominicana
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List of Acronyms

ACIAR	Australian Centre for International Agricultural Research
AMUCAU	Asociación de Mujeres del Cauca, Colombia
ASARECA	Association for Strengthening Agricultural Research in East and Central Africa
BMZ	Der Bundesminister Für Wirtschaftliche Zusammenarbeit (German Federal Ministry for Economic Cooperation and Development)
CARCHI	Consorcio Carchi
CEGA	Centro de Estudios Ganaderos, Colombia
CETEC	Corporación de Estudios Interdisciplinarios y Asesoría Técnica, Colombia
CGIAR	Consultive Group on International Agricultural Research
CIAL	Comité de Investigación Agrícola Local, CIAT Colombia
CIAT	Centro Internacional de Agricultura Tropical, Colombia
CICAL	Cooperativa Industrial Conservadora de Alimentos Limitada, Honduras
CICRTRC	Post-harvest Working Group of the Committee for the Inter-Center Collaboration on Root and Tuber Crop
CIID	Centro Internacional de Investigaciones para el Desarrollo del Canadá
CIMPA	Centro de Investigaciones para el Mejoramiento de la Caña Panelera
CIP	Centro Internacional de la Papa, Perú
CIPASLA	Consorcio Interinstitucional para la Agricultura Sostenible en Laderas, Colombia
CIPAV	Centro para la Investigación en Sistemas Sostenibles de Producción Agropecuaria
CIRAD	Centre de Coopération Internationale en Recherche Agronomique pour le Développement
CLAYUCA	Consorcio Latinoamericano y del Caribe para la Investigación y el Desarrollo de la Yuca
CLODEST	Comité Local para el Desarrollo Sostenible de la Cuenca del río Tascalapa, Yoro, Honduras
CNPMF/EMBRAPA	Centro Nacional de Pesquisa de Mandioca e Fruticultura Tropical/Empresa Brasileira de Pesquisa Agropecuaria, Brazil
COAPRACAUCA	Cooperativa Agraria de Productores de Yuca y Rallanderos del Cauca, Colombia
CODESU	Consorcio de Desarrollo Sostenible de Ucayali, Perú
COHORSIL	Cooperativa Hortícola de Siguatepeque, Honduras
CONDESAN	Consorcio para el Desarrollo Sostenible de la Ecoregión Andina
CONGELAGRO	Congelados Agrícolas S.A.
CORPOICA	Corporación Colombiana de Investigación Agropecuaria
CORPOMIXTA	Corporación Mixta para la Promoción de la Microempresa
CORPOTUNIA	Corporation for the Development of Tunia, Colombia
CORPOVERSALLES	Corporación para el Desarrollo de Versalles, Colombia
COSUDE	Agencia Suiza para el Desarrollo y la Cooperación
CRC	Corporación Regional del Cauca
DEPAM	Desarrollo Participativo Amazónico
DFID	Departamento de Desarrollo Internacional del Reino Unido
DRAU	Dirección Regional Agraria de Ucayali, Perú
DRI	Desarrollo Rural Integrado
EARTH	Escuela de Agricultura de la Regional Tropical Húmeda
ECONORCA	Empresa Cooperativa del Norte del Cauca
EMATERCE	Empresa de Asistencia Técnica e Extensioao Rural
EMBRAPA	Empresa Brasileira de Pesquisa Agropecuaria
FAO	Food and Agriculture Organization, Rome
FES	Fundación para la Educación Superior
FIDAR	Fundación para la Investigación y el Desarrollo Agrícola, Colombia
FODECO	Fondos de Desarrollo Comunitarios, Ecuador
FONTAGRO	Regional Fund for Agricultural Technology
FUNDAGRO	Fundación para el Desarrollo Agropecuario, Ecuador
GASGA	Grain for Assistance on Systems relating to Grain After-harvest
GIS	Geographic Information Systems

GTZ	Deutsche Gesellschaft Fur Technische Zusammenarbeit
IAS	Institute of Agricultural Sciences, South Vietnam
ICA	Instituto Colombiano Agropecuario
ICRAF	International Centre for Research in Agroforestry, Kenya
IDRC	International Development Research Center, Canada
IFAD	International Fund for Agricultural Development, Italy
IFPRI	International Food Policy Research Institute, USA
IAP	Instituto de Investigaciones de la Amazonía Peruana
IICA	Instituto Interamericano para la Cooperación para la Agricultura
IITA	International Institute of Tropical Agriculture, Nigeria
INIA	Instituto Nacional Investigaciones Agropecuarias
IPCA	Institute for Participatory Research in Central America
IRRI	International Rice Research Institute
ISNAR	International Service for National Agricultural Research, The Netherlands
ITDG	Intermedial Technology Development Group
MADR	Ministerio de Agricultura y Desarrollo Rural
MINGA	Alternative Approaches to Natural Resource Management in Latin America and the Caribbean
NRI	Natural Resource Institute, UK
OEA	Organización de Estados Americanos
OECD	Organization for Economic Cooperation & Development
PADEMER	Programa para el Desarrollo de la Microempresa Rural
PHTI	Post-Harvest Technology Institute, Vietnam
PROCIANDINO	Programa Cooperativo de Investigación y Transferencia de Tecnología Agropecuaria para la Sub-región Andina
PRODAR	Programa para el Desarrollo de la Agroindustria Rural, Perú
PROLOCAL	Proyecto de Desarrollo Local – IICA-Ecuador
PRONADER	Programa Nacional de Desarrollo Rural, Ecuador
RED	Rural Enterprise Development
REDAR	Red de Desarrollo Agroindustrial Rural
RIMISP	Red Internacional de Metodologías de Investigación en Sistemas de Producción
SENA	Servicio Nacional de Aprendizaje, Colombia
SERTEDESO	Servicios Técnicos para el Desarrollo Sostenido, Honduras
SMMEIT	Small, Medium and Micro Enterprise Innovation and Technology
TCA	Tratado de Coperación Amazónica
UMATA	Unidad Municipal de Asistencia Técnica Agropecuaria
UNA	Universidad Nacional Agraria, Nicaragua
UNIVALLE	Universidad del Valle, Cali, Colombia
UPLB	University of the Philippines, Los Baños
UPWARD	Users' Perspectives with Agricultural Research and Development (CIP-Philippines)
USAID	United States Agency for International Development
WARDA	West Africa Rice Development Association, Cote d'Ivoire

Abbreviations

NARS	National Agricultural Research Systems
NGO	Non-governmental Organization
NRM	Natural Resource Management

Rural Agroenterprise Development Project team members 1999

Rupert Best	Post harvest R&D specialist and Project Manager
Christopher Wheatley	Enterprise organization specialist
Nadine Zakhia	Food technologist, CIRAD-amis
Carlos Ostertag	Market and business specialist
Veronica Gottret	Economist (50% time input)
Mark Lundy ¹	Rural agroenterprise specialist
Mireille Totobesola	Food Technologist (stationed in Honduras)
Miguel Angel Valdivieso	Economist (stationed in Pucallpa)
John J. Hurtado	Food Technologist
Freddy Alarcon ²	Expert, starch processing
Enna Salcedo	Lab. technician
Luzmila Murcia	Lab. technician
Carlos Chilito	Processing technician
Jairo Jimenez	Field technician
Stella Narváez	Bilingual secretary

¹ Arrived August 1999

² Left October 1999