PRODUCT LINE PA-1: MARKETS, INSTITUTIONS AND LIVELIHOODS

Summary

Annual Report 2007

CIAT

Centro Internacional de Agricultura Tropical
International Center for Tropical Agriculture
Supported by the CGIAR
# TABLE OF CONTENTS

ANNUAL REPORT 2007 .....

PEOPLE AND AGROECOSYSTEMS RESEARCH FOR DEVELOPMENT CHALLENGE (PA RDC) .....

Product Line PA1: Markets, Institutions and Livelihoods .....

SUMMARY ANNUAL REPORT 2007 .....

CIAT Markets, Institutions and Livelihoods Product Line PA-1 .....

1. Logframe 2007 .....

2. Outcome 2007 – Quality management of high value products .....

3. Achievement of Output Targets for 2007 .....

   Output 1: Institutional arrangements and mechanisms for targeting, increasing and evaluating impacts .....

   Output 2: Diagnostic, targeting and information tools that improve market value chain management for the economic and environmental benefit of smallholder farmers and the poor .....

   Output 3: Approaches, tools and technologies for improving the competitiveness of smallholder producers of high value commodities including tropical fruits .....

   Output 4: Technologies for better product and environmental quality through management of diseases and pests .....

   Output 5: Policy guidelines, tools and innovations for adaptation to risk, high stress and vulnerability .....

4. Research Highlights 2007 .....

   4.1 Genetic diversity in causal agent of Moko disease in banana and plantain .....

   4.2 Global modeling of impacts of climate change .....

   4.3 Enabling rural innovation .....

5. Description of one project outcome .....

   Targeted action-research to develop pro-poor private sector policy .....

6. Publications .....

   Articles in refereed journals .....

   Books and monographs .....

   Book chapters .....

   Papers presented at formal conferences and workshop with external attendance .....

   Articles in international newsletters or other scientific series .....

7. Funded project proposals .....

8. Project Staff (* Left during 2007) .....

2
ANNUAL REPORT 2007

PEOPLE AND AGROECOSYSTEMS RESEARCH FOR DEVELOPMENT CHALLENGE (PA RDC)

Product Line PA1: Markets, Institutions and Livelihoods

Introduction
This new Product Line aims to deliver innovations, mostly in the form of approaches, methods, tools and policy options, that contribute to improving the effectiveness of agricultural research and development and the uptake of research results by small-scale farmers. Above all, PA1 aims to ensure that the strategies, approaches and methods employed and advocated by CIAT are appropriate for benefiting the hard-to-reach, and especially the poor, which include many female farmers in Africa, Asia and Latin America.

The tropical world is characterized by considerable variation at many scales. Agroecological conditions tend to be most varied in hillside agriculture. Markets are often undeveloped, distant, poorly informed, and especially imperfect in the way they serve the poorer, small farmers. Institutions at all levels from village to region tend to be numerous, and at varying levels of effectiveness, inclusiveness and governance. Small farmers’ livelihoods range from near-subsistence to small scale commercial (although pure subsistence is less common than is sometimes thought), and households may seek or have opportunities to emerge from poverty in ways that differ according to their composition, agroecological situation and socioeconomic circumstances.

Both social and biophysical outcomes are needed to achieve widespread impact under these conditions. Development and research practitioners need tools that enable them to work at different scales, and to discriminate effectively among rural populations and environments. Many of the most appropriate tools will be interdisciplinary in nature, and in general need to be derived through iterative interdisciplinary research processes. Agricultural science practice cannot be successful if it is disconnected from development practice, and some of these research processes need to be embedded in development (research for development R4D) in order to yield robust and international public goods.

PA1 on Markets, Institutions and Livelihoods aims to address several aspects of the System Priorities 3, 4 and 5, by addressing key research questions around systems approaches (targeting, systems integration, organizational models, reaching end users, learning approaches and impact assessment). We expect outputs from PA1 to increase the effectiveness of other product lines of CIAT, as well as the wider R4D community. Some outputs contribute directly to those of other Product Lines through teamwork with biophysical scientists, and may be reported elsewhere. This Product Line incorporates previously separate CIAT Projects on Tropical fruits, Crop and agroecosystem health management, Rural agroenterprise development, Participatory research approaches, and Spatial and economic analysis for decision and policy support in agriculture and the environment. In this transitional year, this annual report for PA1 is presented in the format in which our work was organized throughout 2007 (and which first appears only.
in the MTP 2008-2010). However, we have maintained in this report the Output Targets formally approved in the MTP 2007-2009, reorganized into the five Outputs of PA1. Reports are mostly in the form of published abstracts or summaries, with full papers or reports being available elsewhere (including in many cases on the CIAT website).
SUMMARY ANNUAL REPORT 2007

CIAT Markets, Institutions and Livelihoods Product Line PA-1

1. Logframe 2007
This Product Line was established at the end of 2006 from the merger of several previously separate Projects. CIAT’s MTP for 2007-2009 had been developed on the basis of those former projects. This annual report for the new Product Line PA-1 is presented in the format in which our work was organized throughout 2007 (and which first appears only in the MTP 2008-2010). However, we have maintained in this report the Output Targets formally approved in the MTP 2007-2009, reorganized into the five Outputs of the new PA-1.
<table>
<thead>
<tr>
<th>OUTPUT</th>
<th>OUTPUTS</th>
<th>INTENDED USER</th>
<th>OUTCOME</th>
<th>IMPACT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Institutional arrangements and mechanisms for targeting, increasing and evaluating impacts.</td>
<td>Agricultural and environmental research organizations, development and environmental organizations, civil society groups, policy makers at regional, national and local scales.</td>
<td>Greater incorporation of the interests of the poor in the design and implementation of R&amp;D projects.</td>
<td>R&amp;D investments have larger impacts, of which a larger share goes to the poorest beneficiaries.</td>
</tr>
<tr>
<td></td>
<td>Methodologies and approaches for diagnosis, tracking and strengthening social capital outcomes for improved NRM documented.</td>
<td>NARES and other organizations and actors involved in rural innovation processes, e.g., IARCs, NARS, NGOs, private sector companies, farmers organizations.</td>
<td>Increased efficiency and number of actors including vulnerable/ disadvantaged farmers participating in rural innovation systems.</td>
<td>Increased productivity and multiple use of resources (social, financial, natural, human) through integrated agricultural and natural resource management interventions.</td>
</tr>
<tr>
<td></td>
<td>At least 10 active partnerships developed with national and international organizations in 4 Latin American countries, for action research on organizational procedures, institutional mechanisms and policies for co-development of technologies.</td>
<td>NARS in Latin America.</td>
<td>Rural innovation systems strengthened through co-development of technologies, and the creation of a more nurturing environment for innovation.</td>
<td>Faster development and adaptation of more appropriate technologies leading to improved sustainable livelihoods, especially for the rural poor.</td>
</tr>
<tr>
<td>Output Targets 2007</td>
<td>At least 40% of NARS professionals trained in the ERI framework are using it in at least four African countries, and as a result at least 25 farmers' groups are using the ERI approach.</td>
<td>NARS in Africa.</td>
<td>Increased capacities of organizations / institutions to develop and promote integrated agro-enterprise development solutions for wealth creation. Increased efficiency and number of actors including vulnerable/ disadvantaged farmers participating in marketing chain.</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>At least three teams of facilitators are formed in Africa and Latin America for wider capacity building, dissemination and application of community managed PM&amp;E systems.</td>
<td>NARS in Africa and Latin America.</td>
<td>Ditto.</td>
<td>Ditto.</td>
</tr>
<tr>
<td></td>
<td>Disaggregated data on food consumption, and production and nutritional outcomes for key HarvestPlus target countries.</td>
<td>Researchers internal and external to CIAT.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>DIAGNOSTIC, TARGETING AND INFORMATION TOOLS THAT IMPROVE MARKET VALUE CHAIN MANAGEMENT FOR THE ECONOMIC AND ENVIRONMENTAL BENEFIT OF SMALLHOLDER FARMERS AND THE POOR.</td>
<td>POLICY-MAKERS (PUBLIC, PRIVATE &amp; DONOR), FARMER ORGANIZATIONS, NGO’S, RESEARCHERS IN CIAT AND PARTNER ORGANIZATIONS.</td>
<td>IMPROVED CONCEPTUAL AND EMPIRICAL UNDERSTANDING OF HOW IMPACT OCCURS IS USED TO DESIGN MORE EFFECTIVE RESEARCH AND DEVELOPMENT INTERVENTIONS.</td>
<td>R&amp;D EFFORTS LEAD TO MORE EFFECTIVE, EQUITABLE AND SUSTAINABLE DEVELOPMENT IN THE TROPICS.</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>OUTPUT 2</td>
<td>AGRO-ENTERPRISE METHODS AND STRATEGIES, MARKET-BASED SOFTWARE APPLICATIONS VALIDATED AND CONTEXTUALIZED WITH DEVELOPMENT PARTNERS. PRODUCTS PUBLISHED IN PRINT AND DISSEMINATED IN ELECTRONIC FORMATS. METHODS AVAILABLE IN ENGLISH, SPANISH, FRENCH, VIETNAMESE AND LAO.</td>
<td>DEVELOPMENT PARTNERS AND SERVICE PROVIDERS LINKED TO SELECTED MARKET CHAINS, ENHANCE THROUGH LOCAL ICT PROVIDERS, AND CBO’S.</td>
<td>MARKET-BASED SOFTWARE AND ICT MARKET INFORMATION APPLICATIONS WILL OPEN NEW OPPORTUNITIES FOR COMMERCIAL INVESTMENT.</td>
<td>SIGNIFICANTLY INCREASED USE OF MARKETING TOOLS BY SERVICE PROVIDERS LEADING TO MORE DIVERSIFIED AND MEASURABLE GAINS IN INCOMES FOR POOR RURAL COMMUNITIES.</td>
</tr>
<tr>
<td>OUTPUT TARGETS 2007</td>
<td>LEARNING ALLIANCE PARTNERSHIPS ESTABLISHED FOR IMPACT, ACTION RESEARCH AND STRATEGIC STUDIES. ICT-BASED KNOWLEDGE MANAGEMENT SYSTEMS AND FIRST LEVEL ENTERPRISE “TOOL BOX” FOR LEARNING ALLIANCE COMPLETED TO SUPPORT SELECTED SITES IN LAC, SE ASIA AND AFRICA, SCALED UP TO 30 COUNTRIES.</td>
<td>CLIENTS: STRATEGIC PARTNERS FROM NGOs, GOV EXTENSION, PRIVATE ENTERPRISE, DONOR AGENCIES AND FARMER ORGANIZATIONS</td>
<td>STRATEGIC PARTNERS INVEST IN LEARNING PROCESS AND INTEGRATE MARKETING SKILLS INTO PROJECT DEVELOPMENT AND IMPLEMENTATION</td>
<td>INCREASED PARTNER SKILLS, MORE EFFECTIVE RURAL DEVELOPMENT PROJECTS AND INPUTS FOR IMPROVED PUBLIC, PRIVATE AND DONOR POLICIES</td>
</tr>
<tr>
<td>OUTPUT TARGETS 2007</td>
<td>RESEARCH OUTCOMES LEAD TO PROJECTS THAT ENABLE DIFFERENTIATED CLIENTS AND SERVICE PROVIDERS TO ACHIEVE BETTER ACCESS TO MARKETS AND SERVICES. NEW MODELS IN PLACE THAT LINK PRIVATE SECTOR FIRMS WITH SMALLHOLDER FARMERS BASED ON PRINCIPLES OF BUSINESS EQUITY AND SUSTAINABLE NRM. IMPACT STUDIES OF BDS SERVICE OPTIONS FOR SMALL-SCALE PRODUCERS UNDERTAKEN IN SELECTED SITES TO SUPPORT PRO-POOR MARKET IMPROVEMENT.</td>
<td>ADVOCACY GROUPS, NGO’S, POLICY AND ECONOMICS RESEARCHERS, NATIONAL – REGIONAL TRADE POLICY GROUPS, PRIVATE SECTOR FIRMS.</td>
<td>INITIAL MODEL FOR LINKING SMALLHOLDERS WITH MAJOR PRIVATE SECTOR FIRMS IN A SUSTAINABLE FASHION.</td>
<td>---</td>
</tr>
<tr>
<td>OUTPUT</td>
<td>OUTCOMES</td>
<td>INTENDED USER</td>
<td>OUTCOME</td>
<td>IMPACT</td>
</tr>
<tr>
<td>--------</td>
<td>----------</td>
<td>---------------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td>OUTPUT 3</td>
<td>Approaches, tools and technologies for improving the competitiveness of smallholder producers of high value commodities including tropical fruits.</td>
<td>Scientists and research managers; development planners and practitioners; producer associations; policymakers; donors.</td>
<td>Decision-makers gain better understanding of high value crop systems and performance, and thereby take informed decisions on resource allocations.</td>
<td>R&amp;D efforts more effectively and systematically targeted. Increased productivity of high value, readily-marketed products.</td>
</tr>
<tr>
<td>Output Targets 2007</td>
<td>Proposal for development of a Tropical Fruits Information Center submitted to potential donors for funding.</td>
<td>Research agencies, donors.</td>
<td>Consortium of potential national and international partners identified and engaged in the initiative.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Selected at least 10 elite clones from 3 fruit species with desirable attributes to growers and consumers. (lulo, Guatemalan raspberry and avocado).</td>
<td>Local research and development agencies and farmers groups.</td>
<td>Producers using selected and propagated elite materials.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least 6 populations of three fruit species (lulo, Guatemalan raspberry and avocado) tested for resistance to most limiting diseases.</td>
<td>Research agencies.</td>
<td>Breeders of tropical fruits could add identified lines to their breeding program.</td>
<td></td>
</tr>
<tr>
<td>OUTPUT 4</td>
<td>OUTPUTS</td>
<td>INTENDED USER</td>
<td>OUTCOME</td>
<td>IMPACT</td>
</tr>
<tr>
<td>----------</td>
<td>---------</td>
<td>---------------</td>
<td>---------</td>
<td>--------</td>
</tr>
<tr>
<td></td>
<td>Technologies for better product and environmental quality through management of diseases and pests.</td>
<td>National research and development agencies; and farmer associations in Latin America and Africa.</td>
<td>Cost-effective and environmentally friendly practices and tools promoted by national R&amp;D agencies and in use.</td>
<td>Increased rural income through increased yield, higher market values and reduced production costs.</td>
</tr>
<tr>
<td></td>
<td>Molecular tools for detection, diagnosis and diversity studies of key pathogens and pests of CIAT commodities made available.</td>
<td>NARI researchers in LAC, Asia and Africa, IARCs.</td>
<td>Disease and pest characterization tools developed and adopted by researchers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>At least 2 Brachiaria genotypes with spittlebug resistance, a whitefly resistant cassava variety, and 50 blast and sheath blight resistant rice lines developed.</td>
<td>Researchers in LAC, Asia and Africa; CIAT scientists; farmers.</td>
<td>Selected genotypes of Brachiaria, cassava and rice tested for resistance to insects and pathogens in different regions.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Management strategies for soil-borne pests (white grubs and burrowers bugs) evaluated with farmers.</td>
<td>NARI researchers and farmers in LAC, Africa.</td>
<td>Soil pest management methods adopted by farmers.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farmer participatory research on integrated whitefly management conducted in selected pilot sites of sub-Saharan Africa, S.E. Asia and Latin America.</td>
<td>NARI researchers, Universities, NGOs, IARCs, farmers.</td>
<td>Methods in lower pesticide use resulting in lower production costs and environmental contamination adopted.</td>
<td></td>
</tr>
<tr>
<td>OUTPUT S</td>
<td>OUTPUT</td>
<td>INTENDED USER</td>
<td>OUTCOME</td>
<td>IMPACT</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>Policy guidelines, tools and innovations for adaptation to risk, high stress and vulnerability.</td>
<td>Policy-makers (public, private &amp; donor), farmer organizations, NGO's, researchers in CIAT and partner organizations.</td>
<td>Improved conceptual and empirical understanding of how policy enables effective research and development interventions.</td>
<td>R&amp;D efforts lead to effective, equitable and sustainable development in the tropics.</td>
</tr>
<tr>
<td></td>
<td>Potential of payment for environmental services schemes to provide incentives for adoptions of better soil and water management practices in catchments assessed.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Canasta and Homologue tools adapted to a range of crops. Concepts expanded to Africa.</td>
<td>Decision makers in producer associations, NGOs, and GOs.</td>
<td>Tools are used for identification of environmental niches that support the implementation of supply chains high value crops.</td>
<td>More effective locating and targeting of germplasm leads to higher welfare and environmental benefits.</td>
</tr>
</tbody>
</table>
2. Outcome 2007 – Quality management of high value products

Three years ago CIAT engaged in a 3-year BMZ-funded project entitled Diversification Agriculture Project Alliance (DAPA) which had the overall objective of developing the methods and process for linking farmers to high-value product markets. DAPA focused on carefully selected agricultural products, including specialty coffees, high value fodder crops, aromatic plants and high-value honey supply chains in Colombia. The selection represents larger groups of similar products. The project developed a conceptual framework whereby quality of high value products is monitored and managed accordingly at the stages of the value chain that are in the origin country. The developed processes include those for the identification of quality niches in the landscape, quality management at the farm-level, and the accompanying information management of quality attributes through the value-chain.

DAPA research was organized under four thematic lines: (i) Methods and tools for the identification of environmental niches apt for high-value products and their site specific management. (ii) The development and testing of principles for online data management that assures information flow and traceability along the supply chain. (iii) The assessment of the costs and benefits of grower groups to participate in high-value supply chains. (iv) The governance mechanisms of supply chains that enable associations and grower groups’ equitable participation in high-value supply chains.

The methodologies are generic in nature, and applicable to a number of high value crops where quality is controlled by environmental and / or management factors, and of value to the market. The uptake of methodologies developed by the project, and published in international peer-reviewed journals and books, by coffee grower associations and their partners led not only to higher farm-gate prices, but helped to establish a culture of quality management. The project also developed an information system entitled Cinfo which has evolved into a broader value-chain management system for differentiating agricultural produce based on their quality characteristics. Currently, over 1,500 farmers have their green coffee production managed in the Cinfo system as part of the DAPA project. DAPA research insights about the generation of relevant product quality information inform and empower producers to negotiate successful business deals. DAPA lead to several spin-off projects, where project outputs are now being adopted by a range of national farmer associations in Colombia, Honduras, Nicaragua, and coffee businesses in consuming countries. CIAT has been contracted to take part in some of these projects. The Cinfo database now houses data on 5,000 growers, and continues to grow. It is now the adopted system for managing quality in some major commercial projects of the National Federation of Colombian Coffee Growers, and training is continually requested on implementing such concepts and systems in new value-chains in coffee and other high value crops.
3. Achievement of Output Targets for 2007

Output 1: Institutional arrangements and mechanisms for targeting, increasing and evaluating impacts
Methodologies and approaches for diagnosis, tracking and strengthening social capital outcomes for improved NRM documented.

- Yes, 100% complete in both Africa and Latin America (Refer to papers by Sanginga et al, Njuki et al on social capital and NRM).

At least 10 active partnerships developed with national and international organizations in 4 Latin American countries, for action research on organizational procedures, institutional mechanisms and policies for co-development of technologies.

- Yes, 100% completed through the CAI-Kellogg Project (see report).

At least 40% of NARS professionals trained in the ERI framework are using it in at least four African countries, and as a result at least 25 farmers' groups are using the ERI approach.

- Yes (100% complete).

At least three teams of facilitators are formed in Africa and Latin America for wider capacity building, dissemination and application of community managed PM&E systems.

- One team formed at the Kenya Agricultural Research Institute. Others not formed due to departure of two senior social scientists. In Latin America, one team was formed in Bolivia and is active in training more technicians, while another is in process of being trained by the new trainers. (See project reports).

Disaggregated data on food consumption, and production and nutritional outcomes for key HarvestPlus target countries.

- Yes, 100% completed (see this Annual Report).

Output 2: Diagnostic, targeting and information tools that improve market value chain management for the economic and environmental benefit of smallholder farmers and the poor.

- Yes. List of manuals at:

  http://isa.ciat.cgiar.org/catalogo/listado_es.jsp?tema=AGROEMPRESAS.

Learning alliance partnerships established for impact, action research and strategic studies. ICT based knowledge management systems and first level enterprise “tool box” for learning alliance completed to support selected sites in LAC, SE Asia and Africa, scaled up to 30 countries.

- Yes. Refer to Learning alliances reports.
Research outcomes lead to projects that enable differentiated clients and service providers to achieve better access to markets and services. New models in place that link private sector firms with smallholder farmers based on principles of business equity and sustainable NRM. Impact studies of BDS service options for small-scale producers undertaken in selected sites to support pro-poor market improvement.

- Yes. Cuatro Pinos / Costco study; Gates Africa project (USD 5m); CRS project Nicaragua (USD 20m).

**Output 3: Approaches, tools and technologies for improving the competitiveness of smallholder producers of high value commodities including tropical fruits.**

Proposal for development of a Tropical Fruits Information Center submitted to potential donors for funding.

- Yes: Seed money for developing the proposal was obtained from donor; a full proposal was developed and submitted for funding to Asohofruco (manager of National Horticultural Fund), Colombia in November 2006. However, this donor was not willing to fund the full proposal. Other donors and partners in the region has been approached without success. Activity will not longer continue in 2008.

Selected at least 10 elite clones from 3 fruit species with desirable attributes to growers and consumers (lulo, andean raspberry and avocado).

- 60%. Activities are still in progress and will be completed in 2008, as per timetable of corresponding projects. Full version of Annual Report 2007 provides details for this output target.

- Elite clones have been identified in national collections of Colombia and Ecuador (naranjilla and Andean blackberry) and are currently being tested for agronomic performance. Avocado germplasm for rootstocks is being collected by Corpoica (Colombia) and will be assessed for disease resistance (*Phytophthora cinnamomi*) in 2008. Low cost methodologies for clonal propagation of safe planting material are being developed and will be reported in 2008.

- At least 6 populations of three fruit species (lulo, Andean raspberry and avocado) tested for resistance to most limiting diseases.

- Activities are still in progress following the timetables of corresponding projects. Selected germplasm, from national collections in Colombia and Ecuador and from accession from farmers fields, is being tested for resistance to principle diseases and pests (diseases vary according to the species being evaluated). Annual Report 2007 describe the progress achieved to date.

**Output 4: Technologies for better product and environmental quality through management of diseases and pests.**

Molecular tools for detection, diagnosis and diversity studies of key pathogens and pests of CIAT commodities made available.

- Following the reorganization into Product Lines, this output target is reported under SBA RDC.
At least 2 Brachiaria genotypes with spittlebug resistance, a whitefly resistant cassava variety, and 50 blast and sheath blight resistant rice lines developed.

- Following the reorganization into Product Lines, this output target is reported under SBA RDC – cassava and rice.

Management strategies for soil-borne pests (white grubs and burrowers bugs) evaluated with farmers.

- Yes. Following the reorganization into Product Lines, this output target is reported under SBA RDC – Beans.

Farmer participatory research on integrated whitefly management conducted in selected pilot sites of sub-Saharan Africa, S.E. Asia and Latin America.

- Final report on whitefly project under preparation by end March 2008.

**Output 5: Policy guidelines, tools and innovations for adaptation to risk, high stress and vulnerability.**
Potential of payment for environmental services schemes to provide incentives for adoptions of better soil and water management practices in catchments assessed.

- Yes. Working paper submitted to CPWF.

Canasta and Homologue tools adapted to a range of crops. Concepts expanded to Africa.

- Yes. Tools in use in Africa.


#### 4.1 Genetic diversity in causal agent of Moko disease in banana and plantain

This study focused on characterization of the genetic diversity of a Colombian population of *R. solanacearum* race 2, causal agent of bacterial wilt of plantain and banana and a very important disease affecting these crops. Using Multiplex PCR a strain of *Ralstonia solanacearum* isolated from banana was found to be pathogenic in plantain, and showed genetic identity with a group of strains isolated from plantain around Colombia. The DNA pattern suggests that this strain is not pathogenic in banana. In areas where the two crops are produced together, the risk of non-pathogenic strains of *R. solanacearum* infecting plantain is high; consequently, disease management measures need to be developed.

#### 4.2 Global modeling of impacts of climate change

Two papers, published or in press in peer reviewed journals, seek to understand the likely impact of climate change on aspects of the agricultural sector. Both papers have received press attention during the year.

The first looked at the threats of climate change on wild crop relatives in Latin America and Africa. Taking wild peanuts, potatoes and the Vigna gene pool as case studies, species distribution modeling was combined with results from global climate models to evaluate the likely threat that climate change will have on these important wild species. Climate change strongly affected all species, with an estimated 16-22% (depending on the migration scenario used) of these species predicted to go extinct and most species losing over 50% of their range size. These results are important for highlighting the
importance of these genetic resources, and the need for policies to facilitate better conservation of the gene pools.

The second paper modeled climatic suitability for 43 crops from Annex 1 of the International Treaty for Plant Genetic Resources for Food and Agriculture (ITPGRFA), with the aim of understanding the geographic shifts in suitability of major crops and of some important high-value niche crops. Climate change is not all bad news for agriculture, with significant areas actually gaining in climatic suitability. Nevertheless, the most detrimentally affected, in terms of reduction of suitable areas for current staple crops, will be sub-Saharan Africa and the Caribbean, areas with the least technological capacity to cope. The paper shows on a crop by crop basis where the major threats and opportunities exist.

4.3 Enabling rural innovation
Farmer organizations are increasingly being recognized as key players in agricultural research and development. Research on the role of social capital in improving collective marketing, technology adoption and utilization, policy dialogue and in reducing conflict over natural resource in Southern Africa in 2007 showed that endowment in certain dimensions of social capital significantly decreased the occurrence of conflicts and played a significant role in managing them. However, social capital mechanisms have some limits, and are not always effective in resolving some types of conflicts. In such cases, people rely on formal mechanisms for arbitration and adjudication. The use of various soil management technologies is dependant on socio-economic variables as well as the existence of different dimensions of social capital. Social capital affects adoption especially through its importance in determining the access of households to a particular soil management technology. Different kinds of social capital influence technology adoption differently; therefore, it is important to differentiate these kinds when working with farmer groups and farmer organizations. While men and women were found to invest equally in participation in group activities or contribution of communal work, the benefits of social capital are unequally distributed. Women find it significantly harder to transform the number of social relations into improved information, access to markets, or help in case of need.

5. Description of one project outcome.
Targeted action-research to develop pro-poor private sector policy
CIAT Research on the French bean supply chain in Guatemala contributed to the development, improvement and implementation of pro-poor mechanisms by a major US retailer and the dissemination of these results to a group of large-scale buyers of agricultural products globally. This outcome relates to Outcome 3 – Pro-Poor Policy Options for Rural Communities – and specifically the respective Output target for 2006 of the former Rural Agro-enterprise Development Project. The outcome is documented in a study summary available at

http://www.sustainablefoodlab.org/filemanager/download/7767/

This outcome was achieved in the context of a Guatemalan French bean supply chain that links nearly 2,000 low-income rural producer families to dynamic markets in the US, moves 4.2 million pounds of product a year and generates US$ 1.5 million income for
producers. The outcome contributed to the following changes: i) a decision by the retailer to source its product exclusively from poorer producers and communities; ii) a commitment by the retailer to source additional products (i.e. frozen beans) from the farmer owned cooperative; iii) review of existing business practices on the selection of secondary suppliers; and, iv) the establishment of a fund supported by a small percentage of profit from chain actors to reinvest in health care access and educational scholarships for participating smallholder communities and families.

Beyond the chain specific results, this case has contributed to thinking on sustainable relationships between major buyers of agricultural products globally and smallholder suppliers as evidenced by its use at the Healthy Value Chains workshop co-hosted by MIT, World Wildlife Fund and the Sustainability Institute in Boston (August 2007)\(^1\) and the Sustainable Value Chains workshop hosted by the Sustainable Food Laboratory in Guatemala (October 2007)\(^2\). Companies involved in these learning and discussions spaces purchase over US $ 50 billion of agricultural products annually. They include Unilever, US Foodservice, Costco, CH Robinson, Chiquita, SYSCO, General Mills, Green Mountain Coffee Roasters, Coca Cola, IKEA, BP and Nike among others. The evidence in this paper has contributed to similar work on coffee in Mexico and Central America (with Green Mountain Coffee Roasters), work on shrimp and cashew nuts in Asia and Africa (Costco) and the assessment of tea sourcing (Unilever). Based on this work, CIAT has secured funding through a consortium for US $ 5 million to work on new business models for sustainable trading relationships in Africa.

The principal users of this work are global buyers of major agricultural products. This study contributes to their understanding of how to build pro-poor mechanisms into their supply chains and, as a result, enhances opportunities for millions of smallholders globally directly and indirectly. The study served to initiate dialogues and concrete activities in this direction but is far from the expected final outcome, which is the mainstreaming of sustainable trading practices by businesses globally, and the development of a sustainable food system.

---

6. Publications

Articles in refereed journals


Books and monographs


Hernández, L. A. 2007. "Selection of Tropical Forages: Development and implementation of a participatory procedure and main results from Honduras,


Book chapters


Papers presented at formal conferences and workshop with external attendance


**Articles in international newsletters or other scientific series**


## 7. Funded project proposals

<table>
<thead>
<tr>
<th>Project</th>
<th>Donor</th>
<th>Total US$ in 2007</th>
<th>CIAT</th>
</tr>
</thead>
<tbody>
<tr>
<td>BFP1 Workshop/Meeting 17-20 September 2007</td>
<td>IWMI</td>
<td>25,000</td>
<td>25,000</td>
</tr>
<tr>
<td>Elaboración de una nota conceptual que se le presentará a donantes</td>
<td>CENIPALMA</td>
<td>2,738</td>
<td>2,738</td>
</tr>
<tr>
<td>potenciales, tales como CFC/FAO y la elaboración de una propuesta para que CENIPALMA structure, organize y dirija la división de Apoyo a Palmicultores e investigadores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A Situation Analysis to Identify Challenges to Sustainable Management of</td>
<td>DFID</td>
<td>122,113</td>
<td>122,380</td>
</tr>
<tr>
<td>Ecosystems to Maximize Poverty Alleviation: securing Biostability in the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amazon/Andes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improving CGIAR effectiveness through Knowledge Sharing (KS) Planning</td>
<td>IPGRI</td>
<td>18,765</td>
<td>18,765</td>
</tr>
<tr>
<td>and Coordination</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Determinar cuantos de los beneficios netos de conservación de la cuenca</td>
<td>TNC</td>
<td>68,281</td>
<td>68,281</td>
</tr>
<tr>
<td>abastecedora de Bogotá pueden ser pagados por el valor del aumento del</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>caudal de agua y ahorros en costos de tratamiento</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FEDERACAFE/Analyses of Coffee Quality and Production System Characteristics in Huila (North),Tolima (South),Santander and Santander Norte, Cesar-Guajira and Magdalena</td>
<td>FNC</td>
<td>90,000</td>
<td>90,000</td>
</tr>
<tr>
<td>Formulación del Plan de Ordenamiento y Manejo de la Cuenca del Río Melía Municipio de Puerto López</td>
<td>Municipio de Puerto López</td>
<td>8,697</td>
<td>8,697</td>
</tr>
<tr>
<td>Educoandes-Contrato Estudio de Línea Base con Indicadores Sociales,</td>
<td>CGIAR</td>
<td>10,560</td>
<td>10,560</td>
</tr>
<tr>
<td>Económicos, Ambientales y Educativos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDC - Knowledge Expedition Workshop Netherland</td>
<td>SDC</td>
<td>8,195</td>
<td>8,195</td>
</tr>
<tr>
<td>Transferencia Tecnológica y formación de capital humano en sistemas de</td>
<td>EC</td>
<td>43,203</td>
<td>43,203</td>
</tr>
<tr>
<td>información geográfica-SIG como herramienta de apoyo al ordenamiento territorial, departamentos piloto: Meta y Guajira</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge Sharing: Scaling up and Strengthening Champions</td>
<td>ICT-KM</td>
<td>170,500</td>
<td>210,500</td>
</tr>
<tr>
<td>Identificación de Nichos de Café Especiales y la Interacción de la Calidad y el medio ambiente</td>
<td>CAFENICA</td>
<td>12,548</td>
<td>12,548</td>
</tr>
<tr>
<td>Alianza para la creacion de oportunidades de desarrollo rural a traves de relaciones Agroempresariales (ACORDAR)</td>
<td>ACORDAR</td>
<td>28,000</td>
<td>28,000</td>
</tr>
<tr>
<td>Linking Farmers to Markets Partnership Programme</td>
<td>FAO</td>
<td>110,500</td>
<td>110,500</td>
</tr>
<tr>
<td>Fortalecimiento Organativo y Empresarial de Pequeños Productores Porcicolas del Municipio de Candelaria</td>
<td>N/A</td>
<td>3,414</td>
<td>3,414</td>
</tr>
<tr>
<td>Developing a Community of Practice for Agricultural Marketing and Agro-Enterprise Development in ACP countries</td>
<td>CTA</td>
<td>5,264</td>
<td>5,264</td>
</tr>
<tr>
<td>Productores de Lulo y Mora Competitivos Mediante Selección Participativa de Clones Elite, Manejo Integrado del Cultivo y Fortalecimiento de Cadenas de Valor</td>
<td>FONTAGRO</td>
<td>96,758</td>
<td>172,770</td>
</tr>
<tr>
<td>Equipos insumos/materiales</td>
<td>FONTAGRO</td>
<td>41,348</td>
<td>105,027</td>
</tr>
<tr>
<td>FLIPA-Fondo Latinoamericano de Innovación en Palma de Aceite</td>
<td>FLIPA</td>
<td>166,790</td>
<td>166,790</td>
</tr>
<tr>
<td>INIA-Institutional Strengthening for Sustainable Resource Use in the Amazon</td>
<td>INIA</td>
<td>149,730</td>
<td>149,730</td>
</tr>
<tr>
<td>Contribution EMBRAPA</td>
<td>EMBRAPA</td>
<td>22,890</td>
<td>22,890</td>
</tr>
</tbody>
</table>
Impact Assessment of Research in the CPWF: An Adoption and Cost-Benefit Analysis Project

Breaking the Spiral of Unsustainability in arid and Semi-Arid areas in Latin America Using an Ecosystems Approach for co-Innovation of Farm Livelihoods

Desarrollo de un modelo para la gestión integrada de recursos hídricos, que promueva la equidad, la reducción de la pobreza y el desarrollo del país, bajo el concepto de Desarrollo Sostenible

Managing Uncertainty: Innovation Systems for Coping with Climate variability and change

Improving Livelihoods and Enhancing Protected area Buffer Zone Functions by Integrating Profitable Nature-based agro-entreprises and Natural

The Borlaug Leadership Enhancement in Agriculture Program (LEAP) Richard Miiro

The Borlaug Leadership Enhancement in Agriculture Program (LEAP) Sheila Onzere

Total

ACTUAL EXPENDITURES 2007

<table>
<thead>
<tr>
<th>Outcome Line PA-1: Linking Farmers to Markets</th>
<th>SOURCE</th>
<th>Total US$</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted Core</td>
<td>540,802</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Restricted Core</td>
<td></td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>Sub-total Core</td>
<td>540,802</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Restricted</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Projects</td>
<td>4,938,656</td>
<td>77%</td>
<td></td>
</tr>
<tr>
<td>Water and Food Challenge Program</td>
<td>59,255</td>
<td>1%</td>
<td></td>
</tr>
<tr>
<td>Sub Total Restricted</td>
<td>4,997,910</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>Direct Expenditures</td>
<td>5,538,713</td>
<td>86%</td>
<td></td>
</tr>
<tr>
<td>Non Research Cost</td>
<td>874,964</td>
<td>14%</td>
<td></td>
</tr>
<tr>
<td>Total Expenditures</td>
<td>6,413,676</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

(1) Excluding Non Operational expenses: Phase-out and Fixed Assets adjustment.
## ACTUAL EXPENDITURES 2007

### Outcome Line PA-2: Risk & Climate Change

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Total US$</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted Core</td>
<td>613,918</td>
<td>16%</td>
</tr>
<tr>
<td>Restricted Core</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sub-total Core</strong></td>
<td>613,918</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Restricted</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Projects</td>
<td>1,712,509</td>
<td>44%</td>
</tr>
<tr>
<td>Generation Challenge Program</td>
<td>74,377</td>
<td>2%</td>
</tr>
<tr>
<td>Sub Saharan Africa</td>
<td>113,193</td>
<td>3%</td>
</tr>
<tr>
<td>Water and Food Challenge Program</td>
<td>836,938</td>
<td>22%</td>
</tr>
<tr>
<td><strong>Sub Total Restricted</strong></td>
<td>2,737,017</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Direct Expenditures</strong></td>
<td>3,350,935</td>
<td>86%</td>
</tr>
<tr>
<td>Non Research Cost</td>
<td>529,355</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Total Expenditures</strong></td>
<td>3,880,291</td>
<td>100%</td>
</tr>
</tbody>
</table>

(1) Excluding Non Operational expenses: Phase-out and Fixed Assets adjustment.

---

## ACTUAL EXPENDITURES 2007

### PA-3: PRGA

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>Total US$</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrestricted Core</td>
<td>37,623</td>
<td>7%</td>
</tr>
<tr>
<td>Restricted Core</td>
<td></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Sub-total Core</strong></td>
<td>37,623</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Restricted</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special Projects</td>
<td>449,406</td>
<td>80%</td>
</tr>
<tr>
<td><strong>Sub Total Restricted</strong></td>
<td>449,406</td>
<td>80%</td>
</tr>
<tr>
<td><strong>Direct Expenditures</strong></td>
<td>487,029</td>
<td>86%</td>
</tr>
<tr>
<td>Non Research Cost</td>
<td>76,397</td>
<td>14%</td>
</tr>
<tr>
<td><strong>Total Expenditures</strong></td>
<td>563,426</td>
<td>100%</td>
</tr>
</tbody>
</table>

(1) Excluding Non Operational expenses: Phase-out and Fixed Assets adjustment.
8. Project Staff (* Left during 2007)

IRS

Alonso Gonzalez (100%)  PhD, Biologist
Andrew Jarvis (50%)  PhD, Geography
Andy Farrow (100%)  MSc, GIS
Arjan Gijsman*  PhD, Soil Science/Crop Modeling
Boru Douthwaite (50%)  PhD, Sociologist
Douglas White (50%)  Ph.D., Agr. & Environ. Econ.
Edith Hesse (100%)  PhD, Pathologist
Elizabeth Alvarez (100%)  PhD, Virologist
Francisco Morales (100%)  PhD, Sociologist
Jemimah Njuki (100%)  BS Mining
Keith Fahrney S. (100%)  MSc, Agronomy
Mark Lundy (100%)  MA Latin American Studies, MSc Community & Regional Planning
Nancy Johnson (100%)  PhD., Economist
Norbert Niederhauser (50%)  DI(FH), Inf. & Com. Engineering
Pascal Sangiinga* (100%)  Sociologist
Roberto Porro (50%)  PhD, Anthropology
Roger Kirkby (100%)  PhD, Agronomist
Segenet Kelemu* (100%)  PhD, Pathologist
Shaun Ferris* (100%)  PhD, Post Production
Simon Cook (100%)  PhD, Social Scientist
Susan Kaaria (100%)  PhD, Economist
Thomas Oberthur* (100%)  PhD, Geography
Tiago Wandschneider (100%)  Msc Economist
Zaida Lentini (100%)  PhD, Geneticist

Senior Scientist, Project Manager
Senior Scientist
Research Fellow, Kampala, Uganda
Associate Member to Senior Staff
Senior Scientist
Senior Research Fellow
Senior Scientist
Senior Scientist
Senior Scientist
Senior Research Fellow, Harare, Zimbabwe
Senior Research Fellow, Vientiane, Lao PDR
Senior Scientist, Project Manager, Vientiane, Lao PDR
Senior Research Fellow
Senior Scientist
Research Fellow
Senior Scientist, Kampala, Uganda
Senior Scientist
Leader of Outcome Line and PA RDC
Senior Scientist
Senior Scientist
Senior Scientist
Senior Scientist, Kampala, Uganda
Senior Scientist
Senior Scientist, Hanoi, Vietnam
Senior Scientist

NRS

Adriana Arenas (100%)  Biologist
Adriana Cardona (100%)  Economist
Alexander Cuero (100%)  Systems Technology
Alvaro Mejia (100%)  PhD, Cell Biology
Ana Karine Martinez (100%)  MSc, Plant Breeding
Ana Milena Guerrero (100%)  Bilingual Secretary
Annet Abenakyo (100%)  MSc, Management of Agro-Ecological Knowledge and Social Change
Bertha Libia Garcia (100%)  Research Assistant 3
Buenaventura Riascos (100%)  Administrative Assistant 3
Carlos Julio Herrera (100%)  GIS Expert
Carlos Nagles (100%)  Research Associate
Carlos Ostertag (100%)  Research Assistant 2

Agronomy Engineering
Agricultural Technology
MSc, Industrial Management

Research Fellow, Kampala, Uganda
Laborer 3
Technician 1
Research Assistant 1
GIS Expert
Research Associate 1
Carlos Quiros (100%)
Carolina Gonzalez (100%)
Catalina Ramirez* (100%)
Cesar Tulio Rodriguez (100%)
Clara Roa (100%)
Claudia Perea (100%)
Diego Izquierdo (100%)
Edidah Lubega (100%)
Eduardo Gómez (100%)
Edward Guevara (100%)
Eliud Kaganzi (100%)
Elizabeth Barona (100%)
Elly Kaganzi* (100%)
Erika Eliana Mosquera (100%)
Escobar Freddy (100%)
Fernando Lukauskis (100%)
Francisco Escobar (100%)
Gerardo Arturo Criollo (100%)
German Lema (100%)
German Llano (100%)
Harrison Moran (100%)
Herman Jose Usma (100%)
Isaure Rodriguez (100%)
Ivan Lozano (100%)
James García (100%)
Jenny Correa* (100%)
Johanna P. Villamizar (100%)
John Bernard Loke (100%)
John Jairo Hurtado (100%)
Jorge Beltran (100%)
Jorge Cabrera (100%)
Jorge Cardona (100%)
Jorge Delgado (100%)
Jose de Jesus Tamayo (100%)
Jose V. Roa (100%)
Juan Fco. Barona (100%)
Juan Fernando Mejia (100%)
Juan Miguel Bueno (100%)
Libardo Rivas* (100%)
Lilian P. Torres (100%)
Liliana Rojas (100%)
Lucia Afanador (100%)
Luis Armando Munoz (100%)
Luis Hernandez (100%)
Ma. Alexandra Peralta* (100%)
Ma. Consuelo Martinez (100%)
Marcela Estrada* (100%)
Marcela Quintero (80%)

MSC Agronomist
Lawyer and Economist

MSc, Sanitation and Water Resources
BSc, Systems Engineer
BSc, Economist
MSc, Agricultural Extension Education
BSc, Microbiologist
Environmental Engineering
BSc, Agroenterprise Development
BSc, Systems Engineer
BSc, Agroenterprises
BSc, Social Communicator
Agronomy Engineering
Social Communicator

BSc, Industrial Engineering
MSc Breeding
Bachiller
Agricultural Technology
Agronomy Engineering
Biologist
MSc, Statistician
BA Social Communication
Biologist
Agronomy Engineering
BSc, Food Technology
Agronomy Engineering
BSc, Systems Engineer

Technical
Agronomy Engineering
BSc, Marketing and International Business

MSc Breeding Candidate
Agronomy Engineering
MSc, Economist
BSc, Business Administration
MSc, Natural Resources
MSc, Phytopatology
Biologist
PhD Development
BSc, Economist
Agronomy Engineering

Research Associate 1
Research Associate
Asociado Invest. 2
Laborer 1
Research Assistant 2
Systems Analyst 3
Research Assistant 2
Regional Research Fellow, Kampala, Uganda
Research Assistant 2
Technician 1
Research Assistant, Kampala
GIS Analyst 3
Research Assistant, Uganda
Research Assistant 3
Technician 1
Administrative Assistant 1
Communication Assistant 2
Technician 2
Statistical Consultant 2
Research Assistant 1
Laborer 3
Expert Research 1
Research Assistant 2
Associate 1
Data Base Specialist
Research Assistant 1
Research Assistant 3
Professional Especialista
Research Assistant 1
Associate Expert
Technician 1
Systems Analyst 3
Pool Laborer
Laborer 1
Profes. Especialista
Research Assistant 3
Technician 1
Research Associate 2
Research Associate 1
Administrative Assistant 1
Research Assistant 1
Visiting Researcher
Research Assistant 3
Research Associate 1
Research Assistant 2
Technician 1
Research Assistant 3
Research Assistant 2
<table>
<thead>
<tr>
<th>Name</th>
<th>Degree/Role Description</th>
<th>Role in Uganda</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maria Cecilia Roa (100%)</td>
<td>PhD, Water Resources</td>
<td>Research Assistant 1</td>
</tr>
<tr>
<td>Maria Claudia Garzón (100%)</td>
<td>Biologist</td>
<td>Secretary 4</td>
</tr>
<tr>
<td>Maria Eugenia Buitrago (100%)</td>
<td>Agronomy Engineering</td>
<td>Research Assistant 3</td>
</tr>
<tr>
<td>Maria Luisa Orozco (100%)</td>
<td>Architectural Drawing</td>
<td>Regional Research Fellow, Uganda</td>
</tr>
<tr>
<td>Mariam Mapila (100%)</td>
<td>Ecologist</td>
<td>Administrative Assistant 1 (Bolivia)</td>
</tr>
<tr>
<td>Marisol Calderón (50%)</td>
<td>BSc, Agro-industrial Engineering Systems Technology</td>
<td>Office Clerk 1</td>
</tr>
<tr>
<td>Melissa García Ramos (100%)</td>
<td>MSc, Agricultural Economics</td>
<td>Research Associate, Uganda</td>
</tr>
<tr>
<td>Mike Salazar (100%)</td>
<td>MSc, Crop Science</td>
<td>Research Assistant 3</td>
</tr>
<tr>
<td>Noel Sangole (100%)</td>
<td>BSc, Social Communicator</td>
<td>Regional Research Fellow, Kampala, Uganda</td>
</tr>
<tr>
<td>Oscar Sandoval (100%)</td>
<td>MSc, Sustainable Forestry</td>
<td>Office Clerk 2</td>
</tr>
<tr>
<td>Ovidio Rivera (100%)</td>
<td>BSc Student, Business Administration</td>
<td>Research Assistant 1</td>
</tr>
<tr>
<td>Paola A. Victoria (100%)</td>
<td>BSc, Industrial Engineering</td>
<td>GIS Coordinator</td>
</tr>
<tr>
<td>Patrick Engoru (100%)</td>
<td>BSc, Systems Engineer</td>
<td>Research Assistant Agro-Enterprise Uganda</td>
</tr>
<tr>
<td>Peace Kankwatsa (100%)</td>
<td>BSc, Business Administration</td>
<td>GIS Expert</td>
</tr>
<tr>
<td>Samir Patino (100%)</td>
<td>MSc, Sustainable Forestry</td>
<td>Research Assistant 2</td>
</tr>
<tr>
<td>Sandra Bolaños* (100%)</td>
<td>Student administration</td>
<td>Technician 1</td>
</tr>
<tr>
<td>Silvia E. Castaño (100%)</td>
<td>Technical Systems</td>
<td>Secretary 4</td>
</tr>
<tr>
<td>Tennyson Magombo (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Victor M. Soto (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viviana Gonzalías* (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wilson Celemin (100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zulma Zamora (100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>