SUMMARY ANNUAL REPORT

2001

PROJECT PE-4

Land Use Studies: Reconciling the Dynamics of Agriculture with the Environment

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PE-4 PROJECT

Title: Land Use Studies: Reconciling the Dynamics of Agriculture with the Environment

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Ministerio de Agricultura y Ganadería (MAG), Costa Rica
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Ministerio Agropecuaria y Forestal (MAF), Nicaragua
Ministerio de Ambiente y Energía (MAE), Costa Rica
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Budget:

Budget 2001

Source	Amount (US$)	Proportion (%)
Unrestricted core	983,733	62.90
Core substitution	92,744	5.93
Carry over from 2000	303,423	19.40
Subtotal	**1,379,900**	
Special Projects	184,062	11.77
Totals	**1,563,962**	**100.0**

Research Highlights in 2001

Output 1: Improved land management options

- Cross-scale analyses were made at field, farm, and watershed scale for the Potrerillo watershed, Colombia.

- Information was generated about local knowledge of the soil and land resources in hillside agroecosystems. Results will directly help implement project work on harmonizing scientific rigor and local relevance for improved management of natural resources.

- Applying and using the tools produced by the Indicators Project in CIAT analysis activities, data and information were digitized and accessibility analyzed for the Tropileche Study in Colombia.

- An initial survey was successfully carried out on cassava production in Ecuador to advise the CIAT Ecuador team on future directions, covering issues such as the introduction of new varieties, the relationships between production and site characteristics, and risk analyses with respect to climate change.

Output 2: Decision support tools for natural resource management produced

- The Accessibility Analyst was produced and made available on the Web.

- FloraMap version 1.01 was released, incorporating some corrections and minor modifications. A set of release notes is now available along with new grids for download on the FloraMap Web site.

- The studies on global climate change are expected to be of benefit in targeting research on combating its effects by identifying the probable responses of the crop and livestock systems modeled. They will identify areas for case study and guide both researchers and policymakers in the years to come.

- Successful data collection nets new data sets from over 20,000 stations for use in MarkSim V1.0. The final functionality is defined and software almost complete, with user interface completed except for final trials.

- The "Mitch Atlas" was used for a range of applications, from basic mapping to more strategic planning, predominantly within the agricultural and natural resource management sectors. The Atlas improved access to information and the quality and efficiency of decision making. Its lack of "institutionalization" will limit future Atlas use.

- The Web-based Decision Support System for Radargrammetry has been developed to help our partners with this all-weather imaging technology, for orthoimagery, digital elevation model (DEM), and cartography generation. It can complement or even replace expensive training provided the user has Web access.

- The GIS laboratory provided WF-IPM with the needed tools to enable spatial modeling of WF parameters and dynamics, extending GIS research activities to epidemiology.

Output 3: Indicators for different purposes in use (sustainability, changes in land use management)

- During this phase of the Rural Sustainability Indicator project, the Indicators Toolkit was distributed and disseminated in the English and Spanish versions and a survey made on its impact in Nicaragua and Honduras.

- New Rural Sustainability Indicators project home page available with all indicators' products on line.

Output 4: NRM technology components and information developed

- The first phase of the Value of Biodiversity (ASB Project) involved the identification and critical analysis of data sets in Central America related with physical, ecological, and human geography. It used the information and tools available and produced by the Indicators Project and led to improved collaboration with other CGIAR centers.

- An analysis was made of the ecogeographic distribution of wild peanut species (*Arachis* spp) to support the development of strategies for the conservation and use of the genetic resources of these important crop wild relatives. Results have been communicated to relevant national programs, and conservation activities are being planned based on these analyses.

- We geo-referenced, classified, and combined two Landsat scenes to produce a new map of land cover for the Central Peruvian Amazon, providing input to our analysis of deforestation processes.

- The work on "Extrapolation: poverty targeting with local indicators" represents a significant step towards harmonizing perceptions of poverty from the "top" (i.e., World Bank) and "bottom" (local), by providing a methodology for extrapolating locally derived indicators up to country level. Poverty indicators based on local perceptions were computed for Honduras from unit-level census data and compared with ground truthing.

Output 5: Organizational models for decision making about improving land use management developed and applied

- The PROCIG project promoted the development of a joint information product by the participating partners in each country. These products are described on the project Web site (http://www.procig.org). They include an analysis of agricultural and demographic pressures on protected areas in Costa Rica, a prototype Web portal for the El Salvador Spatial Data Infrastructure, and the Rural Atlas of Nicaragua.

- Training was provided on how to develop a plan of "*Ordenamiento Territorial*" and in this context how to use MapMaker software and the participatory planning methodology developed in CIAT; about 80 professionals were trained.

- The ongoing activity "Participatory planning of agricultural development in five villages of the Puerto López municipality" is developing long-term thinking reflexes that will encourage sustainability, and collective thinking mechanisms that increase social capital.

- We used environmental and topographic factors to predict the distribution of diversity in tropical forests. The models are constructed based on ecological theory, and then tested using data collected in the two test sites in Colombia and Ecuador. This research provides a methodology for rapid biodiversity assessment, whereby areas important for biological resources can be identified and subsequent conservation/management implemented.

- Modules for distance learning of the Rural Sustainability Indicators were produced and visits made to identify user needs and test distance-learning modules (Nicaragua and Honduras).

- A multi-collaborative approach was developed to link participatory planning and image processing that includes the definition of meaningful indicators. A method was developed and applied to derive land use classifications and maps of potentially degraded lands from time series of multispectral images.

Output 6: Improved capacity for resource management research

- Highly favorable impact on institutional relationships between CIAT and French institutions is already measurable through an increase in the number and quality of joint concept notes and submitted projects in the natural resource management area.

- System reliability and data integrity have been improved; GIS and remote sensing analysis, service, and research capacities have advanced.

- A CGIAR systemwide, integrated spatial information system was developed and integrated in CSI, improving collaborative GIS research work and investigation and information interchange.

- The PE-4/GIS documentation and communication service capacities are constantly being improved and updated. This leads to an increased publicity for PE-4/GIS research work and an improved transparency of PE-4 projects. It provides fast access to research-related information and enhanced Internet-based access to public spatial data.

- A topical spatial and alphanumeric land use database is being created that will eliminate data redundancies and anomalies in the strategic database. Quality standards and metadata will provide reliable data sources for NRM research and GIS services to CIAT stakeholders and clients.

Problems encountered and their solutions:

Project PE-4 commenced a second year without a manager. A project manager was recruited in March to find a situation in which scientists were working hard, but lacking common objectives, direction, or cohesion. Morale was quite low. Scientists were often unclear of their responsibilities. National staff were uncertain of their future. Supply of external funds had slowed to a trickle. Financial reserves were exhausted. Although individuals within the project were performing well, the project as a whole was in danger of losing momentum.

The lack of scientific direction was perhaps the most serious concern. This was addressed partially by a consultancy commissioned in September 2000 to develop a strategy for PE-4. This report identified potential areas of work that would develop existing strengths on which GIS scientists could focus; particularly areas that combined GIS and biological know-how in which CIAT has a competitive advantage. Until these strategic directions acquire a life of their own, activities may continue to appear fragmented.

In terms of the mixture of “top-down” and “bottom-up” research, the project has tended to over-emphasize the provision of GIS tools for strategic users at the expense of community-scale organizations. Although excellence in strategic science should be commended, the project required re-balancing to respond to the lessons from elsewhere in the CGs that a process intended to improve the livelihoods of poor farmers must

ultimately involve them, normally at community level. It was recognized that this research needed expansion through collaboration with other projects.

Plans for next year:

Project PE-4 is in a phase of re-focussing and reorganization. The first requirement is to strengthen strategic directions around identified themes of biological mapping, spatial epidemiology (vulnerability mapping), socioeconomic mapping, community-based natural resource management, and land development. These titles are intended to reflect potentially high-value insights and methods that contribute to CIAT's goals. They provide non-exclusive focus clusters of activities.

For example, the first, biological mapping, describes insights of spatially variable biophysical attributes of systems and includes FloraMap, biodiversity mapping, and generation of climatic data surfaces (e.g., MarkSim) that significantly influence biological function. This work interacts powerfully with other activities in CIAT to provide unique modeling capacity of great potential value to CIAT stakeholders.

The second requirement is to rebuild external funding to a level of $400,000 to eliminate our budget deficit. Twenty-eight proposals are already in train. It is important that we ensure they are congruent with the strategic directions as they develop.

Our third requirement is to improve team function internally within the project and with other projects. Joint opportunities are being developed with PE-2, PE-3, IP-5, SN-1, and PE-1. A key step in this process is determining core strengths within our own project so we know what we offer others.