Sustainable Agriculture and Natural Resource Management
Collaborative Research Support Program

SANREM CRSP
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Trip Report: Ecuador

19-30 May 2009

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Purpose of Trip: To accompany interns to Ecuador, set up Spanish lessons and other internship activities, supervise research progress, prepare for annual meeting, and discuss plans for subsequent phase of the CRSP.

Sites Visited: Santa Catalina Experiment Station, INIAP's Tumbaco Fruit research station, on-field naranjilla trials in Tandapi, and offices of research partners ECOCIENCIA and SIGAGRO.
Courtesy visits were made to the Director of the Santa Catalina Experiment Station, Dr. Rodriguez; the Director General of INIAP, Dr. Delgado; and the Director of Corpoiniap, Dr. Nieto.
In addition, an extended discussion was held at USAID with Monica Zuquilanda (USAID), Thomas Rhodes (EDGE director) and Esteban Espinoza (APHIS representative).

Description of Activities:
The research is going better than planned, due to successful activities and substantial buy-in (more than $150,000 in the past fiscal year alone) by the Ecuador government. This financial support has taken pressure off the project and provided new vehicles, equipment for weather and water-quality monitoring, and paid other research expenses such as personnel, travel and educational costs. The project has achieved the following objectives:

1) Ongoing system has been established for water (quality and flow) and weather monitoring. This system involves key participation by local stakeholders. Water quality is being monitored through chemical tests and by counting populations of target macro-invertebrates.

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2) Creation of a comprehensive GIS. Identification of zones of vulnerability to erosion, landslides and flooding. Identification of bio-diversity hot spots. GIS is being used to develop farm-level and sub-watershed level land use plans.
3) Identification of improved varieties for potato, maize, blackberry, and beans. As a result of the project's recommendations for variety adoption and fertilization/ management, indications from extension agents are that yields have increased two-fold in the upper watershed.
4) Identification of several options for soil conservation on steeply sloped fields. These options include: contour plowing, live barriers, banded planting, diversion ditches, natural terracing, intercropping annual and perennial crops in strips. Field observations show widespread adoption of these practices, especially in those areas where the SANREM model farms are. Our UG research team will investigate the extent and determinants of adoption of these techniques during their four weeks in Guaranda/Chimbo.
5) Ongoing demonstration plots have been set up on model farms in both the upper and lower watersheds.
6) Identification of key pest problems and partial solutions to them (research is being conducted jointly with the IPM CRSP).
7) Identification of factors affecting household livelihood strategies and the variables affecting changes in farming and livelihood practices. This information has been incorporated into the GIS and we now have the ability to simulate how changes in policies (such as access to irrigation, improved education, more widespread availability of land) will affect the spatial distribution of economic activity. Information, for example, on changes in the spatial distribution of adoption of soil conservation techniques will be input into our erosion and water quality monitoring.
8) Creation of a participatory process (see figure 4) for enhanced land-use planning. We use results from modeling exercises and information about appropriate land uses given on-farm conditions to work with farmers and plan land use practices leading to higher incomes and enhanced soil conservation.
9) Substantial participation by producer groups and local government in our research has led to wide-spread uptake of our recommendations. For example, local governments in both the upper and lower watersheds and the Provincial Government are now engaged in land-use planning exercises that use SANREM research as a basis to make decisions.

The team has also decided that in subsequent project phases (if approved) we will focus less on technical watershed modeling and more on agronomic research to enhance productive processes in the watersheds. We will strengthen our focus as well on alternative native species which show potential for income generation and are consistent with environmental goals. We will continue to collect data on weather and water quality, and will seek alternative lower-technology techniques for "modeling" impacts of land use changes on soil loss and water quality. The reason for this decision is the high information demands of the SWAT model and observations that the GIS, when combined with local knowledge, could do a sufficiently good job "modeling" the relationship between land use changes and outcomes such as soil loss and water quality.

A meeting with USAID officials indicated a high degree of complementarity between our SANREM project and Mission goals. The Mission (Zuquilanda, Rhodes, Espinoza) has agreed

to visit Guaranda on the closing day of the internship program. At that program, the interns will present their findings. USAID can take advantage of the visit to learn about ongoing activities, and discussions will be held with the local government in Guaranda about its inclusion in the USAID FONAG program. This program, now being piloted in several large cities in Ecuador, is designed to promote better decision making about water resources. USAID also encouraged the SANREM team to apply for small-project funding for construction of a greenhouse. In the upper watershed, stakeholders have shown a lot of interest in reforestation using native species and the main constraint is access to seedlings. This represents a positive opportunity. Finally, the APHIS representative expressed interest in the naranjilla and other Andean Fruit research (conducted under the IPM CRSP). Guaranda, especially the lower watershed, has significant potential for production of these perennial crops. They are erosion-friendly (when pests are properly managed) and there is a growing volume of exports to the US. However, recent shipments of naranjilla have been rejected because of pesticide residues and enhanced management techniques would increase the potential for this export.

Suggestions and Recommendations:

1) Propose renewal to project with enhanced integration of Andean Fruit IPM research with the IPM CRSP;
2) Publication of three journal articles on: household decision-making; incorporation of household decisions into spatial map and watershed modeling; vulnerability mapping;
3) Integrate Guaranda local government into USAID's FONAG program;
4) Propose greenhouse construction project (for production of native tree species seedlings in upper watershed) to take advantage of USAID's small project funding mechanism;
5) Continue to prepare for annual meeting.

List of Contacts Made:

Name	Title/Organization	Contact Info (address, phone, email)
Esteban Espinoza	APHIS	
Dr. Wilson Vazques	Director, INIAP fruit program, Tumbaco	