Sustainable Agriculture and Natural Resource Management
Collaborative Research Support Program

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Trip Report: Ecuador

21 – 24 January 2008

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and
Wills Flowers (Florida A&M)

Purpose of Trip: Deliver two (2) day-long watershed management workshops to water resources, government agency and NGO professionals and participate in one (1) day-long community workshop; conduct training of in-country staff and collecting discharge measurements in Chimbo river subwatersheds; continue program of benthic organism biomonitoring in Culebrillas and Chillanes subwatersheds.

Sites Visited:

- Professional workshops:
  - 21 January – INIAP Estacion Experimental Santa Catalina (Quito);
  - 22 January -- Fundacion Cambio su Cambio por el Cambio (San Simon/Guaranda)
- Community workshop:
  - 23 January – Alto Guanujo – Culebrillas
- Training/data collection in upper Chimbo River watershed. Sites visited on 24 January:
  - Paltabamba
  - Quindigua-1 and 2
- Biomonitoring data collection (Calles & Flowers).
  - Río Cullebrillas I & II (Alto Guanujo)
  - Paramo Arenales I&II
  - Río Quindigua
  - Queb. Arrayacu
  - Bosque Tiquibuzo (Chillanes)
  - Queb Panecillo
  - Queb Pacay

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Description of activities:

Dr. Benham conducted two (2) day-long watershed management workshops for government and NGO professionals. The workshops addressed six steps in watershed management planning:

1. Building Stakeholder Partnerships
2. Watershed Characterization – Approach and Data Needs
3. Developing Water Quality Goals and Identifying Possible Solutions
4. Designing a Watershed Management Implementation Program
5. Implementing a Watershed Management Plan
6. Measuring Progress and Making Adjustments

Workshop Learning Objectives:
After completing this workshop, participants should be able to describe the following concepts:

- typical steps involved in conducting a watershed-scale study to assess the potential pollutants contributing to degraded water quality.
- typical steps involved in developing a watershed-scale plan to address the offending pollutants.
- how best management practices (BMPs) control nonpoint source (NPS) pollution.
- the role of watershed stakeholders in the watershed management planning process.

Forty-four people participated in the January 21 and 22 workshops (see **List of Workshop Participants** in the Appendix). Workshop resource materials were provided to all participants. Those presentations made in English were simultaneously translated. Extensive interaction/discussion occurred during both workshops. Feedback about the workshops as communicated to Victor Barrera (LTRA-3 Coodinator, INIAP) has been and continues to be very positive.

The community workshop on 23 January was very beneficial and eye-opening. Juan Calles and Adriana Cárdenas (Ecociencia) and Dr. Wills Flowers (Florida A&M) conducted the workshop. The community stakeholders were very engaged throughout the workshop. Adriana used a technique for engaging stakeholders that she learned during Dr. Benham's workshops during the previous two days. The technique requires stakeholder to illustrate their perception of their watershed by drawing a picture of their watershed. Stakeholders then trade the pictures and discuss commonalities and differences. This exercise promotes dialogue among stakeholders and gives watershed management professionals insights that can be used to more effectively educate/communicate with stakeholders.

With respect to training in-country personnel and collecting observations, Dr. Benham, Dr. Heatwole and Carlos Montufar collected stream discharge data at three stations in the upper Chimbo river basin. Dr. Benham's contribution to the training was primarily illustrating and explaining good data collection practices to Carlos Montufar.

Training Activities Conducted:

Program type (workshop, seminar, field day, short course, etc.)	Date	Audience	Number of Participants		Training Provider (US university, host country institution, etc.)	Training Objective
			Men	Women		
Workshop	21Jan 08	Govt. and NGO professionals	18	5	BSE/Virginia Tech	Understand watershed planning and analysis
Workshop	22Jan 08	Govt. and NGO professionals	17	4	BSE/Virginia Tech	Understand watershed planning and analysis
Workshop	23 Jan 08	Community members	12	7	EcoCiencia and Florida A & M	Understand watershed planning and analysis

Following the workshop, Juan Calles and Wills Flowers proceeded with the ongoing sampling for biomonitoring. Streams in the Alto Guanujo area were visited on the 22, 23, and 25 of January, streams in the Chillanes area were visited on Jan. 24. A total of 2017 aquatic insects were collected, which will be temporarily housed in Fundación Agua in Quito for the duration of the SANREM project. The site Paramo Arenales II continued to show exceptionally high conductivity levels. This is puzzling because it is close to Paramo Arenales I which has a normal conductivity level; nor have we found obvious sources (such as a mine) of high conductivity upstream from the sampling site. An Excel file of the aquatic invertebrates collected on this trip is attached.

Suggestions and Recommendations:

1) Use data previously collected in community-based livelihood interviews work with Virginia Tech Ag and Applied Economics team members to define plausible, cropping and livestock management alternatives.
2) Become more familiar with Ecuador regulations re: livestock and cropping system management, e.g. I learned in this trip that there are livestock buffer width regulations.
3) Use the information developed/learned in numbers 1 and 2 above, develop and deliver a second day-long workshop (July or August 2008) to the same audiences that attended the January 2008 workshops. The workshop objective would be to develop specific water quality-based management strategies that can be communicated to stakeholders by attendees.
4) For the biomonitoring, additional clean-water paramo streams should be sampled (one-time basis probably sufficient). The invertebrate communities encountered so far in this project would rate low in several biomonitoring protocols due to high numbers of certain invertebrates —especially amphipods—generally considered to be indicators of poor water quality. It is likely that the amphipods in our paramo samples are very different from pollution-tolerant species in temperate countries. Collections from streams known to be relatively free of human disturbance should be made so there will be a basis for comparison of streams in human-impacted areas.

Appendix: List of Workshop Participants:

21 January		22 January	
Name	**Organization**	**Name**	**Organization**
Christian Martinez	EcoCiencia[1]	Willie Sánchez	SIGAGRO
Adriana Cárdenas	EcoCiencia	David Jácome	SIGAGRO
Karla Beltrán	EcoCiencia	Santiago Monge	SIGAGRO
Alvaro Monteros	INIAP[2]	Edwin Chela	INIAP
Raúl Ramos	INIAP - Forestería	Luis Escudero	INIAP
José Riofrío	INIAP - Forestería	Carlos Monar	INIAP
Ximena Checa	INIAP - Forestería	Moazir Celleri	INIAP
Diana Andrade	INIAP - Forestería	Nelson Monar	UEB
Marlon Caicedo	INIAP - Maíz	Víctor Barrera	INIAP
Fausto Jara	INIAP - Forestería	Eugenia Nuñez	INIAP
César Tapia	INIAP	Martha González	INIAP
Fernando Chamorro	INIAP	Elena Cruz	INIAP
Venus Arévalo	INIAP - Floagricultura	Gustavo Sánchez	Promoción Humana[5]
Jorge Grijalba	INIAP - Forestería	Carlos Zapata	Gobierno Prov. Bolívar[6]
Pedro Llangarí	INIAP - Chimborazo	Mauricio López	Gobierno Prov. Bolívar
Javier González	INIAP - Chimborazo	Marcelo Pilamunga	Gobierno Prov. Bolívar
Raphael Parra	INIAP	Karina Paredes	Gobierno Prov. Bolívar
Franklin Valverde	INIAP	Henry Fierro	Gobierno Prov. Bolívar
Elena Cruz	INIAP	Italo Tamayo	Magap
David González	Sigagro[3]-Magap[4]	Jorge del Pozo	CNRH[7]
Gustavo Sevillano	Sigagro-Magap	Jaime Saltos	CNRH
Gerardo Heredia	INIAP		
R.Wills Flowers	Florida A&M Univ.		

[1]EcoCiencia, Ecuadorian Foundation for Ecological Studies; [2]INIAP, Instituto Nacional Autónomo de Investigaciones Agropecuarias (Ecuador); [3]Sigagro, Geographic Information Systems for the Farming Sector (Ecuador); [4]Magap, Ministerior de Agricultura, Ganadería, Acuacultura y Pesca (Ecuador); [5]Promoción Hummana, an NGO working in the Chimbo River watershed; [6]Gobierno Prov. Bolívar, provincial government official; [7]CNRH, Consejo Nacional de Recursos Hídricos (Ecuador)