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Adaptive Watershed Management in the South American Highlands: Learning and Teaching on the Fly

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Sub-watershed of the Chimbo river, Bolívar, Ecuador

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ABSTRACT

The purpose of this poster is to describe an adaptive watershed management process in Chimbo, Ecuador. We show the conceptual framework and our empirical strategy. We present results showing that ethnic and agro-ecologic diversity in the watershed mean that technical interventions must be tailored to local conditions and the process of moving knowledge to action is highly context specific. Low incomes and high vulnerability of human populations mean that livelihood alternatives must be identified and incorporated into the adaptive plan.

Figure 1. See panoramic Illangama River Sub-watershed.

OUR APPROACH

Our approach to watershed management in Bolivar Province focuses on policies that help to reduce poverty, ensure food security and promote the sustainable management of natural resources consistent with environmental quality. We combine several approaches: Livelihood Analysis, Adaptive Management, Production Systems, and Social Learning. Several steps were necessary to implement our approach in Bolivar Province (figure 3).

Figure 4. Baseline household survey

Figure 3. Integrated management model of the Chimbo sub-watershed,

INTRODUCTION

People in the watershed are highly dependent on agricultural incomes, yet small holdings, low productivity and environmental degradation are associated with the highest rate of poverty in Ecuador. As a result of the central importance of the Chimbo River (figure 2) and interconnectedness of economic activities, the government of Bolivar Province has expressed interest in a watershed approach to land-use planning. Several local and international NGOs work in the area and have bought into the watershed approach to natural resource management.

Figure 5. Actors in the Participatory Planning of the Sub-watershed.

Figure 2. Map of Chimbo sub-watershed, Ecuador.

Figure 6. Participatory Research in the Sub-watershed.

PRELIMINARY RESULTS

The diagnosis of social, economic and environmental conditions identified stark differences between the two sub-watersheds (table 1). Careful steps were taken to familiarize regional and local authorities with the research team and gradually build ownership in the process. The team also confronted an extremely narrow focus on the part of institutions and unwillingness to view problems as being interdependent; the trans-disciplinary and trans-scale nature of the adaptive watershed management process contributed to problems of language and conflicts across decision domains that were difficult to overcome. Parallel to establishment of the participatory research program, the team worked with provincial governments, where substantial interest in the watershed approach was found. Data collection efforts were designed to maximize community participation. These community data collection methods represented a form of stakeholder engagement and stimulated curiosity about data use. A major goal of the research project was to integrate social sciences with engineering and agronomic research to strengthen the analytical model used in the adaptive watershed planning process.

Figure 7. Participatory Training in the Sub-watershed.

OBJECTIVES

1) To identify economic, social, political and environmental conditions in the watersheds and understand the determinants of these conditions.
2) To generate and validate environmentally sustainable alternatives to improve production systems and enhance income generation.
3) To create a means of evaluating the impacts of alternative actions, policies and interventions.
4) To build local capacity to evaluate policy alternatives, make and enforce decisions, and strengthen social capital.

Description	Alumbre	Illangama
Male-headed	82.8	87.2
Household size	4.7	5.8
Dependency ratio	.47	.50
Years education (head)	4.3	4.5
Highest educated		
Male	6.2	5.9
Female	5.3	3.9
% Indigenous	34.9	100
% with Migrants	40.2	53.0
% Migrants to Quito	67.4	87.1
% Migrants Other Ecuador	13.2	12.9
% Migrants International	19.1	0.0

Table 1. Description of survey households