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CHEMONICS INTERNATIONAL INC.



## **Watershed Management in the Motagua and Polochic Watersheds**

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# **Watershed Management in the Motagua and Polochic Watersheds**



**RURAL AND AGRICULTURAL INCOMES WITH A SUSTAINABLE ENVIRONMENT**

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However, the opinions expressed in this document are those of the authors and do not necessarily reflect those of USAID or of Chemonics International Inc.

Carlos Perez  
Henry Tschinkel

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## Executive Summary

In late 1998 Hurricane Mitch struck 20 departments in Guatemala, but the hardest hit areas were the northwest river valleys of the Polochic and Motagua watersheds, the south coast, the center of the country and the Caribbean coast. USAID/Guatemala asked seven private and governmental Guatemalan organizations, with which it had worked in the past or had an ongoing contractual relationship, to submit proposals for post-Mitch rehabilitation work in the watersheds of the Polochic and Motagua rivers. ANACAFE, CARE, CRS, Defensores de la Naturaleza, Fundación Solar, and SHARE submitted their proposals between August and September 1999 and USAID/Guatemala signed the first cooperative agreement in September and the last in December 1999.

USAID/Guatemala requested specialized technical assistance from Chemonics International to:

- Identify watershed best management practices on forest land and agriculture areas
- Design, implement and monitor action plans to carry out best management practices in forestry and agriculture
- Design overall performance monitoring and evaluation system.

This document covers the first two items. The Chemonics' specialists reviewed the proposals submitted by the implementing organizations, as well as midterm evaluations, final evaluations and other similar documents. They also conducted in-depth interviews, and made short visits to field sites and organized several meetings to obtain feedback on drafts of this document and to agree on feasible changes to be made in the operations. The conclusions reached by following this process about the currently used practices are summarized below:

### Which practices and what is their effect?

- *Most organizations promote similar practices:* There is very little difference among the implementing organizations regarding the practices they promote. All the organizations have a long list of practices that they encourage farmers to adopt. They tend to be particularly biased toward promoting reforestation and soil conservation physical structures, which are quite labor intensive, do not provide short-term benefits for participating farmers, and generally do not rank high in the farmers' priorities. All of these conditions make those practices not sustainable in the long run.
- *Shotgun approach:* The implementing organizations have inadequate prioritization and focus. They promote too many activities in too many places at the same time. The organizations try to address as many constraints to the farmers' economy as possible, but end up with a long list of activities and practices with different levels of relevance. Implementing that long list is ultimately ineffective. Very few organizations rank their activities according to farmers' preferences, market demand, proven effectiveness of the practice or potential for impact, replicability and prospects for scaling-up.

- *Emphasis is on cure rather than prevention:* Surprisingly, there is relatively little effort invested in promoting preventive agronomic and agroforestry practices that have been proven to be a lot more effective for soil conservation than curative approaches. Also, while all the organizations seek to launch reforestation activities, very few of them are giving adequate importance to the protection of existing forests. There is a tendency to invest in rehabilitation on one site while the forest is being destroyed on another nearby. The potential payoff is much greater, however, for the prevention of damage rather than its repair.
- *Some conservation practices work but not all of them spread:* The implementing organizations promote some agricultural and soil conservation practices that are effective to curtail soil erosion. Many of those practices, however, do not spread on their own. The selection of practices promoted is not based primarily on the economic priorities that farmers express. The practices do not spread because neighboring farmers cannot see that the practices bring about clear economic benefits to those who adopt those technologies.
- *Emphasis is on production for food sufficiency:* All the implementing agencies have adopted a strategy that primarily promotes basic grain production (corn and beans) and promote cash crops very timidly or not at all. This basic grain strategy has limited effectiveness because farmers need cash income for their households. Clearly the economic viability of the farming households and the ecological health of the watershed depend on the farmers' access to cash income opportunities. This requires a strong promotion of diversification of crops and other economic activities.
- *Inadequate promotion of perennial crops:* With the exception of ANACAFE, the implementing agencies neglect the promotion of perennial crops despite the high slopes and soil erosion potential in the target areas. Perennial crops are more likely to protect the soils in hillsides and provide cash income in the short term than annuals and forest tree species.
- *Trees are used as conservation cover rather than as crops:* The implementing agencies show an unfortunate bias toward solving watershed problems by planting trees. Forest tree plantations, however, are only justified when they can be considered as crops. There will never be sufficient financial resources available for plantations to cover areas large enough to have a significant effect on the conservation of such large watersheds. In almost all of the project area, the dense vegetation that develops after only a few months of abandoning agriculture and grazing or of excluding fire provides watershed protection equal or better than that provided by planted trees.
- *Neglect of the power of the market to change the landscape:* Most watershed efforts promoted by the implementing agencies to date are technology focused rather than driven by economic incentives. Almost all practices that have changed the landscape in Guatemala and elsewhere, however, are market driven.

## Where to apply the practices?

- *On-farm approach used rather than a watershed approach:* Very few implementing organizations explicitly make the link between on-site activities and downstream effects. Most of the organizations have taken their traditional small-farmer, rural development approach and packaged it in watershed management wrappings in order to comply with the new direction dictated by the donors or development fads. The organizations use watershed wording or boundaries but almost all the practices that they promote are site-specific and dispersed. These current practices might improve the welfare of some individual farmers but they are unlikely to have a significant effect on improving watershed conditions.
- *Neglect of the large owners and other stakeholders:* The watershed approach requires practices that change the landscape and are applied over large expanses. Few of the implementing organizations, however, work with watershed stakeholders other than the small farmers. To assure adequate vegetative cover of large areas it may be necessary to work with large landowners as well.
- *Lack of attention to land use capacity:* Implementing agencies do not take into account basic biophysical conditions to tailor technical recommendations. They should accept that there are limits to the use of land and that non-agricultural solutions may be the only hope for certain situations.

## How do the implementing organizations learn from experience?

- *Insufficient learning from experience:* There are very few serious evaluations of the effectiveness of the practices and their dissemination. Because of inadequate monitoring, concentration on outputs rather than impact, high turnover among field staff, overworked staff, overextended projects, more concern about meeting targets than doing the things right, and inadequate feedback to supervisors, institutional memories are short, and learning from experience inefficient.
- *Farmers not given the chance to choose among practices promoted:* Most agencies carry out participatory assessments of farmer needs, conditions and priorities but hardly any of them use this information as input for planning or monitoring technical service delivery. The agencies continue promoting practices that are not effective because they cannot receive correct feedback from farmers who are unwilling to jeopardize their access to food aid, credit or technical assistance.

## Elements and guidelines for a new watershed-wide design

The majority of implementing organizations is using an approach that concentrates on the needs of individual farmers and their communities, in what amounts to isolated, patchy activities. The individual farmer plots are used as the main planning unit. Only in a very few cases the overall hillside is considered as a target, and for all practical purposes no real planning or monitoring is carried out at the level of the watershed. We propose that a re-orientation of project activities is

required to ensure that both on-farm goals and watershed goals are met under the auspices of the project.

The approach we propose stresses five general guidelines. These should also be taken into account in the design and implementation of future projects with watershed-wide mandate and seeking a watershed level impact.

### **General guidelines proposed for the project**

- *Concentrate efforts in a moderate area:* This area will be a few priority sub-watersheds and a few communities within them to enhance impact, visibility and potential of replication.
- *Promote a short menu of conservation and economic practices:* The practices promoted will have been tested and readily accepted by farmers.
- *Focus on income-generation:* The practices will support activities that have demonstrated cash income return.
- *Let farmers decide topics to be included in technical assistance:* The practices will reflect the priorities of farmers and will be sensitive to market incentives.
- *Focus on quality of service delivery:* Diffusion strategy based on farmer satisfaction, documentation of what works, farmer enthusiasm and informal promotion of economically gainful alternatives.

### **Steps needed to apply the recommended practices by June 2001**

Although the financing agreements have already been signed and time is extremely short before the end of June 2001 beyond which these funds will not be available, the following steps can be initiated immediately. Facilitated by the Chemonics team, the organizations and USAID have reached agreement with respect to the practices described below (see Table 8 and Annex 9).

#### *1. Focus on income-generating crops*

- There is an urgent need to identify permanent crops appropriate for farmers on steep hillsides in remote areas in addition to coffee and cardamom. Systematic efforts should be made to identify other suitable crops and markets.
- A study should be conducted jointly for all organizations, by a consultant group with expertise in marketing, to identify commodities that have elastic demand, command good prices, and could be produced or processed in the target areas by small farmers.
- Staff from all the implementing organizations should receive training by ANACAFE on activities related to the production, transformation and marketing of coffee.

#### *2. Target working areas according to land-use capacity*

- Field staff should be trained in the concept and the application of the INAB method of land use classification so that they can apply it at the farm and plot level to help make objective decisions about the suitability of the plot for certain practices.

- Instead of having a situation whereby each organization prepares maps for its target area, MAGA should prepare maps for all. Various overlays (scenarios) should be created to answer specific practical questions. In the future, the map coordinates of all field interventions should be recorded so that periodically an updated map can be prepared showing progress of the project.

### 3. *Improve project accountability and learning from experience*

- The organizations, in agreement with USAID should define four or five indicators common to all the organizations as well as baselines, in order to monitor jointly the progress toward sustainable watershed management.
- Business-as-usual and the continuation of practices that have failed to show success and failed to spread are no longer acceptable. Long-standing assumptions about what works need to be honestly reexamined. Improved quality control is urgently required. The implementing organizations propose to establish a consejo with representatives from all the organizations to improve communication and coordination, reflect on technical issues and plan joint training.
- Better horizontal communication between the implementing organizations would help to change attitudes and refine practices. Several means could be used to forge a team: including reciprocal field visits, interchange of staff, circulation of reports, frequent joint review of a minimum set of common indicators, and periodic coordination meetings of all implementing organizations. They also include having a common map base, training cutting across all organizations, improved use of e-mail between organizations for dissemination of technical information.

### **Changes needed for watershed management beyond the short term**

This consultancy has identified the following transformations that should start immediately but obviously will require a longer time than June 2001 to come to fruition.

- Implementing organizations must concentrate their work in areas that are currently under threat instead of being already damaged, focus on problems that are easier to solve and target activities that are cost effective in relation to the effort and money invested. The adoption of these selection criteria will require a conscious and continuous reinforcement from USAID to change the implementing organizations' prevailing attitudes and practices. These recommendations, in fact, tend to be counter-intuitive for many of those organizations and may even challenge the mandate of some of them. Many of those organizations focus on addressing the most difficult social, productive or environmental problems, and therefore the challenges they face are often overwhelming for both staff and farmers.
- Income generation should be a major thrust in watershed management projects like this one. USAID/G should hire as soon as possible a consultant organization to carry out

market analysis of cash crops that are appropriate for small-scale producers in the target watershed areas, and make available the resulting information to all the implementing organizations. It is extremely important to identify agricultural and forestry cash crops that are well established in national or international markets, command competitive prices and have a relatively stable or increasing demand. The crops selected should preferably be perennials, so as to meet the double goals of income generation and soil conservation.

- USAID should help explore extension systems that encourage farmers to take the lead in the definition of the content of technical assistance, selection of the provider of extension services and the evaluation of its impact. Particularly, it should encourage the implementing organizations to explore and refine fee-based extension systems, whereby farmers can meaningfully influence the content and quality of the services provided.
- There is a need to concentrate on approaches that will proliferate as a chain reaction (the carambola effect). A different type of implementor should be tried, particularly more business-oriented actors. USAID should explore contracting private enterprises, such as private consulting companies to manage some of the sub-watersheds or to carry out certain functions. A comparison of performance and costs between this private enterprise arrangement and the traditional approach could be very instructive.
- Where is the incentive for the hillside farmer to manage those watersheds? It is assumed that what is good for increasing production on the hillside farms is good for the watershed. Fortunately, this is usually true. So the focus has been on promoting such win-win practices. However, there are many situations where the assumption does not apply, especially on land that is not used by the hillside farmer for production. There is increasing recognition that the provision of such environmental services that benefit society in general merit compensation. Watershed management efforts financed by USAID should include support for policy changes needed so that users of water and hydropower pay for upstream interventions that protect the watersheds. This would be a large step toward assuring financial sustainability of watershed management and breaking the dependence on external funding.
- Under the current agreements the implementing organizations receive USAID funding whether or not they produce the results promised in their proposals. Therefore, there is not much pressure to produce. USAID should explore payment for deliverables similar to the arrangements common with private contractors. The need for more attention to planning, budgeting and the negotiation of the amount to be paid for deliverables is largely compensated by the simplicity of reporting, monitoring and control.
- Response to evaluations, recommendations and to experience is excessively slow. There is not enough pressure internally and from donors to improve. Institutions, like individuals, seek more effective approaches when they are forced to compete or are rewarded according to what they produce. USAID would do well to also give more emphasis to these principles before signing agreements with the NGOs, even when these do come with matching funds. Such an approach would stimulate learning from

experience, a quest for efficiency and quality in the organizations' service delivery and greater accountability.

- If large areas in a watershed are to be covered, the large owners cannot be ignored. They need to be involved in watershed management and the NGOs should make special efforts in this direction. It is probably more effective to assign this task to private enterprises to support policy changes including credit policies, to apply environmental regulations, to introduce "green" certification, to use market intelligence and mechanisms to encourage these owners to try new crops and practices, to influence some of the associations to which they belong. Many of the largest landowners are the municipalities and they should be assisted in managing their own lands better, partly to provide them with income.
- Given its shortage of technical specialist, USAID might consider contracting the review of future proposals so as to assure higher quality, coherence with other ongoing work and adherence to USAID guidelines.
- In the long run, substantial improvements in the management of the watersheds can only be achieved through a change in the attitude of a critical mass of the local population. There are no single, simple means of bringing about these changes in attitude and, consequently, in behavior. Certainly a fundamental reorientation in education is essential in order to strengthen the ability of rural people to solve their own problems. History shows that a combination of innumerable interventions, including the kind proposed in this document, can gradually get people to change their ways for their own long-term benefit.

The implementing organizations have agreed on immediate follow up actions and the future role of the Chemonics team (Annex 9).

# **Watershed Management in the Montagua and Polochic Watersheds**

## **1. Background**

In late October and early November 1998 Hurricane Mitch struck Guatemala. According to INSIVUMEH (Instituto de Sismología, Vulcanología, Meteorología e Hidrología), in 96 hours the Hurricane brought 755 mm of rainfall, which caused major flooding and landslides. Despite the rapid and effective emergency response by Guatemalan organizations that minimized the loss of life, the Hurricane caused considerable damage to private property and public infrastructure, and severely curtailed the country's agricultural productive capacity. The Hurricane affected 20 departments in Guatemala, but the hardest hit areas were the northwest river valleys of the Polochic and Motagua watersheds, the south coast, the center of the country and the Caribbean coast.

The Government of Guatemala estimated losses at \$550 million, affecting 750,000 people most of them in the agricultural sector. Some 55,000 people were evacuated from their communities before and after the storm hit. Close to 90,000 hectares (i.e. over 5% of the country's cultivated land area) were devastated. The area damaged per crop was considerable: chili pepper (60%), tobacco (37%), soybeans (34%), coffee (21%), bananas (28%), peanuts (13%), vegetables (5%), corn (2%) and beans (2%) (World Neighbors 1999:5). Water systems, 121 bridges, major and minor irrigation systems and hundreds of kilometers of road were damaged or destroyed. Over 400 hectares of active landslides were observed in the Jones River alone, where severe stream sedimentation seriously limited production of drinking water. Close to 68,000 *quintales* of coffee beans estimated at \$5.4 million were lost due to fruit dropping, landslide and flooding in plantations, affecting some 25,000 small-scale producers. Vast coffee-, banana-, melon- and livestock-producing areas in the Motagua, Polochic and Panzós watersheds were damaged, which resulted in a 15% collapse in the agriculture sector employment. This affected thousands of landless or semi-landless workers who regularly rely on salaried, often seasonal, labor opportunities to make ends meet.

Immediately after the disaster the US Government contributed \$9.5 million in new funds for emergency assessment, food for evacuees in shelters, and US Army helicopter support. Additionally, it supplied close to \$26 million in US military support in the form of engineers, medical teams and troops for the reconstruction of rural roads, dikes and levees, schools and health posts (see Annex 2).

USAID/Guatemala, for its part, established a two-year assistance effort (mid FY 1999 to mid FY 2001) targeting Guatemala's most affected departments, under the Special Objective for post-Mitch reconstruction, the funds for which were approved by Congress in June 1999. The special objective reads: "Rural Economy Recovers from Mitch and is Less Vulnerable to Disaster." This goal will be attained through the following intermediate results (IR): 1) strengthened national- and community-level disaster preparedness; 2) sustainable recovery of agricultural productivity; and 3) improved disease prevention and control programs. The Agency set aside \$28 million to support this Special Objective. The breakdown by intermediate results is as follows: \$1 million

for disaster preparedness enhancement, \$3 million for community disease prevention, and \$24 million for agricultural productivity recovery.<sup>1</sup> This consultancy is aimed at \$19 million out of those \$24 million, i.e., at all agricultural production and soil and water conservation activities in the watersheds of Motagua and Polochic.

USAID/Guatemala approached seven private and governmental Guatemalan organizations with which it had worked in the past or had an ongoing contractual relationship, and asked them to submit proposals for post-Mitch rehabilitation work in the watersheds of the Polochic and Motagua rivers. Some of the implementing organizations submitted proposal to address all three intermediate results, but most of them concentrated their proposals on only one intermediate result. The following organizations submitted proposals related to the sustainable recovery of agricultural productivity: ANACAFE, CARE, CRS, Defensores de la Naturaleza, Fundación Solar, and SHARE. These organizations submitted their proposals between August and September 1999 and USAID/Guatemala signed the first cooperative agreement in September and the last in December 1999.

## **2. Scope of work and methodology of this consultancy**

Having received the proposals from the implementing organizations, USAID/Guatemala requested specialized technical assistance from Chemonics to:

- Identify watershed best management practices in forest land and agriculture areas
- Design, implement and monitor action plans to implement best management practices in forest land and agriculture
- Design overall performance monitoring and evaluation system.

Three Chemonics consultants were contracted to carry out the scope of work. The consultants were Dr. Henry Tschinkel, Senior Forestry Specialist (Chemonics), Carlos Pérez, Ph.D., Senior Watershed Management Agricultural Specialist (CARE), and Mircea Enache, Ph.D., Planner and Systems Analyst (Chemonics). The activities carried out by Mircea Enache are described in a separate report. Henry Tschinkel and Carlos Pérez were tasked to address the identification of watershed best management practices, and prepare the action plan for the implementation of those best management practices. They started their assignment on January 6, 2000.

The scope of work required the participation of the appropriate government agencies and NGOs in the preparation of the action plan and the design, implementation and monitoring of the best management practices. Accordingly, the Chemonics' specialists reviewed the proposals submitted by the implementing organizations, as well as midterm evaluations, final evaluations and other similar documents that described the activities that those organizations promoted in similar projects financed by USAID/Guatemala. They also conducted in-depth interviews with

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<sup>1</sup> The budget for agricultural productivity is divided as follows: \$8 million for watershed management; \$5 million for road repair in Ixcán, Quiché and Alta Verapaz; \$3 million for community natural resource management; \$3 million for small farmer coffee improvement; \$2 million for reforestation; \$2 million for micro-enterprise recovery and credit, and \$1 million for seed recovery and multiplication.

staff from the different implementing organizations in Guatemala City. The consultants complemented these interviews with observations at field sites of ANACAFE, CARE, CRS, and Defensores de la Naturaleza, around Tukurú, Teleman and Zacapa (see Annex 1).

The scope of work also required that the government agencies and NGOs have sufficient time to review the identified best management practices and proposed action plan. As a result, on February 19 and 21, 2000, the consultants held two separate meetings with representatives of the implementing organizations to review the consultants' preliminary conclusions, proposed guidelines for project implementation, and decision-making tools designed to select target implementation areas and project activities. These meetings provided a forum for the implementing organizations to discuss and provide feedback to the consultants. In both meetings the representatives of the implementing organizations stated that in general terms they were in agreement with the conclusions that the consultants had arrived at regarding practices in the project. They also expressed the need to define the programmatic implications of accepting them. Particularly, their concern was to determine which changes were necessary and feasible within the limited timeframe that spans from the end of February 2000 until the end of the project in June 2001. Additionally, it was necessary to identify which activities should be carried out jointly by the implementing organizations or by one organization to support all the implementing organizations.

In this context, the implementing organizations and the consultants had another meeting on February 28, 2000 during which the organizations reached a consensus on the following points:

- Almost no changes are feasible before October 2000 because commitments have already been made;
- Modest changes will be possible after that date and some were identified;
- Joint activities were identified that the organizations could implement immediately in cooperation with the other organizations;
- Some general approaches were identified that the organizations would like to implement but require more time, and therefore would involve possible future activities beyond June 2001;
- Formalizing any of these changes would require a decision-making meeting with representatives of USAID.

Consequently, on 13 April representatives of USAID, the organizations, the two Chemonics consultants plus some other relevant parties met and produced the commitments summarized in Annex 9.

### **3. Description of the Motagua and Polochic watersheds**

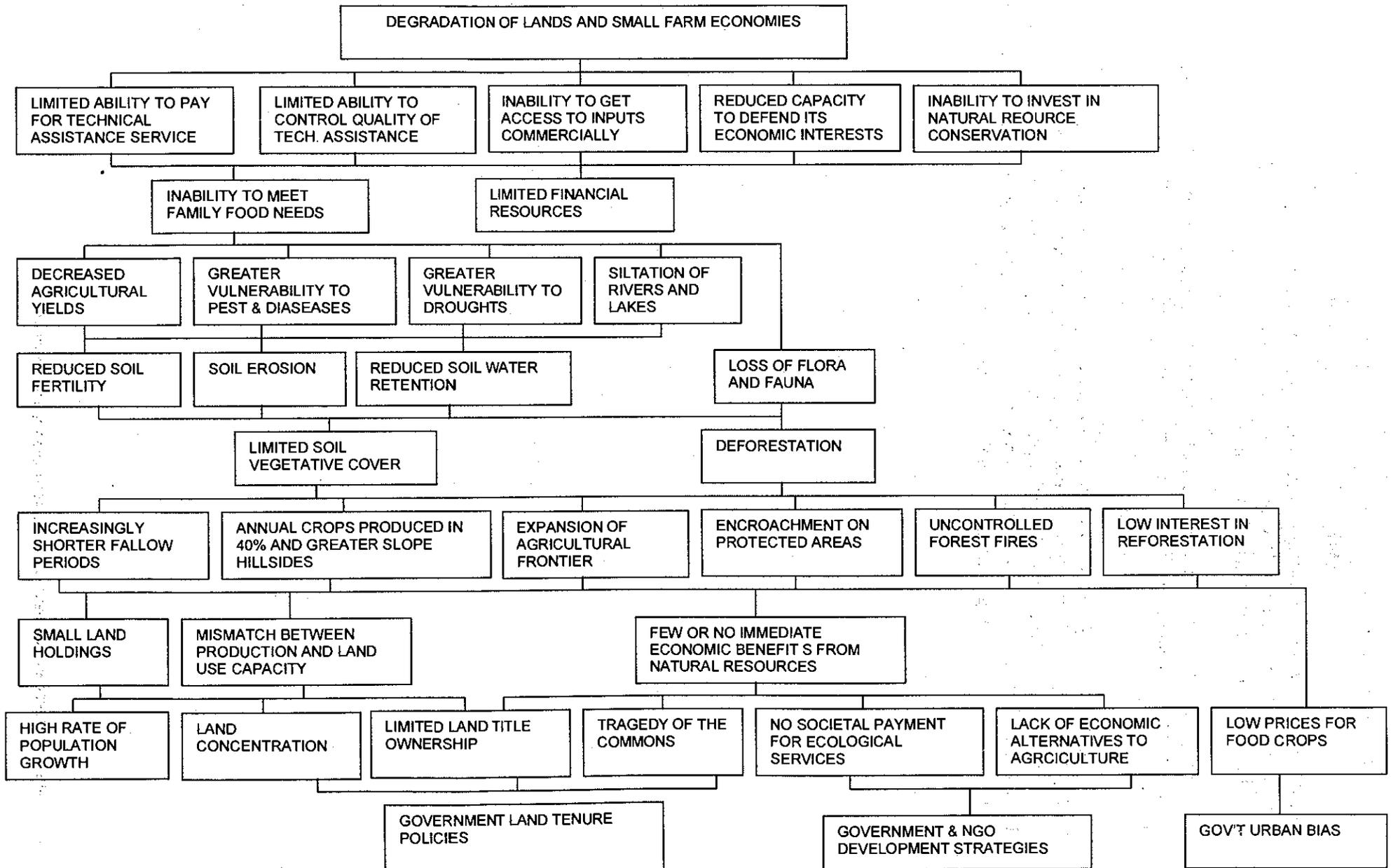
The Motagua River is the largest river in Guatemala with a drainage area of approximately 15,000 km<sup>2</sup>. The river has its source northeast of Guatemala City and passes through the Departments of Baja Verapaz, El Progreso, Zacapa and Izabal on its way to the Gulf of Honduras.

The Polochic River (above Teleman) drains 1,542 km<sup>2</sup>. It is joined by the Cahabon River (2,626 km<sup>2</sup>) a few kilometers before flowing into the Lago Izabal. For purposes of this discussion, the Polochic watershed includes that of the Cahabon.

The damage caused by the Mitch hurricane has been summarized in Section 1. More details can be found in the studies by INAB, the U.S. Army Corps of Engineers (1999) and in other documents.

There are several factors that have combined to degrading the watersheds. These include biophysical and production-related factors, and socio-economic and institutional conditions, as expressed in the problem tree for the Motagua and Polochic watersheds presented in Figure 1. The combined effect of all of those factors results in lands at risk of economic and environmental disaster, and small farming economies unable to overcome poverty.

Figure 1. Problem Tree for the Motagua and Polochic Watersheds



#### 4. Current watershed management activities

##### 4.1. Organizations promoting watershed practices

Table 1 shows the organizations currently working in the Motagua and Polochic watersheds under the USAID/Guatemala Special Objective to recover the rural economy from Mitch and make it less vulnerable to disasters. Defensores de la Naturaleza is legally responsible for the Sierra de las Minas Biosphere Reserve and therefore also works in other parts of the Reserve but with other funds.

**Table 1. Organizations Working in the Motagua and Polochic Watersheds under the USAID Post-Mitch Special Objective**

Watershed	Organization	Target area
Polochic	ANACAFE	Municipios Tamahú, Tucurú, Senahú, Cahabón and San Pedro Carchá (Alta Verapaz)
	CARE	Municipios Cahabón, Senahú, Panzós, San Pedro Carchá, Tamahú, Tucurú, Chamelco, (Alta Verapaz) and Purulhá (Baja Verapaz)
	CRS	Cahabón and Senahú (Alta Verapaz)
	Defensores	Panzós and La Tinta (Samilha & Pueblo Viejo watersheds)
	Fundación Solar	13 communities in Municipio Cahabón
Motagua	CRS	Izabal and Zacapa/Chiquimula

##### 4.2. Types of practices being promoted

Over the years the package of agricultural, conservation and forestry practices promoted by the various organizations working in the watershed and even elsewhere in Guatemala has evolved to be surprisingly similar. Much of the effort has gone into promoting soil conservation measures. Details of the practices that the implementing organizations intend to apply, many of which they are already implementing, are included in their respective project proposals that were submitted to USAID and which are the basis of the agreements that are in force. Those activities are summarized in Table 2 and described with more detail in Annex 3 of this report.

**Table 2. Practices currently applied by the implementing organizations**

(Numbers in parentheses after each practice refer to the organization listed at the end of the table)

Practices	
<b>1) Perennial crops</b>	
a) Coffee	
i) Credit (1)	
ii) Agronomy, maintenance (1)	
iii) Renovation of old plants (1)	
(1) Coffee nurseries (4)	
iv) Machinery/infrastructure processing (1)	
v) Access road rehabilitation (1)	
b) Macadamia (2, 6)	
c) Cacao (2)	
d) Citrus (2)	
e) Black pepper (2, 6)	
f) Fruit trees (6)	
<b>2) Reforestation</b>	
a) Woody species: Pine (2, 4)	
b) Fruit trees (4):	
c) Incentives for reforestation (2)	
d) Tree distribution (2)	
e) Nursery setting and management training (3, 6)	
f) Distribute materials for seedling production (4)	
<b>3) Fire Prevention</b>	
a) Organize/equip fire brigades (2, 4)	
b) Develop radio spots and materials for fire prevention (4)	
<b>4) Basic grains production</b>	
a) Farmer production of improved ICTA grain seed (3)	
b) Distribution of open-pollinated ICTA grain seed (3)	
c) Training in and installation of grain silos (3)	
<b>5) Horticultural production</b>	
a) Distribution of horticultural seed (2)	
b) Establish horticultural production (4)	
c) Distribution of chicken manure (2)	
<b>6) Irrigation systems</b>	
a) Rehabilitate irrigation systems (3)	
b) Establish gravity-fed irrigation sprinkler systems (2)	
c) Train on irrigation system management (3)	
<b>7) Land Tenure</b>	
a) Mapping land tenure pattern (2)	
b) Organize agrarian committees for LT	
<b>8) Marketing of local products</b>	
a) Marketing study (ies) for local products (3, 6)	
b) "Facilitate marketing of local products" (3)	
<b>9) Diagnoses of the biophysical, socioeconomic conditions watershed</b>	
(3, 6)	
<b>10) Develop watershed management plans (3)</b>	
<b>11) Environmental Education materials and activities (4)</b>	
<b>12) Fuel-efficient stoves materials distribution (6)</b>	
<b>13) Distribution of photovoltaic power systems (2, 5)</b>	

Extension activities and target groups	
1)	Organize farmer groups (3)
2)	Training target groups
	a) extension agents (2)
	b) municipal staff (2)
	c) teachers (4)
	d) community promoters (2)
	e) farmers (4)
3)	Training subjects:
	a) production of improved seed (3)
	b) soil fertility management (3)
	c) use of grain storage silos (3)
4)	Methods:
	a) Establish demonstration plots (4)
	b) Facilitate exchange visits for farmers (4)
5)	Salaries and equipment for municipal staff (2)

Credit	
1)	Organize village banks (3)
2)	Credit distribution (3)
3)	Loans for silos (3)

1. ANACAFE
2. CARE
3. CRS
4. DEFENSORES
5. FUNDACION SOLAR
6. SHARE

### 5. Effectiveness of current practices

We have followed the following conceptual process in developing conclusions:

- Analysis of the proposals that the implementing organizations submitted to USAID, plus the review of the additional documentation listed in the reference section;
- Brief field visits;
- The combination of the information obtained from the two previous steps, plus the experience of many years of visiting, analyzing and managing similar projects under a variety of conditions.

The conclusions we have reached by following this process about the effectiveness of the currently used practices are summarized below:

#### Which practices and what is their effect?

- *Most organizations promote similar practices:* There is very little difference among the implementing organizations regarding the practices they promote. All the organizations have a long list of practices that they encourage farmers to adopt. They tend to be particularly biased toward promoting reforestation and soil conservation physical

structures, which are quite labor intensive, do not provide short-term benefits for participating farmers, and generally do not rank high in the farmers' priorities. All of these conditions make those practices not sustainable in the long run.

- *Shotgun approach:* The implementing organizations have inadequate prioritization and focus. They promote too many activities in too many places at the same time. The organizations try to address as many constraints to the farmers' economy as possible, but end up with a long list of activities and practices with different levels of relevance. Implementing that long list is time consuming and ultimately ineffective. Very few organizations rank their activities according to farmers' preferences, market demand, proven effectiveness of the practice or potential for impact, replicability and prospects for scaling-up.
- *Emphasis is on cure rather than prevention:* Surprisingly, there is relatively little effort invested in promoting preventive agronomic and agroforestry practices that have been proven to be a lot more effective for soil conservation than curative approaches. These preventive practices include avoiding slash-and-burn (fire prevention), zero tilling, mulching, and selecting/combining annuals and perennials according to slope and land use potential. Also, while all the organizations seek to launch reforestation activities, very few of them are giving adequate importance to the protection of existing forests. There is a tendency to invest in rehabilitation on one site while the forest is being destroyed on another nearby. A curative rather than preventive approach is also expressed in the organizations' emphasis on promoting terracing instead of improved tilling and cropping systems. The potential payoff is much greater, however, for the prevention of damage rather than its repair.
- *Some conservation practices work but not all of them spread:* The implementing organizations promote some agricultural and soil conservation practices that are effective to curtail soil erosion. Many of those practices, however, do not spread on their own (the exceptions are use of green manure and production of coffee and cardamom). This seems to be because the agencies tend to select practices according to what they think will solve a soil erosion problem. Farmers, on the other hand, seem to be more interested in improving yields and productivity with the scarce resources they have, and hence more interested in short-term, more visible results. The selection of practices promoted is not based primarily on the economic priorities that farmers express. The practices do not spread because neighboring farmers cannot see that the practices bring about clear economic benefits to those who adopt those technologies.
- *Emphasis is on production for food sufficiency:* All the implementing agencies have adopted a strategy that primarily promotes basic grain production as a cornerstone of hillside development. The agencies concentrate much of their efforts to supporting corn and bean production, and promote cash crops very timidly or not at all. There is an undisputed need to improve the productivity of basic grains, but working exclusively on milpa improvement provides a very limited leverage point for substantially changing the small farmers' economy and environment. This basic grain strategy has limited effectiveness because farmers need cash income for their households. They are unable to

meet all their food requirements, let alone cash needs, by producing corn and beans. Farmers often purchase corn and beans to complement their own production. Many of them also migrate or work as day laborers to meet their cash needs. Farmers are, therefore, a lot more immersed in a cash economy than one would want to accept. At the same time, the potential is very low for causing significant positive changes in yield and/or watershed protection through improving cultivation of corn and beans on steep hillsides. Clearly the economic viability of the farming households and the ecological health of the watershed depend on the farmers' access to cash income opportunities. This requires a strong promotion of diversification of crops and other economic activities.

- *Inadequate promotion of perennial crops:* With the exception of ANACAFE, the implementing agencies neglect the promotion of perennial crops despite the high slopes and soil erosion potential in the target areas. The predominant emphasis is on annual grain crops or on reforestation. Perennial crops, however, are more likely to protect the soils in hillsides and provide cash income in the short term than annuals and forest tree species.
- *Trees are used as conservation cover rather than as crops:* As in other parts of Central America, the implementing agencies show an unfortunate bias toward solving watershed problems by planting trees. Almost all the organizations promote tree planting, normally using multiple purpose trees. Forest tree plantations, however, are only justified when they can be considered as crops, i.e. when farmers can harvest them and derive financial or other benefits from them within a reasonable time. Planting forest trees is very costly. There will never be sufficient financial resources available for plantations to cover large enough area so that they will have a significant effect on the conservation of such large watersheds<sup>2</sup>. Furthermore, it is neither necessary nor cost-efficient to reforest to protect watersheds. In almost all of the project area, the dense vegetation that develops after only a few months of abandoning agriculture and grazing or of excluding fire provides equally or more adequate watershed protection than planting trees.
- *Neglect of the power of the market to change the landscape:* Most watershed efforts promoted by the implementing agencies to date are technology focussed (i.e. on the soil or the crop) rather than driven by economic incentives. Almost all practices that have changed the landscape in Guatemala and elsewhere, however, are market driven. Most of those practices are crops (coffee, cattle, rubber, and forest tree plantations in some countries). Some exceptions are soil conservation in some US agricultural areas, fire prevention and control, and traditional terraces in SE Asia.

### Where to apply the practices?

- *On-farm approach used rather than a watershed approach:* Very few implementing organizations explicitly make the link between on-site activities and downstream effects. Most of the organizations have taken their traditional small farmer, rural development approach and packaged it in watershed management wrappings in order to comply with

<sup>2</sup> The funds available for the PINFOR forest incentives for 1999, for instance, were sufficient to plant 7100 ha in the entire country. Compared to the almost 2 million hectares in the Motagua and Polochic watersheds, this area of plantations is insignificant.

the new direction dictated by the donors or development fads. The organizations use watershed wording or boundaries but almost all the practices that they promote are site-specific and dispersed. These current practices might improve the welfare of some individual farmers but they are unlikely to have a significant effect on improving watershed conditions.

- *Neglect of the large owners and other stakeholders:* The watershed approach requires practices that change the landscape and are applied over large expanses. Few of the implementing organizations, however, work with watershed stakeholders other than the small farmers. In some sub-watersheds most of the land is controlled by large landowners including the municipalities. To assure adequate vegetative cover of large areas in such watersheds it may be necessary to work with large landowners as well.
- *Lack of attention to land use capacity:* Implementing agencies do not take into account basic biophysical conditions (i.e. slope, soil characteristics) to tailor technical recommendations. They do not apply the concept of land use capacity, and therefore often recommend practices that use the land beyond its capacity. They should accept that there are limits to the use of land and that non-agricultural solutions may be the only hope for certain situations.

#### **How do the implementing organizations learn from experience?**

- *Insufficient learning from experience:* The package of practices being disseminated by the project implementing organizations has evolved to be very similar. Yet there are very few serious evaluations of the effectiveness of the practices and their dissemination. Monitoring of advances and performance of the practices by implementing agencies is inadequate because the organizations tend to concentrate on outputs rather than effects and impact. Also, there is high turnover among field staff, staff are overworked, and projects are overextended, unfocused and more concerned about meeting targets than doing the things right. Lastly, field staff are frequently aware that some practices work better than others but are not encouraged or allowed to provide feedback to their supervisors. All of this contributes to making institutional memories short, and learning from experience inefficient. Field personnel tend to demonstrate astounding motivation and willingness to work under extremely difficult conditions, often with inadequate support and resources. It is tragic that many of these admirable efforts have limited results because institutions are following inappropriate strategies and practices because they do not learn from experience.
- *Farmers not given the chance to choose among practices promoted:* Most agencies carry out participatory assessments of farmer needs, conditions and priorities but hardly any of them use this information as input for planning or monitoring technical service delivery, including practice content. Farmers cannot filter out irrelevant practices promoted by the agencies. In addition, some of the implementing agencies use incentives (food-for-work donations and in-kind or cash credit) that are distributed to encourage (ex-ante) or reward (ex-post) the use of a specific practices pre-defined by the agencies. Those incentives increase risks for farmers by requiring them to use technology that it is not necessarily

the most adequate, gainful or relevant to the farmers' conditions. There is no clear rationale as to when food should be distributed, and food distribution generally ends up robbing farmers' own initiative and problem solving skills. The agencies continue promoting practices that are not effective because they cannot receive correct feedback from farmers who are unwilling to jeopardize their access to food, credit or technical assistance.

## 6. Elements and guidelines for a new watershed-wide design

The majority of implementing organizations is using an approach that concentrates on the needs of individual farmers and their communities, in what amounts to isolated, patchy activities. The individual farmer plots are used as the main planning unit. Only in a very few cases the overall hillside is considered as a target, and for all practical purposes no real planning or monitoring is carried out at the level of the watershed. We propose that a re-orientation of project activities is required to ensure that both on-farm goals and watershed goals are met under the auspices of the project (Table 3).

**Table 3. On-Farm and Watershed-Wide Management Goals**

On-farm goals	Watershed goals
<ul style="list-style-type: none"> <li>• Increase regular food availability and cash income</li> <li>• Increase crop yields and overall farm productivity (crops, livestock and trees)</li> <li>• Intensify production (i.e. increase returns to limited land, labor and capital resources)</li> <li>• Increase or maintain soil fertility</li> <li>• Increase or maintain soil humidity (and reduce vulnerability to "drought")</li> <li>• Minimize soil erosion (particularly rain-splash and sheet erosion)</li> <li>• Reduce water flow rate</li> <li>• Increase infiltration rate</li> </ul>	<ul style="list-style-type: none"> <li>• Provide regular and permanent water flow for irrigation</li> <li>• Obtain appropriate and continuous quantity and quality of potable water</li> <li>• Reduce sedimentation and runoff</li> <li>• Reduce flooding, landslides, and damage to infrastructure</li> <li>• Fix carbon in biomass</li> <li>• Increase biodiversity conservation</li> <li>• Maintain landscape beauty</li> </ul>

The adoption of a watershed-wide approach will necessarily require some institutional adaptations. A list of the most important changes needed is included in Table 4.

**Table 4. Design Changes Required to Conform to a Watershed Conservation Approach**

CURRENT APPROACH	PROPOSED APPROACH
<ul style="list-style-type: none"> <li>• Primary focus on poverty-alleviation (subsistence production)</li> <li>• Environmental deterioration as a biophysical problem (conservation solutions needed)</li> <li>• Targeting on the basis of individual people's needs</li> <li>• Geographic and activities target is too broad: need does not allow for prioritization (everyone is poor!)</li> <li>• Opportunistic selection of target communities: whoever wants to participate</li> <li>• The initial focus is on the micro-perspective, and later shifts to the macro perspective</li> <li>• Activities address needs of people most directly affected (most in need)</li> </ul>	<ul style="list-style-type: none"> <li>• Primary focus on protection and enhancement of ecological functions and services via income generation</li> <li>• Environmental deterioration as a sign of economic deterioration (economic solutions needed)</li> <li>• Targeting according to severity of threat to ecosystem as a whole (critical areas).</li> <li>• Narrower target area and activities: some areas and activities more important than others</li> <li>• Selection of target communities based on a cascade of progressively narrower criteria</li> <li>• The initial focus is on the macro-perspective, and later shifts to micro-perspective</li> <li>• Activities address the needs of all major</li> </ul>

CURRENT APPROACH	PROPOSED APPROACH
<ul style="list-style-type: none"> <li>• Benefits expected on-site</li> <li>• Expected results do not necessarily require to add up to a critical overall threshold</li> <li>• Reduced scale (site-specificity)</li> <li>• Generally, broad spectrum technological packages implemented across sites</li> <li>• Risk of focusing on symptoms of watershed deterioration</li> <li>• Technology transfer- and environmental education-centered</li> </ul>	<p>stakeholders (inside and outside farming sites)</p> <ul style="list-style-type: none"> <li>• Benefits expected on-site and downstream.</li> <li>• Expected results require to sum up so as to have on impact on the whole watershed</li> <li>• Large scale influence</li> <li>• Narrow spectrum technological menu appropriate to specific sites according to land use characteristics</li> <li>• Attempts to address most important causes of watershed degradation</li> <li>• Income-generation oriented and economic incentives-led</li> </ul>

The approach proposed in our recommendations stresses five general guidelines. These guidelines should be used to ensure that the project uses a watershed thrust while increasing the efficiency, replicability and sustainability of its interventions. The guidelines should also be taken into account in the design and implementation of future projects with watershed-wide mandate and seeking a watershed level impact. The guidelines, described in the Table 5, are expanded in the body of the recommendations presented in this report.

**Table 5. General Guidelines Proposed for the Project**

<ul style="list-style-type: none"> <li>• <i>Concentrate efforts in a moderate area:</i> This area will be a few priority sub-watersheds and a few communities within them to enhance impact, visibility and potential of replication.</li> <li>• <i>Promote a short menu of conservation and economic practices:</i> The practices promoted will have been tested and readily accepted by farmers.</li> <li>• <i>Focus on income-generation:</i> The practices will support activities that have demonstrated cash income return.</li> <li>• <i>Let farmers decide topics to be included in technical assistance:</i> The practices will reflect the priorities of farmers and will be sensitive to market incentives.</li> <li>• <i>Focus on quality of service delivery:</i> Diffusion strategy based on farmer satisfaction, documentation of what works, farmer enthusiasm and informal promotion of economically gainful alternatives.</li> </ul>
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## 7. Concentrate efforts in a moderate area

### 7.1. Identify and seize critical limiting factors, rather than “work with the poor”

The funds made available by USAID in the Polochic and Motagua watersheds under this program are to be used for activities that will “help small farmers recover lost agricultural production capacity [while] making it more sustainable and resistant to future climatic changes.”<sup>3</sup> Historically the selection of the working area for most of the development organizations, and even for the conservation organizations, has been to focus on those areas where the social need is greatest. This has meant working with the poorest of the rural poor who tend to occupy the areas with the poorest natural resources. Since many of the upper watersheds are covered by thousands of small plots, the organizations are trying to work with hundreds of

<sup>3</sup> See USAID/G’s intermediate result 2 which is described in USAID/G, Guatemala “Mitch Special Objective: Rural Economy Recovers from Mitch and is Less Vulnerable to Disasters.” USAID/G, 1999.

poor farmers, unfortunately with no assurance that their work will bring about changes in the landscape.

“Working with the poor” is not a very useful guide for choosing development- or watershed management sites. In a nutshell, there are simply too many poor people for the implementing organizations to be able meaningfully to decide where in the watershed and with which farmers they should work. Yet, prioritize they must. Development work and watershed management practices must change the local economy and landscape, not only improve a few dispersed plots. The effect of improvements in land use will be negligible at the watershed level unless the organizations cover a large proportion of the areas prone to erosion and runoff. Given that the resources are limited, the challenge is how to reach few farmers but with high impact, rather trying to serve many but superficially. Targeting assistance to farmers on small plots, additionally, does not take into account, let alone solve, the problems of those watersheds dominated by large landowners. Finally, a focus on poor farmers will tend to neglect the protection and management of the remaining forest cover, which still is considerable.

Consequently, the new watershed dimension introduced by the Post-Mitch efforts requires rethinking the traditional focus on only the areas of greatest social need, and moving toward emphasizing those areas of greatest importance to runoff and erosion. These two areas will often not coincide. At present, both USAID and the implementing organizations are ambivalent between wanting to assist the poorest of the poor but also claiming to solve the watershed problem. Some difficult philosophical decisions will be required if the ambitious objectives of the Post-Mitch efforts are to be achieved. These decisions are not only important for this short-term emergency assistance, but even more for the large investments by several international donors that seem to be foreseen.

This is NOT an issue of whether to invest scarce outside resources in humanitarian efforts for the poor on marginal potential hillsides or in maintaining a healthy, productive landscape. It is not a choice between people or trees/soils, or even benefiting upstream- or downstream dwellers. It is rather a challenge of identifying the best leverage point, the most critical limiting factors, to achieve both economic development and long-term management of natural resources. This is similar to the concept of addressing factors that limit plant growth: adding fertilizer to stimulate plant growth will have no effect if the limiting factor is water or disease.

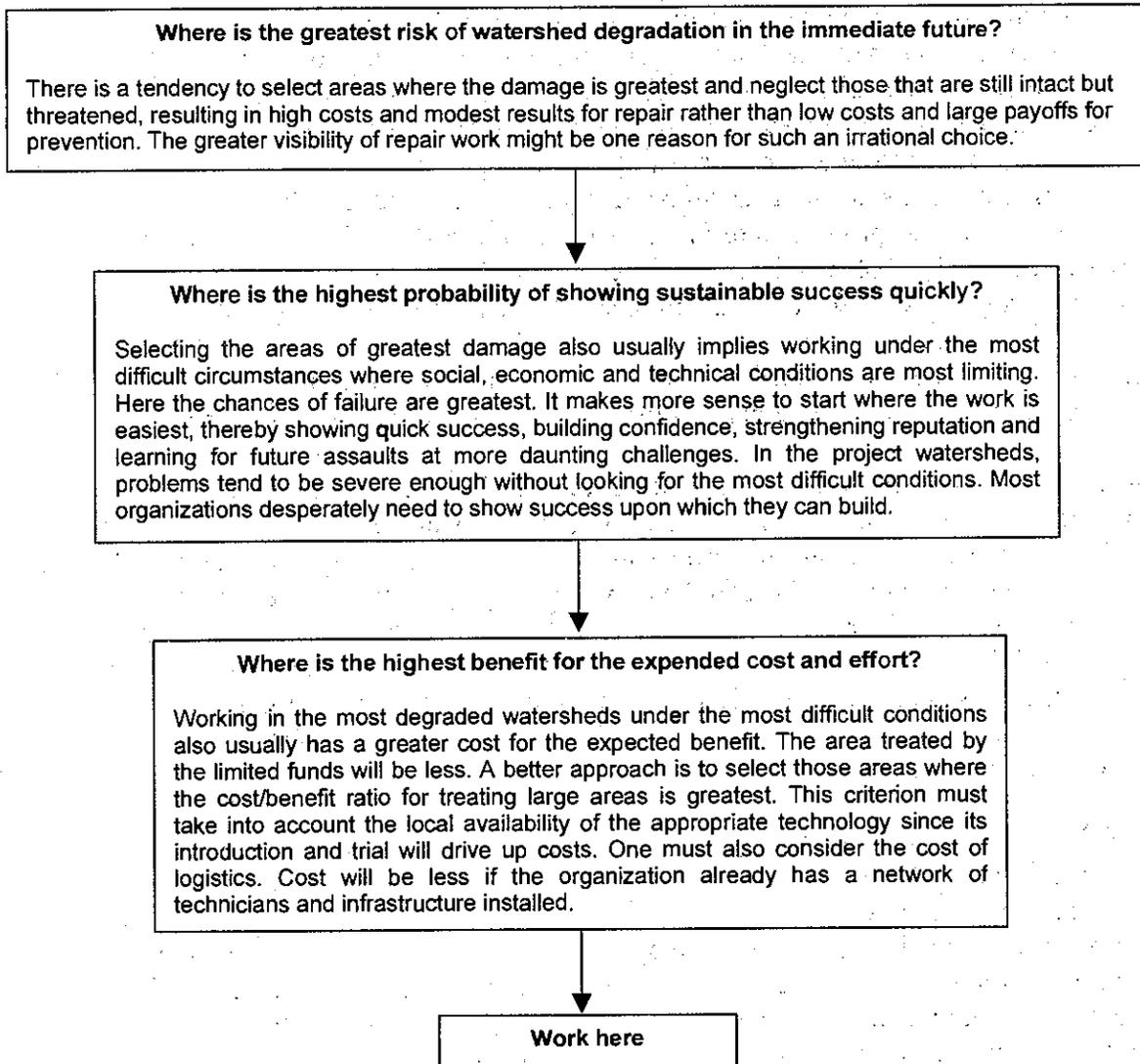
Instead of concentrating efforts where there is poverty, the implementing organizations should clearly target areas where there is more potential for success in addressing the limiting factors.

## **7.2. Criteria for selecting sub-watersheds and working areas**

The organizations currently working in the watersheds seem to have used various criteria for selecting the sub-watersheds and working areas. Many apparently made the selection on the basis of criteria which had very little to do with watershed conditions and more with historical factors of where they had worked before, which is not necessarily bad. These decisions have been made and it would be unrealistic to make major changes at this stage. However, for future selections and for concentrating on sub-watersheds, the criteria summarized in Figure 2 might be useful. These criteria are not hard rules, but they can serve as guidelines. The choice of working areas is one of the most important decisions a project of this kind is likely to make.

## Figure 2. Criteria for Selecting Sub-Watersheds and Working Areas within Them

(To be applied in the order indicated)



## 8. Promote a short menu of conservation and economic practices

### 8.1. Rationale for choosing key practices

The economic damage caused by the Mitch disaster is estimated in the hundreds of millions of dollars. The funds available through the USAID Post-Mitch assistance efforts are less than twenty million dollars (see Section 1). It is obvious that if rehabilitation is interpreted as charity, the long-term results will be insignificant. At this moment, almost a year and a half after the hurricane, the only hope of achieving a lasting impact with such relatively modest funds is to plant seeds that will grow and multiply. This means focusing on practices that are of such benefit to the farmer that s/he will continue them on his/her own, that his/her neighbors will emulate him/her, that the practices will spread with minimal outside assistance. For many of the practices that have been promoted for years, this is not happening. It is time to discard those non-starters. Efforts must immediately concentrate on those few practices and sites that show promise. This is the time to explore new practices and approaches that might not bear fruit before the imminent end of this project but could lay the foundation for future efforts.

Improving the lives of a few hundreds and even thousands of farmers does not necessarily amount to generating sustainable development. Likewise, conserving the soil in thousands of plots does not automatically amount to managing and rehabilitating the whole watershed. The aim should be to foster development in the sense of starting something that will continue to grow on its own, in contrast to the current situation of continuing to provide input but not seeing self-perpetuating growth.

Hence, one of the most important challenges for development institutions is to narrow down continually the number of practices that they offer, focusing on a few that are more relevant to the farmers' resources and priorities, stressing the need for immediate and direct economic benefits. To achieve the adoption of technology by great numbers of project participants and non-participating farmers it is important to avoid "blanket" extension recommendations that are supposed to be valid for all farmers, regardless of their resources and productive goals.

### 8.2. Criteria for selecting appropriate practices

Promoting the right recommendations for farmers requires defining two elements that are often subsumed under the term "practice." These are:

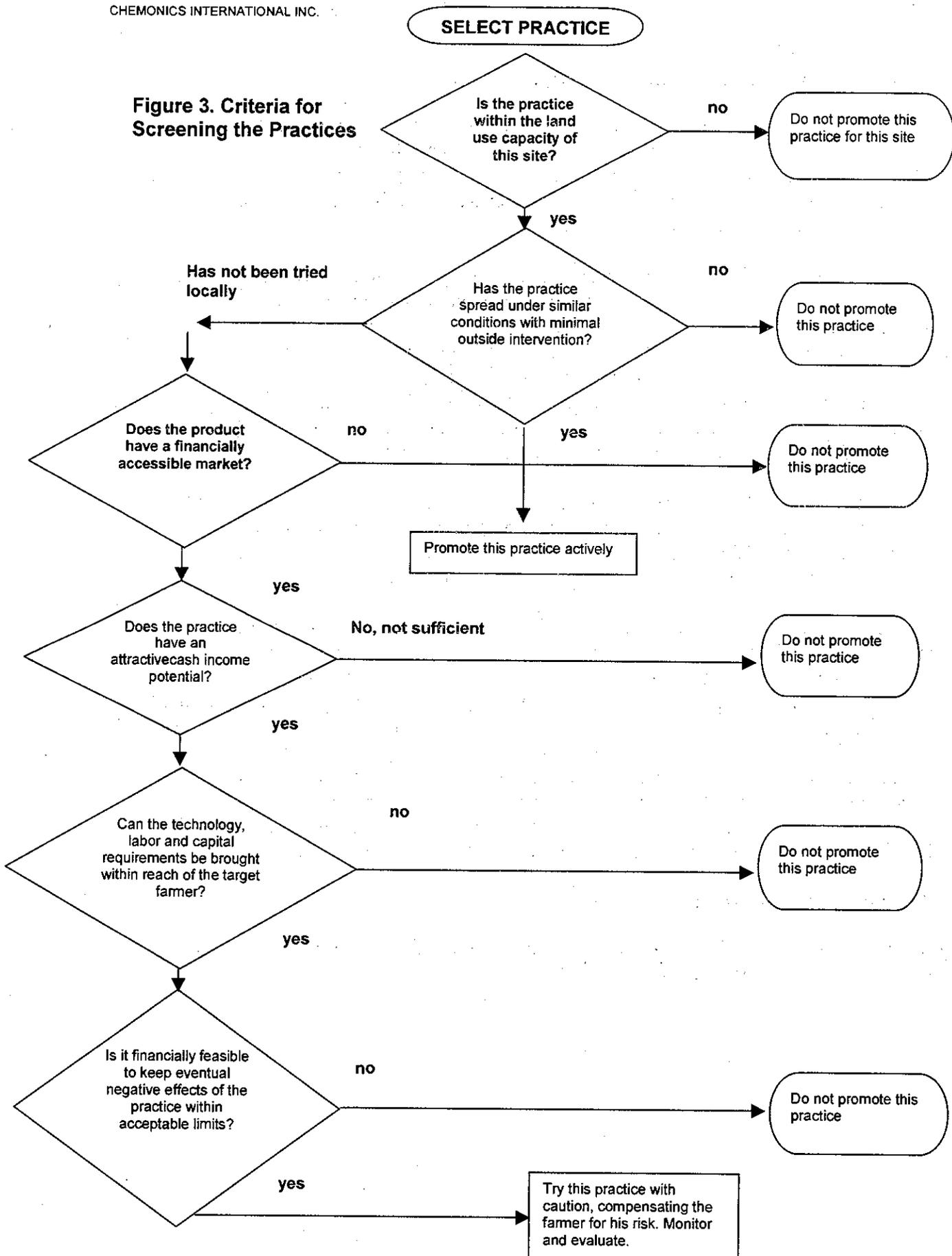
1. *Cultivars and tree species* that farmers work with, such as corn, coffee, bananas, pines and citrus trees, whether as monocrops or in agroforestry systems.
2. *Technologies* used to produce or process those cultivars and tree species. Examples include use of shade for coffee production, mulching for soil fertility and retention enhancement, and bio-pesticides or chemical herbicides for pest management.

The "correct" mixture of cultivars/species and technologies depends on the biophysical limits that the environment imposes, the goals that the producers want to achieve (family consumption, income generation), the resources that they have available, and, for commodities, the opportunities and constraints that the market imposes, including prices, commodity shape and color, etc. Based on the above concepts and the watershed-wide guidelines discussed in section

6, we propose that the criteria indicated schematically in the decision tree of Figure 3 be used to identify practices that merit consideration for possible application.

**SELECT PRACTICE**

**Figure 3. Criteria for Screening the Practices**



### **8.3. The importance of the concept of land use capacity**

Land use capacity is the most intensive use that a land unit will support without being physically degraded. It is based on physical properties and can be considered to be a constant for that unit. Ideally no land in a watershed should be used beyond its capacity. In reality, many areas in the project watersheds are overused and it is precisely those areas that are causing most of the watershed problems.

We recommend that the concept of land use capacity be applied by all of the implementing organizations in all activities that deal with land treatment. In Guatemala, INAB has adapted some of the commonly used land use classification systems and has officially decreed a system to be used for determining land eligible for reforestation incentives, allocation for agriculture and other purposes. INAB has used the system since 1997 and has recently refined it (MAGA-PAFG-INAB 2000). The system is practical, easy to apply at different scales, the best there is available for Guatemala and adequate for application in the project watersheds. Numerous technicians have been trained in its application.

The INAB system of classification should be used for making decisions as to the most intensive use that is to be promoted. Although it will be impossible for the project to prevent much of the land from being over utilized, at least project resources should not be used to promote uses that go beyond the capacity of the land to sustain them.

It is clear that out of desperation many campesinos will continue to over utilize their plots and that in the medium term it will be impossible for them to put that land to proper use or even abandon it. But at least the acceptance of this system of classification will finally give an objective standard against which to identify those interventions that are acceptable based on physical sustainability.

Although for some purposes it might be useful to map the land use capacity of a watershed this is an expensive, time-consuming exercise which would probably have limited application at this stage. Later, on a watershed scale, comparing maps of actual land use with those of land use capacity can be useful for identifying problem areas.

### **8.4. Classification of land use capacity**

Table 6 lists the classes of land use capacity used in the classification system officially employed by INAB. For further details see Annex 4.

**Table 6. Land Use Capacity Classes (MAGA-PAFG-INAB 2000)****Categorías de capacidad de uso**

Las categorías de capacidad de uso que se emplean en la metodología, se ordenan en forma decreciente en cuanto a la intensidad de uso soportable sin poner en riesgo la estabilidad - física - del suelo, se presentan a continuación.

No se incluyen criterios de fertilidad de suelos, ni aspectos ligados a la producción (acceso, mercados y costos), por lo que son categorías indicativas de usos mayores en términos de la protección que ofrecen a las capas superiores del suelo. Bajo este contexto, las categorías son las siguientes:

- a. Agricultura sin limitaciones (A):
- b. Agricultura con mejoras (Am):
- c. Agroforestería con cultivos anuales (Aa):
- d. Sistemas silvopastoriles (Ss):
- e. Agroforestería con cultivos permanentes (Ap):
- f. Tierras forestales para producción (F):
- g. Tierras forestales de protección (Fp):

Con base en el principio en que se basa la presente metodología, una unidad de tierra clasificada dentro de una categoría de uso intensivo no excluye el hecho de que pueda ser utilizada para otra categoría menos intensiva, así, una unidad de tierra clasificada para usos agrícolas intensivos perfectamente puede ser utilizada para arreglos de sistemas agroforestales o aun para usos forestales productivos. Lo contrario no se considera técnicamente posible, es decir, una unidad clasificada con capacidad de uso forestal, no soporta usos más intensivos, tales como los agrícolas o pecuarios sin que se ponga en riesgo la estabilidad del recurso suelo, principalmente en nuestro país donde este recurso es muy vulnerable a procesos erosivos y el deterioro general del terreno.

**8.5. Applying the land use capacity to some watershed management practices**

We have applied the land use capacity classes to some of the watershed management practices currently used by the implementing organizations and some others which seem promising to use (see Table 7).

**Table 7. Land Use Capacity as a Guide for Applying Currently Promoted and Potential Watershed Management Practices**

(1=permitted; 0=not permitted)

Practice	C=current P=Potential C/P	Land use capacity class						
		A	Am	Aa	Ss	Ap	F	Fp
<b>Annual crops</b>								
Corn & beans (=milpa)	C	1	1	1	0	0	0	0
Legumes as green manure	C	1	1	1	1	0	0	0
Horticulture (Vegetables)	C	1	1	1	0	0	0	0
<b>Perennial crops</b>								
Coffee with shade	C	1	1	1	?	1	0	0
Cardamom	C	1	1	1	?	1	0	0
Rubber	P	1	1	1	?	1	0	0
<b>Forest products</b>								
Pine resin tapping	P	1	1	1	1	1	1	0
Management of forest with merchantable timber	C	1	1	1	1	1	1	0
Management of forest without merchantable timber	P	1	1	1	1	1	1	0
<b>Animal husbandry</b>								
Small livestock (poultry & pigs)	C	1	1	1	1	1	1	0
Intensive range management	P	1	1	1	1	?	0	0
<b>Processing &amp; non-land use</b>								
Coffee processing (=beneficio)	C	1	1	1	1	1	1	0
Cardamom drying	C	1	1	1	1	1	1	0
Sources of income not derived from land use	C	1	1	1	1	1	1	1
<b>Conservation practices</b>								
Forest fire prevention & control	C	1	1	1	1	1	1	1
Reduction of fire in agriculture	C	1	1	1	1	1	1	1
Protection of natural forest and brush	C	1	1	1	1	1	1	1

### 8.6. Evaluation of practices using the decision-making flowchart

To evaluate some of the practices currently being applied by the implementing organizations, as well as other practices which we consider worth exploring, we have applied the “filters” of Figure 3 and the land use capacity limitations of Table 7. Those results are outlined in Annex 6 with one panel for each practice. The information used to produce this annex was derived from the documentation we reviewed (see bibliography), field visits during this consultancy as well as the combined experience of many years.

Subsequently, to produce Table 8 we used the criteria for screening the practices to be promoted (Figure 3), to review those practices listed in Table 2 that are currently being proposed by all of the implementing organizations. Applying the screen for the acceptable practices resulted in some being rejected (crossed out in Table 8) and a few new ones recommended. Thus Table 8 represents a first approximation for eliminating and adding practices to the menu currently being offered in the watersheds. It also raises some queries that should be clarified before proceeding further.

**Table 8. Modifications Recommended To the List of Practices  
Currently Applied by the Implementing Organizations**

(Numbers in parentheses after each practice refer to the organization listed at the end of the table)

Practices	Comments
<b>1) Perennial crops</b> a) Coffee i) Credit (1) ii) Agronomy, maintenance (1) iii) Renovation of old plants (1) (1) Coffee nurseries (4) iv) Machinery/infrastructure processing (1) v) Access road rehabilitation (1) b) Macadamia (2, 6) c) Cacao (2) d) Citrus (2) e) Black pepper (2, 6) f) Fruit trees (6)	What is the experience? Is the price attractive? Where/how can they be sold? What is the local experience? Only as a cash crop Only when the forest plantation can be considered as a cash crop Fruit trees are perennial crops, not reforestation
<b>2) Reforestation</b> a) Woody species: Pine (2, 4) <del>b) Fruit trees (4)</del> c) Incentives for reforestation (2) d) Tree distribution (2) e) Nursery setting and management training (3, 6) f) Distribute materials for seedling production (4)	
<b>3) Fire Prevention</b> a) Organize/equip fire brigades (2, 4) b) Develop radio spots and materials for fire prevention (4)	Explore payment for environmental services, such as fire prevention and use of water
<b>4) Basic grains production</b> a) Farmer production of improved ICTA grain seed (3) b) Distribution of open-pollinated ICTA grain seed (3) c) Training in and installation of grain silos (3) d)	Only on commercial scale
<b>5) Horticultural production</b> a) Distribution of horticultural seed (2) b) Establish horticultural production (4) <del>c) Distribution of chicken manure (2)</del>	Make it commercial. Require some payment from farmers Require some payment from farmers
<b>6) Irrigation systems</b> a) Rehabilitate irrigation systems (3) b) Establish gravity-fed irrigation sprinkler systems (2) c) Train on irrigation system management (3)	
<b>7) Land Tenure</b> <del>a) Mapping land tenure pattern (2)</del> <del>b) Organize agrarian committees for LT</del>	Either go all the way to land titling or eliminate.
<b>8) Marketing of local products</b> a) Marketing study(ies) for local products (3, 6) b) "Facilitate marketing of local products" (3)	Yes, but jointly for all implementors
<del>9) Diagnoses of the biophysical conditions of the watersheds (3,6)</del>	Being done jointly for all watersheds by

Practices	Comments
<p>10) <del>Diagnosis of the socioeconomic conditions of the watersheds (3, 6)</del></p> <p>11) Develop forest management plans (3)</p> <p>12) <del>Environmental Education materials and activities (4)</del></p> <p>13) <del>Fuel efficient stoves materials distribution (6)</del></p> <p>14) <del>Distribution of photovoltaic power systems (2, 5)</del></p> <p>15) <i>NEW: Protect the boundaries of the legally declared protected areas (Sierra de las Minas)</i></p> <p>16) <i>NEW: Manage or protect existing forest and other effective watershed cover</i></p>	<p>MAGA?</p> <p>Only if "quick and dirty"</p> <p>Only if application of the plans is assured</p> <p>Photovoltaic only when integrated with economic activities</p>
<b>Extension activities and target groups</b>	
<p>6) Organize farmer groups (3)</p> <p>7) Training target groups</p> <p>a) Extension agents (2)</p> <p>b) Municipal staff (2)</p> <p>c) Teachers (4)</p> <p>d) Community promoters (2)</p> <p>e) Farmers (4)</p> <p>8) Training subjects:</p> <p>a) <del>Production of improved seed of basic grains (3)</del></p> <p>b) Soil fertility management (3)</p> <p>c) Use of grain storage silos (3)</p> <p>9) Methods:</p> <p>a) Establish demonstration plots (4)</p> <p>b) Facilitate exchange visits for farmers (4)</p> <p>c) Salaries and equipment for municipal staff (2)</p>	<p>Only for specific purposes</p> <p>Include training under each practice.</p> <p>Priority on farmer to farmer technology transfer.</p> <p>Include training under each practice</p> <p>Only for munis that match assistance</p>
<b>Credit</b>	
<p>4) Organize village banks (3)</p> <p>5) Credit distribution (3)</p> <p>6) Loans for silos (3)</p>	<p>LIBERATE FOR ANY PROFITABLE ACTIVITY. PRIORITY FOR ACTIVITIES TO SUBSTITUTE AGRICULTURE ON LANDS NOT SUITABLE FOR AGRICULTURE.</p>

1. ANACAFE
2. CARE
3. CRS
4. DEFENSORES
5. FUNDACION SOLAR
6. SHARE

### 9. Focus on income generation

There is an unstated belief among the implementing organizations that erosion occurs because farmers are poor managers of soil and water. As a result, the organizations invest a great deal of efforts to advise, train and "educate" farmers about soil erosion and erosion-control methods. Some of the organizations even pay farmers with food or access to credit so the latter adopt soil and water conservation practices. Environmental conservation campaigns are organized, with posters, bulletins and radio announcements praising the virtues of conservation, reforestation, contour plowing, etc. Demonstration plots are set,

and many hours are spent with farmers to develop land management plans for farms and mini-watersheds, i.e., layouts on pieces of paper showing what a site is supposed to grow in ten or more years. Costly, large scale engineering activities become the goal, especially terracing, even though in the second year of implementation the terraces are not well maintained and the fact that construction w/o maintenance is a best a teaser, if it does more harm than good. Despite all these efforts there are few adoptions among farmers.

The reality is that most farmers fully realize the losses caused by erosion, and often use traditional soil erosion control methods. They, nonetheless, do not enthusiastically adopt the conservation practices espoused by the implementing organizations. Their reasons range from resistance to the organizations' rigidity in the application of technological packages, to lack of opportunities for farmers to experiment with and adapt some of the most promising technologies proposed while discarding others. One additional important reason is not finding clearly visible economic benefit derived from the adoption of those technologies. As a staff from an implementing organization stated, "Farmers do not have any interest in soil conservation for the fun of it. They seek, instead, increases in crops yield or cash revenues."

One of the most limiting constraints for farmers is their lack of income. With income farmers could buy food, agricultural inputs and know-how. With income-generating activities they could overcome the conditions that the small size and general precariousness of their plots impose. They can meet the goal of food security through income-generation. They could tackle food security by complementing the food they produce (availability) with the food they can purchase (access).

The implementing organizations will be much more successful if they devote as much energy to promoting income-generating activities as they have invested in the past in attempting to raise the environmental awareness of farmers. Examples of possible income-generating activities include production of cash crops, commercial production of seedlings of coffee or broadleaf species, commercial harvesting of resins, medicinal plants or herbs, flower production, value-added processing, etc.

## **10. Let farmers decide**

### **10.1. Farmers as beneficiaries in current top-down extension approach**

The implementing organizations go on adopting and promoting technical packages without modifying and streamlining them fast enough or at all even though the services that they offer are often redundant, irrelevant or do not rank high in priority to farmers. At the core of this lack of adaptation is the absence of a mechanism for farmers to provide corrective feedback on the practices and interventions that the organizations advocate. Hence, despite an overabundance of participatory assessments, the provision of extension services by the implementing organizations is strictly top-down. Conditioned on loose promises, the donors give away money to the intermediaries who in turn often give it to other implementing organizations who then donate their services to the farmer. No one who receives a gift has much power to complain. Each link in the chain is controlled by the one above.

In a nutshell, the unstated rule of the game is for farmers to accept thankfully whatever the organizations offer, however marginal many of those practices may be, simply because the offer is a gift. Yet, this approach is as ineffective and self-defeating as attempting to sell cheap three-wheel cars when people are demanding and willing to pay for more expensive and appropriate four-wheel cars. The chances for the organizations to miss critical opportunities to identify highly effective practices continues as long as the implementing organizations reserve for themselves alone the decision on the composition and content of the practices that they promote.

## **10.2. Improve technical effectiveness and efficiency through fee-based extension**

To see substantial changes in technology adoption and landscape management, the implementing organizations must adopt extension approaches that consider farmers as informed clients whose expectations they need to meet rather than charity recipients. The implementing organizations must explore and test extension systems that encourage farmers to take the lead in the definition of the content of technical assistance and the evaluation of its impact. These alternative extension systems should be based essentially on formal contracts between farmers and the implementing organizations whereby the two parties define one common goal and the technical mechanisms that the organizations should provide to attain them. These contracts should increase the accountability of the organizations to farmers. At the same time, the contracts should expand the opportunities for farmers to provide feedback that the organizations should use to hone skills and more accurately hit targets. Above all, the contracts should reinforce the notion that seeking sustainable development and natural resource management is a challenge that requires the active and leading role of farmers, and a focused support from the implementing organizations.

As long as technical services are for free, farmers will not feel compelled or empowered to demand quality in service delivery. The implementing organizations, therefore, should ascertain the farmers' willingness to pay for technical services that the latter consider as having high priority. The information on farmers' willingness to pay should be used to design fee-based extension systems. Farmers should cover increasingly larger segments of the extension system's operating costs, until the system is completely self-sufficient. Even if they cover only a fraction of the operating costs, fee-paying farmers will feel that the systems owes them something good in return, and will speak up accordingly.

In the recent past, CARE tested and validated in Guatemala the FEAT model whereby small farmers paid fees for technical support that private extension agents provided. At the same time, in Honduras the Swiss Program with Private Organizations for Sustainable Agriculture in Hillsides (PROASEL) is promoting an approach whereby technical services are interpreted as commodities rather than gifts, and interested farmers must contribute with at least one part of the service provision costs (Lea 1996, Stürzinger and Bustamante 1999). (FEAT, PROASEL and World Visions experiences are described in Annex 5 of this report). These and other approaches should be widely tested, refined and adopted by all the implementing organizations. USAID/G should actively encourage the adoption of these

private extension mechanisms because they are more efficient, cost-effective and ultimately sustainable approaches to watershed management and economic development.

### **11. Focus on quality of service delivery**

The implementing organizations will engage in multiple activities in the project. No matter what these activities entail, however, the organizations should keep track of three overarching goals: being effective, efficient and sustainable. The strongest evidence of effectiveness in this particular watershed management case will likely be that the technology that the organizations promote are taken by farmers and adapted to fit their own cropping systems, and lead to substantial increases in crop yields and income.

An indication of efficiency would be the number of farmers who adopt the technologies on their own. This number will include especially those farmers who have not participated in the project. The larger the number, the greater will be the project's return on investment. Likewise, this will probably be a sign of the clients' satisfaction with the project services' content and approaches.

A sign of project sustainability will be the degree to which the knowledge of farmers is enhanced, and whether they become involved in their own experimentation with technologies. The implication is that the organizations should not concentrate primarily on teaching new technologies and knowledge, even if those are transferred from farmer to farmer. Technologies and knowledge can become obsolete. Instead, the organizations should focus on developing farmers' own capacity to think for themselves and develop their own solutions. This will empower them not only to solve problems now, but also in the future. Incidentally, it is extremely improbable that an organization will empower farmers to think for themselves if it does not allow its own staff to think for themselves.

### **12. Steps needed to apply the recommended practices by June 2001**

Because the financing agreements have already been signed and time is extremely short before the end of June 2001 beyond which these funds will not be available, the flexibility for making changes is very limited. As a first step in response to this consultancy, the implementing organizations have agreed, in general terms, on the criteria to use for selecting working areas and practices. Progress has also been made on reaching agreement between the organizations and USAID, with respect to those practices that should be promoted (see Table 8).

On February 28, 2000 representatives of ANACAFE, CARE, CRS, Defensores de la Naturaleza and SHARE met with the Chemonics consultants and agreed that certain activities should be implemented jointly among all the organizations. These activities are listed below as joint activities. These same organizations plus representatives from MAGA, ICTA, the AGIL Project and Fundación Solar met with representatives of USAID on April 13 to specify in detail and commit to the changes. We recommend that USAID support this initiative and provide follow up in initiating the following steps immediately (see Annex 9 for details and the schedule agreed upon).

## **12.1. Focus on income-generating crops**

### **12.1.1. Concentrate major efforts on the promotion of perennial crops (jointly)**

Permanent crops that both provide cash income and protect the soil must play a critical role in the strategy to develop and conserve steep hillsides in the long run. There is an urgent need to identify permanent crops appropriate for farmers on steep hillsides in remote areas in addition to coffee and cardamom. This requires crops that have relatively high market value per volume, are easy to transport, and have a well-established market with stable prices. Some candidates worth exploring are allspice, black pepper and rubber. Systematic efforts should be made to identify other suitable crops and markets. AGEXPRONT could probably contribute to this process. Relatively minor investments in post-harvest processing infrastructure and equipment will likely bring additional high returns for small farmers.

### **12.1.2. Market study (jointly)**

The organizations want to support a study to identify commodities such as fruit trees, achote, medicinal plants and *rosa de jamaica* that have elastic demand, command good prices, and could be produced or processed in the target areas by small farmers. The study should be conducted by a consultant organization with expertise in marketing, and should explore opportunities for the different ecosystems of the watersheds. It should be very practical and cover analysis of expected trends as well as identify market niches. USAID could use funds currently earmarked for marketing studies under this project and the AGIL Project.

### **12.1.3. Training on coffee production, processing and marketing (jointly)**

Staff from all the implementing organizations should receive training by ANACAFE on activities related to the production, transformation and marketing of coffee. ANACAFE has offered its facilities in La Tinta and in the Manantial farm in San Pedro Carchá for such training. Training sessions could start as early as September 2000. ANACAFE could also organize training for small farmers working with the rest of the implementing organizations. Training would be complemented with field visits to small farms where coffee-related activities have shown that they can bring substantial income to producers.

## **12.2. Target working areas according to land-use capacity**

### **12.2.1. Training on land use capacity**

Mapping the land use capacity of a watershed is an expensive, time-consuming exercise that would probably have limited application. However at this stage, field staff, especially extension agents, should be trained in the concept and the application of the INAB method so that they can apply it at the farm and plot level to help make objective decisions about the suitability of the plot for certain practices.

### **12.2.2. Prepare and apply maps for the entire Motagua and Polochic watersheds (jointly)**

Instead of having a situation whereby each organization prepares maps for its target area, it is proposed that MAGA or some other similar organization prepares maps for all. There are obvious economies of scale in doing such mapping jointly rather than have each implementing organization do it on its own. USAID should sign an agreement with MAGA immediately to request and accelerate production of these maps.

Overall planning and monitoring of work in the watersheds would benefit considerably from better thematic maps. Such maps would also be valuable for reporting and presentations. Furthermore, the psychological function of maps to stimulate coordination and efforts toward a common goal should not be underestimated. The types of thematic maps needed are currently being prepared by MAGA for the entire country. Extracts could be made at a low cost to cover the Motagua and Polochic watersheds. The following maps at a scale of 1:250,000 would be the most useful:

- A base map showing the rivers, lakes, watershed boundary, boundaries of legally declared protected areas, contours, culture;
- Drainages and boundaries of sub-watersheds;
- Departmental and municipal boundaries, *cabeceras* of the municipalities
- Slope classes;
- Forest cover (about to be finished by INAB for the whole country);
- Population
- Working areas of each implementing organization with communities participating in the project and the types of practices applied.

Various overlays (scenarios) should be created to answer such questions as: Where are the most vulnerable sites? Which areas are still intact and should simply be protected? In which areas have past and current interventions concentrated? Are interventions really concentrating on the areas identified as being priority? The implementors should list questions for which they need answers that these maps could provide.

In the future, the map coordinates of all field interventions should be recorded and reported so that periodically an updated map can be prepared showing progress of the project. If needed, more detailed maps at a scale of 1:50,000 could be prepared for some sub-watersheds. The Sierra de las Minas Biosphere Reserve, which represents a large proportion of the watersheds, has already been mapped in detail by Defensores de la Naturaleza and the maps are available as electronic files.

### **12.3. Improve project accountability and learning from experience**

#### **12.3.1. Share monitoring systems and approaches (jointly)**

The organizations, in agreement with USAID should define four or five indicators common to all the organizations in order to monitor jointly the progress toward sustainable watershed management. The organizations should also prepare jointly baselines for the

target areas. At the end of each fiscal year, the implementing organizations and USAID/G should meet to discuss lessons learned from activities and approaches used by the organizations during that year. The information gathered through all of those means will contribute to reinforcing a learning culture among the organizations. Sharing common monitoring systems and approaches should be construed as opportunities for all the implementing organizations to coordinate with each other, reflect, exchange information, learn from each other and feel that they are part of one team.

### **12.3.2. Promote and coordinate a forum for reviewing experiences (jointly)**

The introspection and discussion stimulated by the preparation of this document and its follow-up will hopefully lead to some changes in the attitude of the implementing organizations. Business-as-usual and the continuation of practices that have failed to show success and failed to spread are no longer acceptable. Long-standing assumptions about what works need to be honestly reexamined. A lot of weeding is needed to discard approaches that do not work. The results of several evaluations, workshops and the knowledge of many experienced field staff can help in this process and should be applied. Improved quality control is urgently required.

In light of this, the implementing organizations propose to establish a *consejo* with permanent representatives from all the implementing organizations. The *consejo* would be a mechanism for communication and coordination among the organizations, reflection on technical issues and joint training. The implementing organizations would identify specific issues to be analyzed in depth. This proposed *consejo* would expand and complement the dialogue that currently exists between contractors such as CARE and subcontractors like SHARE, or among the Title II PVOs. Leadership and coordination of the *consejo* would be rotated once or twice a year among all the implementing organizations.

### **12.3.3. Interchange of experience (jointly)**

Better horizontal communication between the implementing organizations would help to change attitudes and refine practices. Because funding comes from a common source, USAID can do a lot to bring about more interchange of experience that goes beyond the traditional workshop. USAID could use several means to forge a team. These include reciprocal field visits, interchange of staff, circulation of reports, frequent joint review of a minimum set of common indicators, and periodic coordination meetings of all implementing organizations. They also include having a common map base, training cutting across all organizations, improved use of e-mail between organizations for dissemination of technical information. USAID should challenge the pervading attitude of so many organizations of believing they are the only ones possessing the Truth and thus being reluctant to admit failure and learn from it need to be overcome.

## **13. Changes needed for watershed management beyond the short term**

Arguably, the most important contribution of this project would be the opportunity that it affords to weed out practices that show limited success and return for investment, and to explore and refine new approaches to watershed management and rural development. This

consultancy has identified transformations that should start immediately but obviously will require a longer time than June 2001 to come to fruition. These changes are listed below.

### **13.1. Concentrate efforts on a carefully selected target area**

The implementing organizations, as a group and individually, should choose their target areas so as to maximize their chances of bringing about visible transformations in the economy and landscape of the watersheds. As suggested in this report, the organizations must concentrate their work in areas that are currently under threat instead of being already damaged, focus on problems that are easier to solve and target activities that are cost effective in relation to the effort and money invested. These criteria should be used to choose watersheds, micro-watersheds and target sites within communities.

Judging from our discussions, NGO management and senior technical staff seem to be in agreement with these criteria. However, they will only be applied if field staff understand the reasoning behind them and receive precise instructions on how to select sites. There are numerous instances where field staff have entered into commitments with communities based on inadequate justification, but where it is now very difficult to retreat. More effective use of thematic maps would help to visualize the need to concentrate. Selection of working areas is one of the most important decisions with broad implications and is best done in a formal, collegial manner whereby headquarters and field staff jointly weigh the pros and cons.

The adoption of these selection criteria will require a conscious and continuous reinforcement from USAID/G to change the implementing organizations' prevailing attitudes and practices. These recommendations, in fact, tend to be counter-intuitive for many of those organizations, particularly the NGOs, and may even challenge the mandate of some of them. Many of those organizations generally choose to work in areas that are already seriously damaged and whose rehabilitation is very costly. By design, they focus on addressing the most difficult social, productive or environmental problems, and therefore the challenges they face are often overwhelming for both staff and farmers. The organizations are, thus, unable to show results soon, gain confidence while solving problems, and learn from activities that provide clearly palpable results.

### **13.2. Identify new cash crops suitable for critical areas in the watersheds**

Income generation should be a major thrust in watershed management projects like this one. USAID/G should hire as soon as possible a consultant organization to carry out market analysis of cash crops that are appropriate for small-scale producers in the target watershed areas, and make available the resulting information to all the implementing organizations. As indicated above, it is extremely important to identify agricultural and forestry cash crops that are well established in national or international markets, command competitive prices and have a relatively stable or increasing demand. Obviously, coffee is one crop that meets those criteria. It is estimated that even now when the price of coffee is relatively low small farmers can make \$25/*quintal*. Despite coffee's potential profitability, the project cannot promote coffee exclusively. First, there are many areas where coffee production is not

technically or financially viable; also farmers should be encouraged to maintain crop diversification to reduce risks resulting from changes in market prices.

These two conditions underscore the need to identify alternative, profitable cash crops. Implementing organizations, however, are reluctant to promote untested crops that may or may not have profitable market demand, nor do they tend to have the appropriate expertise<sup>4</sup>. The crops selected should preferably be perennials, so as to meet the double goals of income generation and soil conservation. At the same time, the crops' potential for income generation resulting from value-adding transformation should be carefully ascertained.

### 13.3. Empower the farmer to choose the extension services

USAID should help explore extension systems that encourage farmers to take the lead in the definition of the content of technical assistance, selection of the provider of extension services and the evaluation of its impact. Particularly, it should encourage the implementing organizations to explore and refine fee-based extension systems, whereby farmers can meaningfully influence the content and quality of the services provided. At present the provision of extension services is strictly top-down. Conditioned on loose promises, the donors give away money to the intermediaries who in turn often give it to other implementing organizations who then donate their services to the farmer. No one who receives a gift has much power to complain. Each link in the chain is controlled by the one above. The farmer is a beneficiary. Why not turn him into a client for services? A client purchases services and therefore can choose between providers, determine content and insist on quality. There is increasing evidence that such an approach works.

Examples are the models of FEAT, *invertiendo la mirada* in Honduras, and the PRONADE system whereby groups of parents select and contract the teachers for the school in their village. Usually in such arrangements, the donor allows the community group, instead of the service provider, to make decisions regarding the disbursement of the funds (Leal 1996, Stürzinger and Bustamante 1999). Another encouraging example is the success of the *Comités de Investigación Agrícola Local* in seven countries of tropical America. These farmer groups actually carry out practical field experiments in order to learn how to improve their agricultural practices (Pratt 1999).

### 13.4. Engage business-oriented implementors

The problems and the watersheds are enormous. The resources are limited. We need to concentrate on approaches that will proliferate as a chain reaction (the *carambola* effect). A different type of implementor should be tried, particularly more business-oriented actors. The thread running through this document is that farmers will emulate practices through which they can make money (certainly not a new discovery but often forgotten!). By definition, NGOs are not in the business of making money and are usually not good at it.

<sup>4</sup> During this consultancy the implementing organizations indicated interest in promoting crops such as achiote, avocado (there is an association of avocado producers), black pepper, and lemon. The organizations, however, do not have systematic and complete information on the market channels, produce characteristics that the market requires, prices and potential net returns for any of those crops or similar ones. The organizations, therefore, cannot and should not promote these crops until there is a clear definition of those that are found to be profitable in local or international markets.

Private companies are. Nor do NGOs have interest in or credibility with large landowners. USAID should explore contracting private enterprises, such as private consulting companies to manage some of the sub-watersheds or to carry out certain functions. A comparison of performance and costs between this private enterprise arrangement and the traditional approach could be very instructive. The challenge will be in finding companies capable of and willing to assume such a contract. However, once a market is created for such services, the response might be surprising. Contractual conditions for private companies can be much more stringent than those for the current cooperative agreements.

### **13.5. Payment for environmental services**

In Guatemala the rich folks live in the valley and the poor have been driven up the unproductive hillsides. Yet the hillside farmers are expected to manage their land well so that those better off downstream will not be threatened by floods, dirty water and lack of water in the streams during the dry season – all of this for free. The melon growers in the Motagua valley do not pay for the water they use for irrigation. Similarly, the users of hydro-electricity now pay nothing for management of the watersheds that are the source of the hydropower. Where is the incentive for the hillside farmer to manage those watersheds? It is assumed that what is good for increasing production on the hillside farms is good for the watershed. Fortunately, this is usually true. So the focus has been on promoting such win-win practices. However, there are many situations where the assumption does not apply, especially on land that is not used by the hillside farmer for production. What is the incentive for that farmer to make an effort to prevent or combat forest fires? What is the incentive for him to respect the boundaries of a protected area? Where is the incentive for him to not allow the stream to wash away his garbage or coffee processing residues?

There is increasing recognition that the provision of such environmental services that benefit society in general merit compensation. Practical schemes for paying for such environmental services are beginning to be developed. On a global level an example is the payment for carbon sequestration. On a more local level is allocation of part of the revenues derived from electricity or water bills toward funds aimed at management of the upper watersheds. Some possibilities specific to the project, which are worth exploring, are contracts to pay community groups:

- For keeping wildfires out of a particular forest. For every hectare burned, the amount to be paid would be reduced.
- For patrolling the boundaries of a protected area. For every hectare cleared or tree felled illegally, the amount to be paid would be reduced.

Watershed management efforts financed by USAID should include support for policy changes needed so that users of water and hydropower pay for upstream interventions that protect the watersheds. This would be a large step toward assuring financial sustainability of watershed management and breaking the dependence on external funding.

### 13.6. Payment of the implementors for results produced

Under the current agreements the implementing organizations receive USAID funding whether or not they produce the results promised in their proposals. Therefore, there is not much pressure to produce. USAID should explore payment for deliverables similar to the arrangements common with private contractors. This would have several advantages:

- Greater realism in planning and avoidance of overly optimistic proposals;
- Increased accountability;
- A shift in attitude on the part of the staff of the implementors — away from activities toward results;
- Savings for the donor because there is no payment if results are not delivered as agreed;
- Greater quality control;
- Simplicity of reporting, monitoring, evaluation and control;

The primary difficulty is the need for more attention to planning, budgeting and the negotiation of the amount to be paid for deliverables but this is largely compensated by the simplicity of reporting, monitoring and control. Of course resistance on part of the implementing organizations is to be expected.

Such a system has been used for three years by the CONAP/RECOSMO Project funded by GEF/UNDP and the Netherlands. An external evaluation has just been completed. The experience has been positive. Detailed procedures and formats are available. Two of the NGOs involved in the Post-Mitch work (Defensores and FUNDAECO) have been participating under this arrangement. USAID should examine this experience and try it out.

### 13.7. Improved performance and change in response to experience

Many of the deficiencies of the implementing institutions that have been identified in this report have also been identified by others years ago (Ecodesarrollo 1996, Stewart *et al.* 1999). Such documents contain numerous wise admonitions. Yet response to such recommendations and to experience is excessively slow. There is not enough pressure internally and from donors to improve. New contracts are not sufficiently based on the quality of past performance. Institutions, like individuals, seek more effective approaches when they are forced to compete or are rewarded according to what they produce. USAID tends to apply these simple principles to awarding contracts to private firms. It would do well to also give more emphasis to these principles before signing agreements with the NGOs, even when these do come with matching funds. Payment for results as mentioned in Section 13.6 would be a healthy move in this direction. Application of these principles would do more for institutional development than large investments in training, workshops

and equipment. Such an approach would stimulate learning from experience, a quest for efficiency and quality in the organizations' service delivery and greater accountability.

### **13.8. Involvement of large landowners**

Because of the culture of the NGOs and their rightful concern with social justice, they usually avoid the large landowner. However, if large areas in a watershed are to be covered, the large owners cannot be ignored. Also, the large owners are often the innovators that are later emulated by others. They tend to give impulse to development. They need to be involved in watershed management and the NGOs should make special efforts in this direction. However, they are not likely to be very good at this. It is probably more effective to assign this task to private enterprises (see Section 0), to support policy changes including credit policies, to apply environmental regulations, to introduce "green" certification, to use market intelligence and mechanisms to encourage these owners to try new crops and practices, to influence some of the associations to which they belong (*ganaderos, huleros, agroindustrias*, etc).

Many of the largest landowners are the municipalities and they should be assisted in managing their own lands better, partly to provide them with income. The PMS Project in the Petén has several years' experience in this area which is worth considering as a model. This project helps to create and operate an Agriculture and Natural Resources Section within the municipality. A member of the Municipal Council coordinates this Section. Its principal functions are to advise the Municipal Council on natural resources subjects; encourage the integration of municipal projects; plan the rational use of municipal lands; prepare and execute forest management plans on municipal land; provide technical assistance to the communities on agriculture, forestry and the environment; and help establish links between the municipality, government agencies, NGOs and other relevant institutions (Ordoñez 1999).

### **13.9. Stringent review of new proposals**

Given its shortage of technical specialist, USAID might consider contracting the review of future proposals so as to assure higher quality, coherence with other ongoing work and adherence to USAID guidelines. The third party reviewing the proposals would make recommendations to USAID for changes that should be negotiated and eventually even assist the applicants in making the modifications to the proposals.

AID should also consider contracting out for technical support to ensure that the overall recommendations presented in this document (targeting activities where there is more likelihood of success, focus on income-generation, etc.) are enforced by all the implementing agencies. Currently, AID makes the implementing organizations responsible for establishing periodic project performance reviews. Very often, however, the consultants contracted for this purpose are not critical enough of the organizations' activities. This is partly because the consultants are paid by the implementors, partly because they are only asked to look at the work of that particular implementing organization rather than its relation to the overarching Special Objective, and partly because the consultants are not given well-defined standards to judge the project against, other than output goals (i.e.

numbers of farmers that should be trained, or trees that should be planted by a certain date). The result is that many business-as-usual situations emerge from and are perpetuated by mid-term evaluations. A combination of good designs and careful follow-up and coaching will contribute to improving the overall quality of the future projects.

### **13.10. Change in attitude of the local population**

Of course just as in most other development endeavors, in the long run substantial improvements in the management of the watersheds can only be achieved through a change in the attitude of a critical mass of the local population. "Unless you get a critical mass of the population behind this effort, it is unlikely to succeed. Obviously, this critical mass could be composed of 1 or 10 large landowners in a small watershed or thousands of small landowners in larger watersheds. Truly getting the downstream users involved is critical. They are usually wealthier, politically stronger, have more access to and use more water, and suffer major consequences from the lack of watershed management (floods, shortages of water, water quality and so on)... How are you going to get a critical mass to participate (only through natural spread of technologies or through changes in local policies, municipal support, environmental education, incentives, etc.)? How do you get down stream beneficiaries to contribute to upstream protection costs (water associations, taxes, project sponsorship, tree nurseries, etc.)? How do you get people in the watershed to understand the relationship between the upper watershed forest and the water that feeds their town supply or irrigation system ... and then change their behavior to reflect this change in attitude, especially when they are living day to day. This whole issue is the gist of watershed management."<sup>5</sup>

Of course there are no single, simple means of bringing about these changes in attitude and, consequently, in behavior. Certainly a fundamental reorientation in education is essential in order to strengthen the ability of rural people to solve their own problems (see Annex 8). History shows that a combination of innumerable interventions, including the kind proposed in this document, can gradually get people to change their ways for their own long-term benefit.

### **14. Recommended follow-up under the Chemonics task order**

As a result of previous drafts of the present document and the meeting of 13 April 2000, USAID and the implementing organizations have agreed on immediate follow up actions and the future role of the Chemonics team, all of which are summarized in Annex 9. An amplified description of these agreements follows:

#### **14.1. Workshops to agree on practices and monitoring procedures**

The implementing organizations have participated in several meetings organized by USAID/G and the Chemonics team to encourage them to define the practices that work and to make the necessary changes (see Annex 9). The organizations have expressed that these meetings have been useful and should continue. These meetings have stimulated discussion

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<sup>5</sup> John Nittler. Personal communication.

about the best practices in broad terms, but there is a need to further define practices as well as socio-economic and institutional approaches to development that should be tested and refined. This introspection should be a continuous process.

As a next step, it is proposed that a workshop be organized and facilitated by the Chemonics team in early June 2000 for this purpose. The organizations would be encouraged to further refine changes in practices and approaches they would promote during the remaining time of this project, as well as in possible USAID/G-funded projects in the future. These agreements would be distilled into standards to be followed by all the implementing organizations and a system of indices to monitor those standards (see 12.3.1). The standards are principles that the implementors agree that describe "best practices." They standards, in this sense, represent the commitment of the organizations to uphold those principles. For instance, one possible standard would be that the organizations must: "ensure that all project participants have decision-making power in all the project phases." The indicators are used to define how the standards are actually measured. In the example presented above one possible indicator would be: "Percentage of leaders capable of participating in and facilitating group processes to reach mutually agreed upon decisions." Defining and using standards and indicators will directly contribute to setting up systems that the implementing organizations and USAID/G can use to monitor and improve the quality of development projects, as well as to continue encouraging joint work.

#### **14.2. Review work plans for the second year of the special objective**

The Chemonics team could help USAID review the work plans presented by the implementing organizations for the second year of the Special Objective in order to assure that the changes that were agree upon are included.

#### **14.3. Workshop to identify new promising crops, markets and practices**

The study to identify possible new crops and markets foreseen in Section 12.1 should be a reiterative process in which the implementing organizations and other informed individuals should give feedback as to the feasibility of the proposals and the practicalities of how to follow up on the recommendations. The Chemonics team could help organize follow up, which might include one or more workshops.

#### **14.4. Application of thematic maps to be produced by MAGA**

The maps recommended to be prepared by MAGA (see 12.2.2) will be of little value if they are not interpreted, analyzed, updated, distributed and used effectively. The implementing organizations have formed a working group of specialists to periodically interact with MAGA with respect to the mapping work (see Annex 9). We propose that the Chemonics team coordinate this working group. Once the thematic maps are finished, the Chemonics team should participate in trying various overlays so as to produce scenarios useful for watershed management. The team would periodically present the results and discuss applications at the sessions of the coordinating *consejo* (see 12.3.2) and eventually at meetings of the field personnel. Through this process managers and technicians will hopefully get in the habit of seeing these maps as tools, not only as wall decorations.

#### **14.5. Institutional learning**

During the first few sessions of the coordinating *consejo*, which is a permanent working group for interchange and introspection (see 12.3.2), the Chemonics team could act as a facilitator. The Chemonics team could also encourage implementing organizations to learn from each other and from sister organizations by seizing the opportunity to engage in an open dialogue using numerous means, such as those mentioned in Section 12.3.3.

#### **14.6. Organize a course on land use capacity classification**

The implementing organizations agreed to send technicians to a course in land use classification (see 12.2.1 and Annex 9). The Chemonics team could prepare the terms of reference for the course, contact the organization selected to offer the course, and coordinate the whole process.

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## Annex 1. Primary Contacts

Institution	Name	Job title
USAID/Guatemala	Edin Barrientos	Especialista en Desarrollo de Proyectos, IRE
	John Chudy	Mitch Coordinator
	Brian Rudert	Chief, IRE Office
	Carlos Chacón	Program Management Specialist
ANACAFE	Fernando Arturo Juarez	Asesor Técnico, Pequeños Productores
	Arturo Villeda	Coordinador de Proyectos
	José Angel Zavala	Coordinador Region IV, Coban
	Jaime Posadas	Coord. Org. Empresarial de Pequeños Prod.
CRS/Guatemala	José Nicolás Granados	Coordinador Técnico de Cuencas
	Victor Hugo Lemus	Asistente Técnico, El Estor-Poptún
	Adán Pocasangre	Coordinador Agua y Saneamiento
	Edward Walters	Asesor Regional, Prog. De Agricult.
	Jayron Zaladaña	Subgerente
CARITAS	Luis Alvisurez	Técnico en Café
	Rafael Lopez	
	Carlos Sett	Director CARITAS/Zacapa
	David Trujillo	Técnico Comercialización
	Max Vidaure	Especialista en Evaluación y Monitoreo
CARE/Guatemala	Ismael Chavarría	Técnico III, Agricultura, Telemán
	Boris Chinchilla	Coordinador Regional
	Walter Lopez	Gerente I, Telemán
	Kirstin Johnson	Director
	Carlos Piedrasanta	Asesor Recursos Naturales
	Efrain Tecú	Coordinador Regional, Tukurú
	Alberto Tzibxol	Asistente Técnico II, Agricultura
	Zoila Vargas	Asistente Técnico I, Salud
	Jeannie Zielinsky	
Fundación Defensores de la Naturaleza	Gustavo Madrid	Coordinador Sierra de las Minas
	Oscar Rojas	Coordinador Operaciones de Campo
	Cesar Tot	Jefe Distrito Polochic
	Carlos Velazques	
Fundación Solar	Ivan Azurdia	Director Ejecutivo
	Juan Vadillo	Coordinador Proyecto CARE

Institution	Name	Job title
ICTA	Carlos Heer	Director
INAB	Claudio Cabrera	Director
	Carla de Giron	Coordinadora Depto. SIG
	Mario Paiz	Coordinador Incentivos Forestales
	Geronimo Perez	Técnico en SIG
MAGA	Luis Alberto Castañeda	Vice Ministro
	José Miguel Duro	Jefe Area de Planificación
	Rudy Cabrera	Experto en Manejo de Cuencas Hidrográficas
	Danilo Gonzalez Arauz	UPCEP
	Carlos Morales	Unidad de Cooperación Externa
	Roberto Sagestume	Cartógrafo-Fotointerprete
Proyecto Eco-Quetzal	Byron Cordova	Extensionista Agrícola
	David Unger	Director
Proyecto RECOSMO	Edgar Godoy	Especialista en Planificación y Monitoreo
Proyecto AGIL	Rick Clark	Director
SHARE	John Lundine	Rep. de World SHARE en Guatemala
	Mardoqueo Gil	Especialista del Componente
Vecinos Mundiales	Carla Calderon	Administradora
	Oscar Castañeda	Director, Vecinos Mundiales/Guatemala
	Imogenes Castillo	Coordinador Proyecto de Agric. Sostenible
Others	Ron Curtis	Consultant

## Annex 2. U.S. Hurricane Mitch Response

### Emergency - \$9.5 million made up of:

#### *\$1.5M in OFDA emergency assessments and supplies*

- USAID was among the first to respond in Guatemala with emergency help.

#### *\$4.0M PL 480 Title II used to feed evacuees and for food for work programs*

- Through its PL 480 Title II Food Aid program, USAID helped the GOG minimize loss of life and accelerate return to normalcy for affected villages.

#### *\$4.0M for U.S. Army helicopter support to rescue operations and distribution of emergency relief supplies*

- USG response benefited from close interagency collaboration (U.S. Military, USAID, USDA, etc.).

### Rehabilitation - \$30 million made up of:

#### *\$2.8M to support the GOG (from ongoing income, health, and PL 480 Title II activities)*

- USAID helped the Ministry of Health distribute medicine to prevent and combat the spread of cholera and other acute diarrheal diseases.
- USAID supported Ministry Agriculture (MAGA) efforts to repair small irrigation systems and replace black bean seed stocks to help farmers replant their lost crops and avoid basic grain shortages later.

#### *\$26.0M to deploy U.S. military medical and engineering units*

- Assistance provided by the DOD's New Horizons program helped rebuild affected communities prior to the arrival of Mitch supplemental funds.

#### *\$1.2M USDA Section 416B food commodities*

- Assistance was used to support MAGA rehabilitation activities.

### Reconstruction - \$48 million made up of:

#### *\$28M through USAID*

- USAID has signed agreements with the GOG and PVOs to enhance disaster preparedness, recover agricultural productivity, and strengthen community disease prevention and control systems.
- USAID is working closely with other donors, and is co-chairing with the Ministry of Agriculture a coordinating committee on watershed management.
- USAID started work with local NGOs to develop a microenterprise-lending program for reconstruction.

#### *\$20M (Expected) through U.S. government (USG) agencies (e.g. NOAA, CDC, USDA, DOD, OFDA)*

- Collaboration between USAID and USG agencies will support and strengthen GOG disaster early warning and mitigation capabilities and assist in reconstruction.

- In this way, the Special Mitch program responds to the Government of Guatemala's (GOG) national plan for reconstruction presented at the donor meeting in Stockholm in May 1999.

## Annex 3. Summary of Objectives, Indicators and Activities Proposed by the Implementing Organizations

### (SUSTAINABLE AGRICULTURAL RECUPERATION (IR. 2))

OBJECTIVES	INDICATORS	ACTIVITIES
<p><b>ANACAFE</b> To rehabilitate 1,600 has of coffee belonging to individual producers, members of cooperatives associated to FEDECOVERA and other organizations. [Indicators do not match 1,600 ha. Goal]</p>	<ol style="list-style-type: none"> <li>1. Support maintenance of coffee plants. <ul style="list-style-type: none"> <li>• Provide 135 small producers (with an average of 1.5 Mz. each, and a total of 203 Mz. [142 ha.] in cultivation) with credit funds of up to \$ 800/Mz/year each.</li> </ul> </li> <li>2. Support renewal of coffee plants. <ul style="list-style-type: none"> <li>• Make available \$2,560 per Mz/year to all producers receiving technical assistance from ANACAFE.</li> <li>• Renovate 146 Mz [102 ha.] owned by individual small producers.</li> </ul> </li> <li>3. Relocation of infrastructure and purchasing of machinery and equipment for coffee processing plants. <ul style="list-style-type: none"> <li>• Produce 20,000 qq in husk coffee.</li> </ul> </li> <li>4. Coffee plantation road maintenance and repair. [no quantifiable outputs or criteria for road selection].</li> </ol>	
<p><b>CARE</b> Recover the agricultural productivity of 10,800 farming families in 270 communities in Alta Verapaz, and make them less vulnerable to climatic challenges through reforestation and sustainable farming practices.</p>	<p>Farm and watershed areas affected by Mitch are rehabilitated through reforestation and community natural resource management.</p> <ul style="list-style-type: none"> <li>• At least 7,500 ha of degraded and vulnerable farm and watershed land reforested or under improved NR management.</li> </ul>	<ol style="list-style-type: none"> <li>1. <u>Reforestation and community natural resource management</u> <ul style="list-style-type: none"> <li>• Reforest 669 ha (743,000 pine and multi-purpose tree species)</li> <li>• Pay out \$508,904 in grant incentives to 2,972 families.</li> </ul> </li> </ol>
	<ol style="list-style-type: none"> <li>1. Families undertake sustainable agriculture practices. <ul style="list-style-type: none"> <li>• At least 8,600 families re-establish their productive capacity</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Provide training to 73 municipal forestry extension agents; 540 voluntary community forestry promoters; 267 school teachers, and [unspecified] municipal commission advisors and staff on community forestry and forest fire prevention.</li> <li>• Train 270 auxiliary mayors, and provide extension material for forest law promotion.</li> </ul>

OBJECTIVES	INDICATORS	ACTIVITIES
CARE (cont)		<ul style="list-style-type: none"> <li>• Support and equip 8 fire brigades in 8 communities.</li> <li>• Support new municipal forest technicians through the provision of salaries, equipment and training.</li> <li>2. <u>Sustainable agriculture</u> <ul style="list-style-type: none"> <li>• Diversify production by distributing: a) 1,424,300 coffee, macadamia, cocoa, citrus and pepper plants to 5,680 families; and</li> <li>• b) 480 pounds of horticultural seed to 1,440 families.</li> <li>• Distribute 35,100 multi-purpose inter-cropping tree species to 2,700 families (agroforestry); and 201,000 trees to 1,340 families (soil conservation).</li> <li>• Distribute 134,000 pounds of chicken manure to 2,680 families.</li> <li>• Develop 6 gravity-fed sprinkler irrigation systems, and train 240 user groups in system operation and maintenance.</li> <li>• Train 42 extensionists and 536 voluntary community promoters in diversification, agroforestry systems, soil conservation, improved corn and bean crop husbandry.</li> <li>• Provide 800 households in 20 communities with photovoltaic power systems, and train them in system operation and maintenance.</li> <li>• Explore and map potential land legalization approaches and make recommendations for future potential interventions.</li> </ul> </li> </ul>
<p>CRS</p> <p>Restore, on a more sustainable basis, natural resource-based food security of 5,000 small farm families in Potochic and Motagua watershed.</p>	<p>1. Soil, water, and forest natural resources in critical areas of 25 mini-watersheds managed sustainably.</p> <ul style="list-style-type: none"> <li>• 300 (325) ha reforested/ regenerated</li> <li>• 700,000 (725,000) trees planted</li> <li>• 750 ha under agroforestry practices</li> </ul>	<p>1. <u>Soil, water and forest management</u></p> <ul style="list-style-type: none"> <li>• Identify and carry out biophysical, socioeconomic and environmental diagnosis of watersheds.</li> <li>• Train, sensitize and accompany farmer groups in management of nurseries and tree planting</li> </ul>
CRS (cont)	<p>2. Crop productivity of 3,000 hectares damaged by Mitch improved</p> <ul style="list-style-type: none"> <li>• 50% increase in post-Mitch crop productivity</li> <li>• (1,500 farmers planting with improved seeds)</li> <li>• 2,500 (3,000) farmers with improved soil fertility management practices</li> </ul> <p>3. Land-tenure security of 100 communities to contribute to the restoration of food security and</p>	<ul style="list-style-type: none"> <li>• Establish 25 watershed plans and 300 farm management plans</li> <li>• Organize 200 farmer groups</li> <li>2. <u>Improved crop productivity</u> <ul style="list-style-type: none"> <li>• Train, sensitize and accompany farmer groups in management of soil fertility</li> </ul> </li> <li>3. <u>Promotion of land tenure security</u> <ul style="list-style-type: none"> <li>• Characterize watershed area regarding land tenure</li> </ul> </li> </ul>

OBJECTIVES	INDICATORS	ACTIVITIES
	<p>sustainable management of natural resources promoted</p> <ul style="list-style-type: none"> <li>• 100 community land-tenure analyses completed</li> <li>• 60 community land measurements completed</li> <li>• Legalization process begun in 80 communities.</li> </ul> <p>4. Improved income-generating capacity of 3,000 farm families</p> <ul style="list-style-type: none"> <li>• 79 (125) community banks operating</li> <li>• 50 local producers producing improved seed</li> <li>• 500 improved grain storage units installed</li> <li>• 10 ha (30 ha) under irrigation systems rehabilitated</li> </ul>	<ul style="list-style-type: none"> <li>• Promote organization of agrarian committees</li> </ul> <p>4. <u>Improved income-generating capacity</u></p> <ul style="list-style-type: none"> <li>• Organize village banks to serve 79 groups, and distribute and manage 2,000 loans with a 95% (80%) loan repayment rate.</li> <li>• Carry out 1 study for marketing local products, and facilitate marketing of 22,727 Kg of local products</li> <li>• Select 4,545 Kg of improved seed.</li> <li>• Train 35 local farmers in production of improved seed, and 200 farmers in the use of grain-storage silos</li> <li>• Distribute 150 loans for silo purchasing</li> <li>• Identify and rehabilitate 25 (30) Mitch-damaged irrigation systems and train [an unspecified number of] farmers in management of irrigation systems.</li> </ul>
<p><b>DEFENSORES</b> Recuperate the agricultural productivity and reduce vulnerability of 375 families in 15 communities of the micro-watersheds of Samilha y Pueblo Viejo in Sierra de las Minas through reforestation, adoption of sustainable agricultural practices and improved community management of natural resources.</p>	<p>1. Agricultural areas rehabilitated in 15 communities. in the micro-watershed of Samilha and Pueblo Viejo</p> <ul style="list-style-type: none"> <li>• 40 ha reforested in 10 communities</li> <li>• 45,000 trees planted</li> <li>• Q 45,000 granted to 300 families as reforestation incentive</li> <li>• [Forest fires reduced]</li> <li>• 2 municipal governments able to support natural resource management and enforce forestry and environmental laws.</li> </ul> <p>2. Sustainable agricultural practices adopted in 15 communities</p> <ul style="list-style-type: none"> <li>• 75 families adopt techniques for soil conservation.</li> <li>• 40,600 plants of coffee, 1,000 plants of macadamia, 1,000 citrus trees, and 1,000 black pepper plants planted by 150 families</li> <li>• 7,500 multipurpose trees planted</li> <li>• 1 irrigation system established</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen organizations at local and watershed level by working with communities and across communities.</li> <li>• Establish 4 "convergence centers" in 4 communities. Set up pilot demonstration plots and provide technical training for participating farmers. Develop 3 training for extensionists and other 3 trainings for forestry promoters. Organize educational visits to other communities to promote exchange of experiences.</li> <li>• Organize program for community prevention and control of forest fires through written materials and radio spots. Train 6 municipal forest municipal extensionists, 60 voluntary forestry promoters, 150 families and 15 teachers in natural resource management practices. Organize and equip 8 community forestry brigades.</li> <li>• Subsidize purchase of materials for tree seedling production and provide incentives to voluntary promoters.</li> <li>• Establish family horticultural plots and promote bio-intensive pest and soil fertility management (botanical pesticides, trap crops, green manure, fallow).</li> <li>• Diversify production with alternative perennial crops. Promote switch from annual to perennial crops that guarantee the sustainability of land use and stability of family income. Promote shadow coffee, macadamia,</li> </ul>

OBJECTIVES	INDICATORS	ACTIVITIES
DEFENSORES (cont)		black pepper, fruit trees and multi-purpose trees. <ul style="list-style-type: none"> <li>• Continue with local production of coffee plants to 1999-levels (i.e. 70 communal coffee nurseries produced 200,000 plants).</li> <li>• Strengthen the environmental awareness in the local education services through training teachers, organizing "ecological fairs," and distributing training material for schools.</li> </ul>
FUNDACION SOLAR [No objectives or indicators available in document reviewed]		
SHARE [Promote the sustainable management of watersheds by 36 communities in El Progreso through the development of the economic potential of the communities and the environmental education of communities and partner institutions.]	<ol style="list-style-type: none"> <li>1. <u>Improved management of natural resources</u> <ul style="list-style-type: none"> <li>• 550 ha of degraded or at-risk land in process of rehabilitation</li> <li>• 500 families reduce consumption of firewood by using fuel-efficient stoves</li> <li>• 1,200 people received environmental education</li> </ul> </li> <li>2. <u>Agricultural production improved</u> <ul style="list-style-type: none"> <li>• 600 families recuperate their production yields at levels equal or higher to prior to Mitch.</li> <li>• 200 families producing high return sustainable crops</li> </ul> </li> </ol>	<ul style="list-style-type: none"> <li>• Train 2 partner organizations and community promoters on techniques such as live barriers, reforestation, forest fire prevention, forest management, cover crops</li> <li>• Strengthen the productive and environmental capacity of 2 local development institutions and participating communities through environmental education.</li> <li>• Diffuse information on and introduce sustainable practices and alternative higher-return crops</li> <li>• Donate material for construction of 500 fuel-efficient firewood stoves.</li> <li>• Set up community nurseries for the production of local forest species</li> <li>• Dialogue with national, departmental and local authorities so as to initiate a project to protect water sources in the target areas.</li> </ul>

## Annex 4. Land Use Capacity Classes

This material is extracted from MAGA-PAFG-INAB 2000.

### Categorías de Capacidad de Uso

Las categorías de capacidad de uso que se emplean en la metodología, se ordenan en forma decreciente en cuanto a la intensidad de uso soportable sin poner en riesgo la estabilidad -física- del suelo, se presentan a continuación.

No se incluyen criterios de fertilidad de suelos, ni aspectos ligados a la producción (acceso, mercados y costos), por lo que son categorías indicativas de usos mayores en términos de la protección que ofrecen a las capas superiores del suelo. Bajo este contexto, las categorías son las siguientes:

#### a. Agricultura sin limitaciones (A):

- Areas con aptitud para cultivos agrícolas sin mayores limitaciones de pendiente, profundidad, pedregosidad o drenaje. Permiten cultivos agrícolas en monocultivo o asociados en forma intensiva o extensiva y no requieren o, demandan muy pocas, prácticas intensivas de conservación de suelos. Pueden ser objeto de mecanización.

#### b. Agricultura con mejoras (Am):

- Areas que presentan limitaciones de uso moderadas con respecto a la pendiente, profundidad, pedregosidad y/o drenaje. Para su cultivo se requieren prácticas de manejo y conservación de suelos así como medidas agronómicas relativamente intensas y acordes al tipo de cultivo establecido.

#### c. Agroforestería con cultivos anuales (Aa):

- Areas con limitaciones de pendiente y/o profundidad efectiva del suelo, donde se permite la siembra de cultivos agrícolas asociados con árboles y/o con obras de conservación de suelos y prácticas o técnicas agronómicas de cultivo.

#### d. Sistemas silvopastoriles (Ss):

- Areas con limitaciones de pendiente y/o profundidad, drenaje interno que tienen limitaciones permanentes o transitorias de pedregosidad y/o drenaje. Permiten el desarrollo de pastos naturales o cultivados y/o asociados con especies arbóreas.

#### e. Agroforestería con cultivos permanentes (Ap):

- Areas con limitaciones de pendiente y profundidad, aptas para el establecimiento de sistemas de cultivos permanentes asociados con árboles (aislados, en bloques o plantaciones, ya sean especies frutales y otras con fines de producción de madera y otros productos forestales).

#### f. Tierras forestales para producción (F):

- Areas con limitaciones para usos agropecuarios; de pendiente o pedregosidad, con aptitud preferente para realizar un manejo forestal sostenible, tanto del bosque nativo como de plantaciones con fines de aprovechamiento, sin que esto signifique el deterioro de otros recursos naturales. La sustitución del bosque por otros sistemas conllevaría a la degradación productiva de los suelos.

#### g. Tierras forestales de protección (Fp):

- Areas con limitaciones severas en cualquiera de los factores limitantes o modificadores; apropiadas para actividades forestales de protección o conservación ambiental exclusiva. Son tierras marginales para uso agrícola o pecuario intensivo. Tienen como objetivo preservar el ambiente natural, conservar la biodiversidad, así como las fuentes de agua. Estas áreas permiten la investigación científica y el uso ecoturístico en ciertos sitios habilitados para tales fines, sin que esto afecte negativamente el o los ecosistemas presentes en ellas. También se incluyen las áreas sujetas a inundaciones frecuentes,

manglares y otros ecosistemas frágiles. Las áreas cubiertas con mangle, están sujetas a regulaciones reglamentarias especiales que determinan su uso o protección.

Esta categoría también incluye las zonas denominadas bosques de galería, las cuales son áreas ubicadas en las márgenes de los ríos, riachuelos o quebradas y en los nacimientos de agua. Tienen como función, retener sedimentos que proceden de las partes altas, la protección de los cauces, espejos de agua y captación del agua de lluvia, a través de la parte aérea de la vegetación existente. Los bosques de galería, pueden delimitarse con una franja de 15 a 30 metros de ancho de cobertura vegetal a partir de las márgenes de los ríos, riachuelos, quebradas y nacimientos de agua, a lo largo de los mismos.

Con base en el principio en que se basa la presente metodología, una unidad de tierra clasificada dentro de una categoría de uso intensivo no excluye el hecho de que pueda ser utilizada para otra categoría menos intensiva, así, una unidad de tierra clasificada para usos agrícolas intensivos perfectamente puede ser utilizada para arreglos de sistemas agroforestales o aun para usos forestales productivos. Lo contrario no se considera técnicamente posible, es decir, una unidad clasificada con capacidad de uso forestal, no soporta usos más intensivos, tales como los agrícolas o pecuarios sin que se ponga en riesgo la estabilidad del recurso suelo, principalmente en nuestro país donde este recurso es muy vulnerable a procesos erosivos y el deterioro general del terreno.

## **Annex 5. Extension Services For a Fee: Let the Farmer Decide**

In the majority of agricultural extension systems in Guatemala producers are considered project "beneficiaries." Extension services are deemed successful to the extent that they are able to implement activities and meet goals that were defined by donor agencies and project managers, instead of by the farmers that receive technical assistance. The extension systems operate under the critical assumptions that first, the extension services should be accountable to those institutions that fund the technical services (whether governmental or private donors) instead of those who receive the services, and secondly, those donor institutions know what farmers want and need. As a result, the type of technical services provided is determined by what the organizations can, and are willing to offer, i.e. it responds to priorities and capacities of the technical assistance suppliers, regardless of the opinions of the farmers who receive technical assistance. It is not surprising, therefore, that despite considerable investment of time and money many recommended practices are not adopted by farmers.

Several models of per-fee extension systems are currently being used and tested in Guatemala and/or Central America in order to increase the opportunities for farmers to provide feedback on the content and quality of technical services that the extension services provide. The privatization approach to extension is a demand-driven approach. Farmers will not pay for extension services that have no value for them. It is expected that this feedback will increase both the relevance and quality of the technical services provided, and the frequency of widespread adoption and replication of the recommended practices. We describe briefly below the World Vision/AGUDESA project, the FEAT experiment of private extension in Guatemala, and the Swiss Program with Private Organizations for Sustainable Agriculture in Hillsides (PROASEL) in Honduras.

- World Vision Guatemala signs contracts with groups of farmers that it has organized, and transfers money to them through AGUDESA. The farmer groups use these funds to hire one agricultural technician per group of 4 to 10 communities. The technician live in the communities, provide TA through presentations, visits to individuals and groups, and demonstration plots. Communities select a few unpaid innovative farmers (called model farmers) to become the links between the paid technicians and the communities, and magnify the reach of the technical assistance provider. World Vision provides training to both technicians and model farmers. In 1997 there were 40 farmer organizations using private agricultural technicians, reaching some 50,000 families. World Vision/AGUDESA's scheme was designed to become self sufficient in 5 years, with full fee payment from payment expected by then.
- FEAT started in 1991 when the Government of Guatemala and USAID/Guatemala funded a program for the gradual, voluntary privatization of government extension agents (FEAT stands for Fondo Especial de Asistencia Técnica). The management of the program was transferred to CARE in 1993 and continued till 1997, when the

program officially ended. CARE registered participating farmers, monitored quality and frequency of technical services provided, authorized payments to technicians according to farmers' recommendations, and organized one annual training event for FEAT technicians on subjects chosen by them. FEAT paid 90% of the technicians' salaries during the first year of their involvement in the program, 80% the second year, 70% the third year, etc. Farmers were required to pay in cash--or more likely in crop shares--the amounts to complete the extension agents' salaries. The program was supposed to be self-sufficient in 5 years. FEAT extension agents contributed with technical support for the production, post-harvest handling and marketing of grains and vegetables. Through FEAT, two private enterprises and 7 individual technicians provided technical assistance to 1,700 farmers in Jutiapa, Santa Rosa, San Marcos, Huehuetenango, Quetzaltenango and Solalá. Out of those farmers, 81% received subsidies from FEAT to pay for the technical services they received. The remaining 19% paid in full for the private extension services. Elements of the FEAT project are currently being implemented in the AGIL project that USAID/Guatemala funds.

- In Honduras the Swiss Program with Private Organizations for Sustainable Agriculture in Hillsides (PROASEL) is promoting an approach whereby technical services are interpreted as commodities rather than gifts, and interested farmers must contribute with at least one part of the service provision costs. The project started in 1998 with a contract between 60 farmers (men and women), one private technical service provider (SERTEDESO), and PROASEL. Farmers and PROASEL fund the technical services with contributions of 5% and 95%, respectively. The farmers pay between US\$0.40 (women) to US\$1.50 (men) per month to participate in a 2-day training. For an additional US\$0.25 (women) and US\$0.75 (men) farmers receive one field visit by the technician. The farmers are organized in 4 groups that collect the members' fees monthly, and pay them to the service-providing agency. Quarterly, the farmers and PROASEL carry out assessments of the services provided by SERTEDESO. By contract, PROASEL may deduct a fine from SERTEDESO's if the number of participating farmers drops under 70% of the total original farmers. A bonus is also expected by contract if the number of farmers goes over 130% of the original farmers.

In the AGUDESA, FEAT and PROASEL models:

1. Farmers are required to pay fees to cover at least partially the operating costs of providing agricultural technical assistance (it is recognized that it is very unlikely that farmers will be able to pay all of the extension costs, at least in the short- to medium-run).
2. Fees are heavily subsidized in the beginning. Over a period of four to five years, however, farmer should cover most of those costs.
3. Fees are set according to the farmers' willingness and ability to pay for technical services. Rapid assessments on the willingness and ability to pay are often conducted by one independent organization.

4. Contracts are signed by farmers and implementing organizations around the provision of specific, focused technical assistance.
5. Payment of fees signals to the extension agents and farmers themselves that farmers have the right to accept or reject the services that the implementing organizations provide.
6. Private extension agents are more accountable for impact than under traditional extension systems. Since farmers purchase the services or inputs from the extension agent, the latter is more responsible to ensure that impact or benefit is received.
7. The private extension approach does not require significant investments in staff, is relatively low cost, and has high potential for expansion and scaling-up.
8. The support role that NGOs and others provide focuses on training private extension agents and enabling them to become established, rather than on delivering technical assistance. Technical training for private extension agents and a system for monitoring and evaluating service quality with the service "clients" are necessary.

There is an enormous potential in private extension approaches because they are more efficient, cost-effective and ultimately sustainable approaches to watershed management and economic development than conventional extension systems. Private extension should be widely tested, refined and adopted by all the implementing organizations. At the same time, however, one should keep in mind a few critical issues and caveats regarding private extension:

- Paying fees is in itself not enough to ensure the success of the extension services. It is indispensable for the implementing organizations to adopt an attitude that considers farmers as informed clients whose expectations needs to be met rather than charity recipients. The implementing organizations must explore and test extension systems that encourage farmers to take the lead in the definition of the content of technical assistance and the evaluation of its impact. Similarly, farmers must be encouraged and empowered to hire and fire technical service providers. Farmers in the World Vision/AGUDESA project, for instance, have not shown much interest in the private technicians because the latter have not contributed to improvements in production! Farmers have asked World Vision to use the funds directly for profitable projects or for credit. It seems that in the eyes of both farmers and technicians, the technicians are still not accountable to the farmers but rather to World Vision. In contrast, PROASEL farmers can and do choose the contents of services provided, and participate in the periodic evaluation of the services. The topics covered in training reflect the increasing level of knowledge of farmers (the topics are not repeated over and over, year after year as it is customarily in the majority of extension systems). The overall quality of services has improved as defined by training with practical and relevant information for farmers, and punctuality and professionalism of the technicians. At least 80% of the farmers apply what they learned in the training events. The majority of cases of non-application are found among women who are not allowed by men to implement those activities.
- The private extension systems should be based on formal contracts between farmers and the implementing organizations whereby the two parties define one common

goal and the technical mechanisms that the organizations should provide to attain them. These contracts should increase the accountability of the extension agents to farmers. At the same time, the contracts should provide incentives for extension agents that more readily adapt to increase the quality and scale of their services to meet farmers' needs.

- Because the privatized system is sustained by the selling of services, private extension agents may favor providing services to those farmers with resources, essentially focusing on richer farmers at the expense of the poorer. In the FEAT system, private extension agents were allowed to provide services to both farmers receiving subsidies from the project and farmers who paid with their own resources. The extension agents tended to visit the latter weekly and the former twice a month. The length of visit also tended to vary: 1 to 2 hours for those farmers without subsidies, and ½ hour for subsidized farmers.
- The impact of private extension on households may be complicated to measure. There is no incentive on the part of the private extension agent to monitor impact at the household level, since they do not receive a return on any investments they may make in this sort of monitoring. The private extension agent can assume that farmers are willing to purchase his/her services, as they are receiving benefit.
- Environmental impact is difficult to monitor, particularly after the private extension agent becomes fully independent. Given that a great deal of the fee payment is based on sharecropping arrangements, the extension agents have an incentive to increase substantially the overall production and farm income. This is great for the farmers in economic terms, but may encourage environmentally mining and potentially harmful techniques. For instance, extension agents may be tempted to promote higher uses of agrochemicals than warranted and monocropping arrangements.

## Annex 6. The Application of the Selection Criteria to Current and Potential Watershed Management Practices

	Annual crops
	Corn & beans (=milpa)
Criterion	Currently used
1. Is the practice within the land use capacity of this site?	Milpas and other annual crops are not suited for the steep slopes that are of greatest concern in watershed protection. Although farmers will continue to exceed land use capacity in planting milpas for reasons of food security and tradition, the project should not support these annual crops on such unsuitable land.
2. Has the practice spread under similar conditions with minimal outside intervention?	Yes, milpas are traditional and found almost everywhere.
3. Does the product have a financially accessible market?	Yes, except for the remote locations that are common to the working area. Most corn and beans grown by campesinos is for subsistence.
4. Does the practice have a good cash income potential?	No. It has very often been demonstrated that the financial returns to the farmer are very low, frequently below what he would earn as a day laborer.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Yes, but for the chemical inputs needed for higher yields are often not affordable.
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	It is very doubtful that labor intensive soil conservation practices are justified to increase the range where milpa could be sustainably planted.
<b>General Conclusion</b>	Project resources should not be used to promote increased yields milpas. The potential financial and watershed benefits are not sufficient to merit the investment. There are usually better options.

	Annual crops
	Green manure/cover crops
Criterion	Currently used
1. Is the practice within the land use capacity of this site?	Green manure/cover crops (gm/cc) prevent soil erosion, even in slopes of 40%. Through nitrogen fixation and biomass recycling, gm/cc maintain and increase soil fertility, and protect soil from irradiation and rain drop erosion. The main constraint for farmers' well being is soil fertility.
2. Has the practice spread under similar conditions with minimal outside intervention?	Yes, farmers throughout Central America are using it on their own.
3. Does the product have a financially accessible market?	Gm/cc can be used with corn and beans, which have moderate-to-low cash income potential, but they can also be used with higher-return cash crops such as coffee.
4. Does the practice have a good cash income potential?	Increases in soil fertility through the use of gm/cc have resulted in corn yields of 2.2 T/ha (compared to 0.7 T/ha). This represents higher net income through either saving in food purchased or in increases in food sold. Food purchasing tends to be the norm among small farmers. In coffee, low-growing, shallow-root cover crops reduce both soil erosion and the costs associated with herbicide use or manual weeding.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Yes. The chemical inputs needed for higher yields are often not affordable, and organic methods are financially the only option. Environmentally, low-external input farming also represents an advantage over chemical means.
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	
<b>General Conclusion</b>	Project resources should be used to promote green manure / cover crops in conjunction with permanent cash crops.

	Forest products
	Pine resin tapping
Criterion	Potential
1. Is the practice within the land use capacity of this site?	Resin tapping can safely be carried out on all land use classes except in protection forests (Fp). In practice suitable pine forests are rarely found in classes suited for agriculture or grazing.
2. Has the practice spread under similar conditions with minimal outside intervention?	Yes, it has been an established practice in Guatemala, although usually using destructive tapping techniques. It has been done on many thousands of hectares in Honduras.
3. Does the product have a financially accessible market?	Pine resin is a commodity traded on the world market, whose price fluctuates strongly. A processing plant is located near Río Hondo.
4. Does the practice have a good cash income potential?	Resin tapping is almost always a marginally good business and therefore expands and contracts in response to prices. Campesinos tend to consider it as an additional source of income, which they can engage in the off season.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Yes
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	Traditional methods tend to damage the tree, but these can be substituted with appropriate techniques for a relatively low investment in cups and hand tools. The primary positive benefit of resin tapping is that campesinos will assure that the forest does not burn.
<b>General Conclusion</b>	The project should immediately evaluate the potential of resin tapping, primarily because of its very positive effect on preventing fires. Pilot operations need to be started. Defensores has made a beginning, but more needs to be done, especially on developing the local market. If the financial outcome is positive, the practice can be made to spread quickly.

	Forest products
	Management of forest with merchantable timber
Criterion	Currently used
1. Is the practice within the land use capacity of this site?	On all land use classes except in protection forests (Fp).
2. Has the practice spread under similar conditions with minimal outside intervention?	An increasing number of owners of pine timber are placing their forest under management. But experience is still new in Guatemala and spread will continue to require outside assistance. INAB makes generous incentives available for this purpose. A forest management plan approved by INAB provides legal protection against land invasion.
3. Does the product have a financially accessible market?	All species of pine have a ready market either as roundwood or processed product. Only a few of the hardwood species are currently marketable. Forests can usually be managed for multiple purposes, including poles, posts, resin, fuelwood, tourism, non-timber forest products.
4. Does the practice have a good cash income potential?	The financial returns per hectare for sustainably managing the forests found in the project area tend to be low, but so are the costs. The economies of scale are considerable. Of course, simply harvesting timber without concern for the regeneration of the forest has long been a business which brings good returns, except in the most inaccessible locations.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Forest with standing timber usually either belongs to the state, to larger landowners or to municipalities. Few owners are familiar with the appropriate technology for forest management, but the know-how can be easily acquired or contracted.
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	Usually the destructive effects of harvesting timber and other products can be mitigated by better planning of roads, harvesting operations and by fire prevention.
<b>General Conclusion</b>	There is considerable potential for encouraging the spread of extensive management of pine forests with standing timber. One of the most important advantages is that because of the low per hectare costs, large areas can be managed (and protected) with modest investment.

	<b>Forest products</b>
	<b>Management of forest without merchantable timber</b>
<b>Criterion</b>	<b>Currently used</b>
1. Is the practice within the land use capacity of this site?	On all land use classes except in protection forests (Fp).
2. Has the practice spread under similar conditions with minimal outside intervention?	The use of forests without merchantable timber and of degraded forests is a widespread tradition. Farmers use them primarily for fuelwood, small roundwood for on-farm use, but management tends to be poor. With minimal planning, discipline and control returns can be increased significantly. Partly because of the bias toward plantations, there are almost no examples of well managed woodlots.
3. Does the product have a financially accessible market?	Only close to larger settlements, good roads or rural industries (coffee beneficios, bricks)
4. Does the practice have a good cash income potential?	The benefit is likely to be marginal, but the costs are almost negligible. Partly because of the bias toward plantations, examples are few. The increasing prevalence of people stealing fuelwood and roundwood indicates a demand.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Yes. The primary techniques are restricting harvesting to a different area each year and not cutting more than will grow back.
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	Yes, by following a simple management plan.
<b>General Conclusion</b>	A considerable portion of the project area is still covered by numerous fragments of non-timber producing forest and woodlots. Management of these forests to increase returns from them and thus prevent their destruction or further degradation should receive more attention where conditions are promising. Although financial returns will be modest, costs are very low and within the reach of most farmers.

	<b>Environmental services</b>
	<b>Protection of natural forest and brush</b>
<b>Criterion</b>	<b>Currently used</b>
1. Is the practice within the land use capacity of this site?	Yes, always.
2. Has the practice spread under similar conditions with minimal outside intervention?	Outside intervention will be needed. Fortunately, large portions of the watershed are nominally under government control as protected areas. Here non-financial criteria of management dominate. The examples of protected areas adequately managed by the government or co-managed with other entities are increasing.
3. Does the product have a financially accessible market?	No
4. Does the practice have a good cash income potential?	No. Farmers might leave patches undisturbed because they have no use for them, but are unlikely to invest effort in protecting those areas, i.e. protecting against fire.
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	Yes
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	Negative effects are unlikely.
<b>General Conclusion</b>	There is no doubt that simply protecting forests and brushlands on sites that allow no more intensive uses gives the greatest payoff in terms of watershed benefits. The project needs to give greater attention to those areas. The assumption that improving agricultural practices near the protected areas will reduce pressure on those areas, does not seem to be true. More direct measures such as boundary demarcation, patrolling and occasional legal prosecution need to be included in the watershed management efforts. These tend to be delicate, unpopular and even dangerous measures. None of the implementing organizations wants to be perceived as the "bad guy". However, one-sided assistance without requiring reciprocal respect for public property will not save the protected areas.

	Annual crops
	Xxx
Criterion	Currently used
1. Is the practice within the land use capacity of this site?	
2. Has the practice spread under similar conditions with minimal outside intervention?	
3. Does the product have a financially accessible market?	
4. Does the practice have a good cash income potential?	<p style="text-align: center;">To help make objective decisions, the implementors should fill out a similar table for each of the other current and potential practices.</p>
5. Can the technology, labor and capital requirements be brought within reach of the target farmer?	
6. Is it financially feasible to keep eventual negative effects of the practice within acceptable limits?	
<b>General Conclusion</b>	

## **Annex 7. Lecciones Aprendidas del Proyecto MICUENCA <sup>6</sup>**

1. Se invirtió considerable esfuerzo en la organización de grupos de agricultores, mediante el uso de diagnósticos participativos y actividades de capacitación en grupo. La organización incluyó actividades dispersas de todo tipo (incluyendo reparación de infraestructura, estufas mejoradas, letrización, legalización de grupos comunales, etc.) que llevaron a una enorme dispersión de esfuerzos.
2. Este proceso parece haber fortalecido la capacidad de gestión de las comunidades, pero la organización no se manifestó en mejoras económicas o del medio ambiente. Los grupos organizados no dieron prioridad a actividades de protección del medio ambiente.
3. Se invirtió también en educación ambiental. El énfasis fue en “generar conciencia” sobre problemas ambientales en medio de los agricultores y sus hijos. Se usó educación formal (en 34 escuelas piloto) y educación informal (pláticas). El enfoque parece haber sido teórico y no se tradujo en resultados mensurables. La continuidad de los esfuerzos de educación ambiental no fue sostenible: dependieron totalmente de un apoyo externo a las comunidades (p.23).
4. Se invirtieron bastantes esfuerzos en la preparación de planes de manejo de terreno tanto comunales como individuales, escritos o no, cubriendo a cerca del 40% de los grupos e individuos. La mayor parte de estos planes, sin embargo, fueron no usados o poco usados. La obtención de beneficios económicos o medio ambientales no dependió de la existencia de planes de manejo.
5. No hubo un manejo global de cuencas. Las microcuencas fueron usadas como unidades geográficas de referencia, pero no como unidades de planificación y acción integrada. Las actividades del proyecto se orientaron a terrenos de campesinos individuales y con visión de corto plazo. Las comunidades y comités de cuenca realizaron actividades aisladas que nunca sumaron a una visión de conjunto. Solo 5 de las 27 cuencas atendidas habían sido examinadas para ver su impacto ambiental (p.39-40).
6. El proyecto promovió 21 prácticas de agricultura sostenible y 10 prácticas forestales a nivel de fincas (Cuadros 1 y 3). Pocas de estas prácticas parecen haber sido aceptadas por números considerables de agricultores, lo que conllevó a una dispersión de esfuerzos.
7. Las prácticas de agricultura se concentraron básicamente en torno a cuatro grandes temas. En orden de importancia estas fueron formación de barreras para control de erosión de suelos; medidas para aumentar la fertilidad de suelos dentro de un enfoque de bajo uso de insumos externos; diversificación de cultivos, y manejo integrado de

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<sup>6</sup> Basado en Ecodesarrollo, “Evaluación de Medio Término del Proyecto Micuenca. Informe Final”, Guatemala, 1996. El proyecto Micuenca tuvo una cobertura de 3,645 participantes en 103 comunidades de las regiones Centro, Norte, Occidente y Oriente. La evaluación cubrió el 37% de las comunidades y 16% de los participantes. Los participantes tenían un promedio de 0.20 de hectarea para agricultura y 0.70 de hectarea para forestería.

plagas. Las dos primeras prácticas (barreras y abonos) cubrieron el 79% de las actividades, y fueron identificadas como las practicas más efectivas (Cuadros 1 y 2). Se utilizaron particularmente barreras vivas en las milpas, y abono orgánico en huertos familiares. El uso de abono orgánico contribuyo a una reducción reportada de mas del 40% de los fertilizantes químicos usados en la producción de maíz y hortalizas (no hay referencia a la cantidad de fertilizantes químicos usados sin el proyecto).

8. Baja productividad agrícola y magros ingresos económicos fueron identificados por los agricultores como problemas críticos. En la evaluación, los agricultores expresaron la búsqueda de mayores ingresos (incluyendo siembra de café) como un interés fundamental para permanecer parte del grupo organizado por el proyecto. Al mismo tiempo, expresaron interés en mejorar el rendimiento de sus cultivos, particularmente mediante un aumento en la fertilidad del suelo.
9. A pesar de los esfuerzos del proyecto, los resultados fueron modestos. La gran mayoría de los productores entrevistados en la evaluación dijeron que no tenían mayores ingresos agrícolas (71%) o forestales/frutales (82%), o mayores rendimientos de cultivos (68%) que antes de participar en el proyecto. Igualmente, indicaron que no habían mejorado en disponibilidad de alimentos (62%), leña (77%), material forestal para construcción de vivienda (83%), o insumos de otro tipo (60%). Por otro lado, 53% indicó haber observado mejoras en la calidad del suelo (retención, fertilidad, consistencia) como resultado del proyecto (p.30-38)
10. El proyecto fomentó la formación de viveros forestales y frutales. La participación en estos viveros fue muy corta, es decir solamente por el tiempo necesario para que los agricultores llenasen sus necesidades de arboles para cubrir los muy pequeños terrenos de los que disponen. Hubo mucho mas interés y entusiasmo cuando se estableció un sistema de producción para el mercado, particularmente en torno a almácigos y plantación de café. Paradójicamente, el proyecto no fomentó la producción de café (p.18)
11. Los grupos de agricultores mostraron poco interés por desarrollar proyectos comunales para mejorar el medio ambiente y los recursos naturales. Como respuesta, el proyecto cambio su estrategia y promovió estas actividades con familias individuales y no grupos. En la evaluación solo se encontraron solamente dos casos de reforestación comunal y dos de manejo de bosques comunales (p. 19).
12. Tres instituciones participaron en la implementación de diferentes componentes del proyecto Micuenca pero la coordinación entre estas instituciones fue deficiente. Cada institución definió metas sin tomar en cuenta las actividades del proyecto en forma conjunta. Hubo grandes diferencias de recursos entre las diferentes instituciones, lo que influyó en su presencia en el campo. Los comités regionales eran responsables de promover la coordinación, supervisión y evaluación de actividades de a nivel de microcuenca, pero no hubo una buena comunicación entre las instituciones y los comités regionales, y pocos comités tuvieron interés o se reunieron regularmente.

13. "El proyecto tiene una amplitud geográfica muy alta, no solo entre microcuencas sino dentro de las mismas, lo que resulta en alta dispersión de los recursos tanto humanos como físicos, reduciendo su grado de eficiencia... [S]e recomienda concentrarse en las áreas y comunidades en donde se haya tendió éxito inicial, y consolidar en esta forma los logros alcanzados a la fecha." (p.67)

### Cuadro 1. Principales practicas de agricultura promovidas por el proyecto

Practica	Porcentaje de Grupos
<b>Barreras para control de erosión de suelos</b>	<b>43.7</b>
1. Barreras vivas con pasto	18.2
2. Barreras vivas con pasto y acequias	7.3
3. Barreras vivas con madrecaao	1.5
4. Barreras vivas con flores	0.7
5. Barreras muerta de piedra	3.6
6. Mejora de terrazas	3.6
7. Rastrojo, surco abonero	1.5
8. Zanja abonera	1.9
9. Acequias de ladera	2.9
10. Pozos de absorción	2.9
<b>Fertilización del suelo</b>	<b>35.6</b>
11. Abonera, abono orgánico	19.7
12. Aplicación de abono foliar	5.8
13. Lumbricultura	5.8
14. Aplicación de gallinaza	2.9
15. Rotación de cultivos	0.7
16. Incorporación de abonos verdes	0.7
<b>Diversificación de cultivos</b>	<b>11.6</b>
17. Diversificación de cultivos	10.09
18. Investigación de nuevas plantas	0.7
<b>Manejo integrado de plagas</b>	<b>9.5</b>
19. Utilización de pesticidas naturales	7.3
20. Manejo integrado de plagas	1.5
21. Utilización de caldo repelente de gallina ciega	0.7

Adaptado de p. 27

**Cuadro 2. Practicas agrícolas identificadas por agricultores como más efectivas, por regiones**

Práctica	Oriental	Occidental	Central	Norte
Abono orgánico	X	X	X	X
Surco y zanja abonera	X			X
Abono foliar de madrecaao	X			
Abonera en huerto familiar			X	
Barreras vivas con pasto		X	X	
Barreras vivas con sauce		X		
Pesticidas naturales				X
Adaptado de p. 30				

**Cuadro 3. Principales sistemas forestales promovidos por el proyecto**

Sistema	Porcentaje de Grupos
1. Plantaciones (1)	27.8
2. Árboles dispersos	18.5
3. Árboles en contorno	14.8
4. Reforestación (4)	11.1
5. Frutal (5)	7.4
6. Manejo del bosque (6)	5.6
7. Árboles en línea (7)	3.7
8. Cultivos en callejones (8)	3.7
9. Cercas vivas (9)	3.7
10. Taungya (10)	3.7

Adaptado de p. 35

(1) Aliso, ciprés, café, mango, madrecaao, banano, cuje, gravilea	(6) Ciprés, encino, liquidambar
(2) Aliso, Cedro, ciprés, manzana, roble, taxiscobo, maíz	(7) Ciprés
(3) Aliso, eucalipto, palo de agua, sauco, hortalizas, maíz	(8) Aripin, madrecaao, maíz
(4) Aliso, ciprés, pino	(9) Ciprés, madrecaao, pino
(5) Durazno, jocote, manzana, marañon	(10) Eucalipto, mora, pino, maíz

## **Annex 8. La escuela rural debe formar "solucionadores de problemas"**

*Por: Polan Lacki, FAO*

“Hemos estado acostumbrados a pensar en el capital como el factor escaso en la producción y en su transferencia como el instrumento clave para el crecimiento. El conocimiento es ahora tan, si no más, importante factor de desarrollo, y esta situación tiende a intensificarse. En el próximo siglo la acumulación y aplicación del conocimiento conducirán los procesos de desarrollo y crearán oportunidades, sin precedentes para el crecimiento y la reducción de la pobreza. Sin embargo, existen riesgos significativos para incrementar la desigualdad entre y dentro de las naciones.” James D Wolfensohn, Presidente del Banco Mundial, 17 de marzo 1997.

Hasta el presidente del Banco Mundial, institución cuya principal función es exactamente otorgar créditos para el desarrollo, reconoce que el conocimiento es más importante que el capital. Mientras tanto, en el mundo rural latinoamericano estamos perdiendo tiempo y oportunidades, al seguir:

\*Sobrestimando la importancia del crédito y coincidentemente de todos los otros factores externos que los agricultores no pueden manejar, tales como las políticas, las leyes, la falta de subsidios y protección interna, el exceso de subsidios y barreras externas, el valor del dólar, el precio del peaje, etc. y

\*Subestimando la importancia estratégica de proporcionar a los productores rurales el insumo que más necesitan; es decir, el conocimiento porque este sí les permitiría hacer una agricultura mucho más eficiente; y gracias a esta solución realista, volverse mucho menos dependientes y vulnerables a aquellos factores externos que, por deseables que sean, desgraciadamente están fuera de su alcance y manejo.

Magnificar estas variables que los productores no pueden controlar es un planteamiento paralizante porque contribuye a seguir lamentando los problemas en vez de hacer lo que corresponde, es decir solucionarlos. Estas ayudas externas son tan improbables que ya no nos queda otra alternativa que proporcionar a las familias rurales las “herramientas del saber” y decirles con realismo y honestidad, que serán ellas mismas quienes tendrán que solucionar sus propios problemas.

### **Ser eficiente ya no es una ventaja sino un requisito**

El binomio gobiernos debilitados-economía globalizada impuso al sector agropecuario dos enormes desafíos:

1. Sólo sobrevivirán económicamente los agricultores que sean muy eficientes en los aspectos tecnológicos, gerenciales y organizativos de las distintas etapas del negocio agrícola. La eficiencia dejó de ser una ventaja competitiva para transformarse en un requisito para poder sobrevivir en la actividad agrícola, y

2. Por difícil e injusto que sea, dicha eficiencia tendrá que ser lograda con menos crédito, menos subsidios, menos protección, en fin con menos estado. Ello significa, entre otras cosas, que los escasos insumos materiales tendrán que ser potenciados a través de la correcta aplicación de los ociosos insumos intelectuales. Para muchísimos agricultores, significa asimismo que aquellas inversiones que “cuestan mucho y se utilizan poco”, tendrán que ser realizadas y utilizadas en forma grupal o colectiva. El “sálvese quien pueda” tendrá que ceder lugar al “juntémonos para que podamos salvarnos todos”.

Sólo tendrán éxito los agricultores que estén capacitados y organizados con propósitos empresariales que les permitan: incrementar los rendimientos por unidad de tierra y de animal, eliminar sobredimensionamientos y ociosidades, reducir los costos de producción, mejorar la calidad e incorporar valor a sus cosechas y acortar los eslabones de intermediación, tanto en la adquisición de insumos como en la comercialización de sus excedentes. Con estos multipropósitos los agricultores tendrán que:

1. En forma individual, eliminar sus propias ineficiencias para incrementar dramáticamente los actuales rendimientos, y
2. En forma grupal, hacerse cargo y ejecutar con mayor eficiencia algunas nuevas actividades; aquellas que actualmente están siendo realizadas, con baja eficiencia y alta expropiación, por otros eslabones del agribusiness.

Para confirmar la excesiva expropiación basta con hacer dos comparaciones elementales: i) los precios por los cuales los fabricantes venden los insumos con los precios que los productores pagan por ellos; y ii) los precios que los agricultores reciben al vender sus cosechas con los precios que los consumidores pagan por ellas en los supermercados.

### **Lo posible deberá reemplazar lo deseable**

En América Latina necesitamos desmitificar la “imprescindibilidad” de las soluciones paternalismo-dependientes y reemplazarlas por soluciones educativo-emancipadoras, las que permitirán conciliar escasez de recursos con eficiencia empresarial. Algunos ejemplos hipotéticos ilustran la factibilidad y eficacia de un modelo más endógeno y emancipador:

- a. En vez de sembrar un monocultivo que produce alimentos e ingresos una o dos veces al año, los agricultores podrían hacer una gradual diversificación agrícola-ganadera con el propósito de generar ingresos y alimentos, tanto para la familia como para los animales, durante los 365 días del año. El simple hecho de diversificar la producción, automáticamente reduciría la crónica dependencia del crédito y disminuiría riesgos sanitarios, climáticos y comerciales.
- b. En vez de adquirir y mantener un toro y cinco vacas genéticamente mediocres y subalimentadas que rinden en total apenas 20 litros de leche al día y cada una de ellas tiene un parto a cada 22 meses, será preferible deshacerse del semental y de cuatro hembras, porque suelen consumir más de lo que producen. Con el dinero obtenido, mejorar la producción de forrajes y adquirir una única vaca genéticamente mejorada, la

cual bien alimentada podrá producir los mismos 20 litros diarios y un ternero cada 12 meses. En vez de sembrar una hectárea de papas, con graves errores tecnológicos e insuficiencia de insumos que rinde apenas 10 toneladas, será preferible corregir dichos errores, ahorrar trabajo innecesario y concentrar los escasos insumos disponibles, tal vez en un tercio de hectárea y en ésta menor superficie cosechar las mismas 10 toneladas. Al reemplazar la cantidad por la calidad los agricultores podrían disminuir las inversiones y ociosidades, trabajar menos y ganar más.

- c. En vez de comprar raciones balanceadas con alto valor agregado del último eslabón de intermediación y posteriormente vender los cerdos sin valor agregado (vivos) al primer eslabón de la cadena, les sería más conveniente producir gran parte de los alimentos, en la propia finca diversificada, y comercializar los cerdos con más agregación de valor y con menos intermediación. En la medida de lo posible, la finca debería ser transformada en una agroindustria familiar productora de algunos insumos — semillas de variedad, plántones, abonos, forrajes— e incorporadora de valor a los excedentes. Con ello habría menos intermediarios, menos impuestos, menos fletes y menos peajes.

### **Existen soluciones muy sencillas y a su vez muy eficaces**

Estos pocos ejemplos indican que los agricultores podrían adoptar las siguientes medidas que son de bajo costo pero de extraordinaria eficacia:

- a. diversificación productiva,
- b. gradualidad tecnológica con el propósito de que los recursos necesarios para financiar la intensificación productiva sean auto-generados en las propias fincas, y
- c. organización para eliminar sobredimensionamientos/ociosidades y verticalizar el negocio agrícola.

A través de esta reconversión las familias rurales disminuirían dependencias innecesarias y además reducirían la acción expropiatoria de los otros eslabones del agribusiness, la que ocurre antes de la siembra y después de la cosecha. Esta excesiva expropiación, sumada a los bajísimos rendimientos físicos por unidad de tierra y de animal, causan muchísimo más daño económico a los agricultores que la falta de créditos y de subsidios. Ambas distorsiones son tan dañinas para la economía de las familias rurales que ya no pueden seguir siendo subestimadas ni mucho menos ignoradas. Mientras no estimulemos la organización empresarial de los agricultores y no les proporcionemos las competencias (conocimientos, aptitudes, habilidades, valores, actitudes, etc.) para que ellos mismos eliminen estas causas de la falta de rentabilidad, será muy difícil contrarrestar sus consecuencias; por mejores que sean las políticas crediticias, tributarias, arancelarias o cambiarias.

Los documentos de la FAO ofrecidos al final de este artículo indican que la inmensa mayoría de los productores podría hacer una agricultura más eficiente, aún no teniendo acceso al crédito; y que podría competir sin necesidad de subsidios o de medidas proteccionistas. Demuestran asimismo que la solución de los problemas, que con más

frecuencia afectan a la mayoría de los agricultores, requiere fundamentalmente de insumos intelectuales y no tanto de insumos materiales. Dichos documentos indican que para poner en práctica esas innovaciones emancipadoras de dependencias y vulnerabilidades, se requiere mucho más de conocimientos útiles que de créditos abundantes; mucho más de eficiencia productivo/empresarial que de subsidios, mucho más de agricultores competentes que de eximios formuladores de políticas.

Si estas soluciones más autogestionarias son factibles y eficaces, si los factores clásicos de desarrollo agrícola son en gran parte prescindibles, si a través de la gradualidad tecnológica y de la diversificación productiva los recursos necesarios para financiar la modernización de la agricultura pueden ser generados en las propias fincas, ¿por qué los agricultores no las adoptan? Por la sencilla razón de que no se les ha enseñado a formular y aplicar en forma correcta soluciones acordes a los recursos que realmente poseen, ni a utilizar estos últimos en la plenitud de sus potencialidades. No se les ha enseñado en sus hogares porque sus padres no podrían haberles transmitido algo que ellos mismos nunca han aprendido; tampoco se les ha enseñado en la escuela.

### **La escuela básica deberá formar solucionadores de problemas**

Para la mayoría de las familias rurales el paso por la escuela básica rural (del primero a octavo o noveno año) es la única oportunidad en sus vidas de adquirir las competencias que les permitirían eliminar las principales causas internas del subdesarrollo rural. Sin embargo, dichas escuelas no están cumpliendo con esta importantísima función, emancipadora de dependencias y de vulnerabilidades, porque sus contenidos y métodos son disfuncionales e inadecuados a las necesidades productivas y familiares del mundo rural. En dichas escuelas se aburre a los niños exigiéndoles que memoricen temas de escasa y dudosa relevancia; y no se les enseña en forma creativa, participativa y práctica lo que sí necesitan aprender para volverse más autoconfiantes, más emprendedores, más autogestionarios y más autodependientes. De esas escuelas siguen egresando generaciones de futuros agricultores, agricultoras, padres y madres de familia, con bajísima autoestima, sin los conocimientos, sin las actitudes y sin los valores que necesitan para ser agricultores más eficientes, mejores educadores de sus hijos y solidarios protagonistas de sus comunidades.

Las escuelas básicas rurales deberían formar ciudadanos dotados de más confianza personal y autosuficiencia técnica, de modo que puedan ser eficientes correctores de sus ineficiencias y activos solucionadores de sus propios problemas. Esas escuelas deberían otorgarles una formación valórica que les inculque mejores hábitos (amor al trabajo bien ejecutado, iniciativa y disciplina, perseverancia y deseo de superación, cooperación y solidaridad, honestidad y cumplimiento de sus deberes y responsabilidades, espíritu de prevención y previdencia, etc.). La educación básica rural debería tener un carácter más instrumental en el sentido de proporcionar a los niños contenidos útiles que ellos puedan aplicar en la corrección de sus propias ineficiencias y en la solución de los problemas que ocurren en sus hogares, fincas y comunidades.

## **Emancipar en vez de perpetuar dependencias**

Tal como se mencionó anteriormente, varios factores clásicos de desarrollo agrícola, además de inaccesibles y prescindibles, son perpetuadores de dependencias porque es necesario otorgarlos en forma recurrente y permanente. En sentido contrario, el conocimiento ya está disponible y es emancipador de dependencias; basta con difundirlo una sola vez para que pueda ser utilizado, sin gastarse, por todos los agricultores, hasta su obsolescencia. A los debilitados y endeudados gobiernos que no pueden –y no deben– perpetuar dependencias, porque ellos mismos no tienen condiciones de mantenerlas en el tiempo, sólo les queda la siguiente alternativa coherente: emancipar a los agricultores de las referidas dependencias. Se ruega no confundir emancipar con abandonar.

Sin embargo, la eficiencia productivo-empresarial que conducirá a la emancipación de los agricultores, sólo será posible si es precedida de la excelencia educativa. Mientras no otorguemos a las familias rurales, una formación/ capacitación mucho más funcional, relevante, objetiva y práctica, seguiremos desperdiciando esfuerzos y derrochando enormes cantidades de recursos; tal como, dicho sea de paso, hemos venido haciendo en los últimos 50 años.

Afortunadamente, en la actualidad estamos empezando a darnos cuenta de que la falta de recursos económicos, no siempre es la principal causa de la pobreza rural y que su aporte no necesariamente es la solución más conveniente. Tenemos cada vez más evidencias de que la principal causa del subdesarrollo rural es el conjunto de ineficiencias tecnológicas, gerenciales y organizativas, que están siendo practicadas en todos los eslabones del negocio agrícola; y que la principal causa de estos errores es la falta de conocimientos adecuados. Son estas ineficiencias las que originan las tres vertientes que conducen a la falta de rentabilidad en la agricultura y de allí al subdesarrollo, primero rural y después urbano: costos unitarios de producción innecesariamente altos, mala calidad del producto y precios de venta innecesariamente bajos.

### **¿Premiar ineficiencias con subsidios o eliminarlas con conocimientos?**

Al contrario de lo que suele afirmarse, estas ineficiencias generalmente son provocadas por errores primarios para cuya corrección se requiere de conocimientos elementales y no tanto de políticas generosas ni de créditos abundantes. Para confirmarlo basta con analizar, sin eufemismos, los bajísimos índices y rendimientos promedio de la agricultura y de la ganadería latinoamericana, los errores primarios que ocurren en la aplicación de las tecnologías y en el uso de los recursos disponibles y finalmente las gravísimas distorsiones en la forma como los productores rurales adquieren los insumos y cómo comercializan sus excedentes.

Es evidente que estas ineficiencias no ocurren por culpa de los agricultores. Ellas son provocadas por la profunda disfuncionalidad de la educación formal rural en los tres niveles y por el lamentable debilitamiento de la extensión agrícola. Es por este motivo que la profunda transformación de las escuelas básicas rurales, es un prerequisite que deberá ser potenciado o sinergizado con idénticas adecuaciones en las facultades de ciencias agrarias, en las escuelas agrotécnicas y en los servicios de extensión rural, públicos y privados.

Todas estas instituciones deberán pasar por una reingeniería en los contenidos educativos y en los de métodos pedagógicos, los que ojalá prioricen el “enseñar a solucionar los problemas solucionándolos”; en fin por una reingeniería de calidad educativa. Sin embargo, educación de calidad no necesariamente significa construir más edificios, adquirir más computadoras, instalar laboratorios sofisticados u ofrecer más cursos en el exterior. Lo que sí se necesita es tener el coraje de “poner el dedo en la llaga”; reconocer sin eufemismos y enfrentar con determinación el problema de fondo. Es decir, el profundo desencuentro entre el qué y cómo se enseña en las escuelas y el qué y cómo las familias rurales realmente necesitan aprender. Este divorcio es inaceptable y es por esta razón adicional que los líderes más lúcidos del agro latinoamericano están exigiendo una revolución educativa de realismo, de objetividad y de pragmatismo, que permita formar una nueva generación de mujeres y hombres rurales que quieran, sepan y puedan protagonizar la revolución productiva de la eficiencia y de la emancipación.

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2. La formación de profesionales para profesionalizar a los agricultores y para el difícil desafío de “producir más y mejor con menos recursos”.
3. La modernización de la agricultura: los pequeños también pueden.
4. Rentabilidad en la agricultura: ¿con más subsidios o con más profesionalismo?
5. Buscando soluciones para la crisis del agro: ¿en la ventanilla del banco o en el pupitre de la escuela?
6. Desarrollo agropecuario: de la dependencia al protagonismo del agricultor.

Críticas a este artículo y solicitudes de los 3 primeros documentos serán bienvenidas al teléfono (56-2) 3372205, al fax (56 2) 3372102 o al E-mail: [Polan.Lacki@fao.org](mailto:Polan.Lacki@fao.org)

Los 3 últimos podrán ser retirados de la sección “publicaciones” de la siguiente página Web: <http://www.rlc.fao.org>

## Annex 9: Commitments Agreed Upon between USAID and the Implementors

Compromisos acordados en la reunión del 13 de abril 2000

Actividad propuesta	Decisión	Responsable/ Coordinador	Fecha inicio	Fecha tope
12.1 Alcanzar un acuerdo sobre los cambios	<p>&gt;Se acuerda efectuar los cambios siguientes indicados en este cuadro.</p> <p>&gt;USAID incluirá el informe de Chemonics como enmienda a convenios</p> <p>&gt;Los planes de trabajo para el segundo año del proyecto serán revisados para confirmar que incorporan las recomendaciones del documento de Chemonics</p>	<p>Hecho</p> <p>USAID, Edín Barrientos</p> <p>Chemonics</p>	5 julio	
12.2 Realizar un estudio de mercado (conjuntamente)	<p>&gt;Proyecto AGIL coordinará los estudios, incluirá preguntas sobre necesidades en su cuestionario para el foro regional para apoyo ingreso locales.</p> <p>&gt;Seguimiento posiblemente por GEXPRONT??</p>	Proyecto AGIL, Rick Clark y Chemonics	Enviará matriz 17 abril	Respuestas 2 mayo
12.3 Aplicar mapas para todas las cuencas del Motagua y el Polochic (conjuntamente)	<p>&gt;Firmar carta de entendimiento (cubriendo, personal, equipos, contenidos) entre MAGA/AID</p> <p>&gt;Enviar matriz de posibilidades a los implementadores</p> <p>&gt;Respuesta de cada organización a la matriz</p> <p>&gt;Crear comité técnico pequeño de especialistas como contacto con M.Duro del MAGA (I. de la Roca, J.N. Granados, C.Piedrasanta, Mike Richards)</p> <p>&gt;Coordinar entre trabajos cartográficos del Proyecto AGIL y MAGA</p>	<p>Carta: Carlos Morales/Edín Barrientos</p> <p>Matriz: Miguel Duro</p> <p>Seguimiento respuesta: M.Duro</p> <p>Coordinador del comité: Chemonics</p> <p>Mike Richards, AGIL</p>	<p>Carta:25 abril</p> <p>Matriz:17 abr</p> <p>30 abril</p> <p>Comité actúa según necesidad</p> <p>Continuo</p>	27 abr
12.4 Compartir sistemas y enfoques de seguimiento (conjuntamente)	<p>&gt;Chemonics enviará los marcos lógicos a los implementadores</p> <p>&gt;Los implementadores revisan y añaden indicadores propios a los marcos lógicos y devuelven todo a Chemonics.</p> <p>&gt;Chemonics compila, corrige, sintetiza y devuelve los marcos</p>	<p>Chemonics</p> <p>Chemonics</p> <p>Chemonics</p>	<p>17 abr</p> <p>17 abr</p>	<p>Enviado 14 abr</p> <p>2 mayo</p>

Actividad propuesta	Decisión	Responsable/ Coordinador	Fecha inicio	Fecha tope
	>Reunión de coordinación e intercambio	Chemonics	7 junio	
12.5 Promover y coordinar un foro para revisar las experiencias (conjuntamente)	>Identificar temas específicas con el fin de desarrollar soluciones	Chemonics	24 mayo	
12.6 Intercambiar experiencias (conjuntamente)	>Cronograma de alguna experiencia que cada institución compartirá (ej.: informe de interés general, viaje al campo, evaluación, metodología exitosa). Sugerencias de Defensores: <ul style="list-style-type: none"> <li>◆ Estudio de impacto de agricultura sostenible en la biodiversidad</li> <li>◆ Estudio de comparación Ríos Jones y Colorado en cuanto al efecto Mitch</li> </ul>	Chemonics	24 mayo	
12.7 Concentrar importantes esfuerzos para la promoción de cosechas perennes (conjuntamente)	>Primera recopilación de información y análisis  >Seguimiento	Proyecto AGIL, Rick Clark en coordinación con GREXPRONT Chemonics	30 mayo	
12.8 Capacitación en producción, procesamiento y mercadeo de café (conjuntamente)	>Enviar listado de eventos programados  >Enviar documento de capacitación que ofrece ANACAFE  >Enviar documento de comparación de café con y sin sombra	ANACAFE  ANACAFE  Defensores	15 mayo  15 mayo	
12.9 Capacitación sobre la capacidad de uso de la tierra	>Organizar curso de capacidad de uso de la tierra	Chemonics	3 julio	7 julio